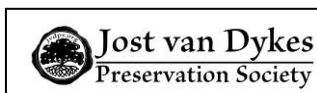


An Environmental Profile of the Island of Jost Van Dyke, British Virgin Islands



including Little Jost Van Dyke, Sandy Cay, Green Cay and Sandy Spit



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An Environmental Profile of the Island of Jost Van Dyke, British Virgin Islands

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An Initiative of the Jost Van Dykes (BVI) Preservation Society
and
Island Resources Foundation

2009

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Cover Photo:

The island of Jost Van Dyke from the north shore of Tortola

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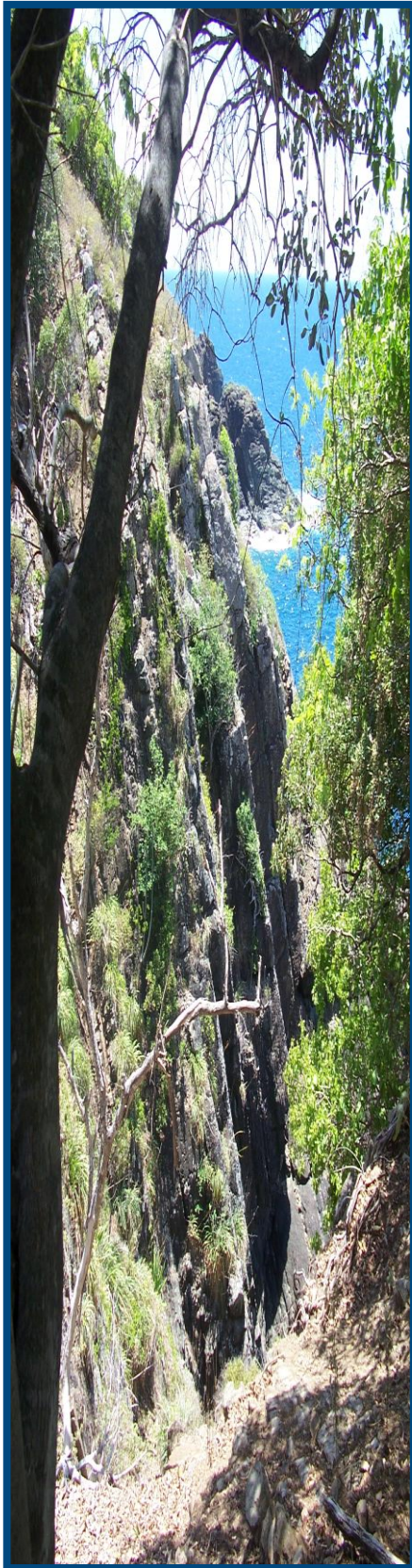
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This project had its origins in numerous discussions between principals from the Jost Van Dykes Preservation Society (JVDPS) and Island Resources Foundation (IRF)—around a library conference table at the Foundation's Road Town office (where fragrant smells tempted us from the College's bakery below) and a tree-shaded table at Foxy's Tamarind Bar and Restaurant on Jost Van Dyke, where we shared the ambiance of that special place with tourists and residents alike.

From those early meetings grew the idea of an “*environmental profile*” for the island of Jost Van Dyke and its nearby satellite islands and cays. Eventually, a proposal was put forward at the end of 2007 to the UK Overseas Territories Environment Programme (OTEP) for a JVD-based, environment-focused project, with this *Profile* as one essential output. The proposal was funded by OTEP in March of 2008.

From the beginning, the Governor's Office in the British Virgin Islands (which oversees OTEP projects in the Territory) has been very supportive. Sue Cotton guided us through the proposal preparation phase with insightful advice and direction. His Excellency, Governor David Peary helped launch the project at a community meeting in JVD in May of 2008. Sue Cotton's successor, Emma Dean, and Claire Hunter, the Project/Consular Officer in the Governor's Office, also provided helpful assistance during project implementation; while, in London, the project was supported by Shaun Earl and his successor, Heather Christie, at the OTEP unit of the Foreign and Commonwealth Office.

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We owe the success of this project in large part to the energy and support of the JVD community. While a group of individuals did serve as part of the project's Advisory Committee, we found that engaging community members in more informal settings—outside of official meetings—allowed us to increase community participation. We owe special thanks to Advisory Committee members Sendrick Chinnery, Cecil Chinnery and Adrianna Callwood, all of whom accompanied field researchers during their visits to JVD, providing useful background information and access to research sites.

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— *Judith Towle (IRF) and Susan Zaluski (JVDPS)*
September 2009

ACRONYMS

ARK

Association of Reef Keepers

ATV

All-terrain Vehicle

BVI

British Virgin Islands

BVIHCG

British Virgin Islands Heritage Conservation Group

CCA

Caribbean Conservation Association

C&FD

Conservation and Fisheries Department (BVI)

CERMES

Centre for Resource Management and Environmental Studies
University of the West Indies
Cave Hill Campus, Barbados

CDC

Conservation Data Centre
University of the Virgin Islands (USVI)

DPU

Development Planning Unit (BVI)

EIA

Environmental Impact Assessment

GC

Green Cay

HLSCC

H. Lavity Stoutt Community College (BVI)

IRF

Island Resources Foundation

JVD

Jost Van Dyke

JVDPS

Jost Van Dykes (BVI) Preservation Society

LJVD

Little Jost Van Dyke

MNRL

Ministry of Natural Resources and Labour (BVI)

MPA

Marine Protected Area

NGO

Non-government Organisation

NPA

National Parks Act (2006)

NPT

National Parks Trust (BVI)

OECS

Organisation of Eastern Caribbean States

OTEP

Overseas Territories Environment Programme (UK)

PR

Puerto Rico

SC

Sandy Cay

SS

Sandy Spit

T&CPD

Town and Country Planning Department (BVI)

UK

United Kingdom

UNDP

United Nations Environment Programme

USVI

United States Virgin Islands

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Photo 38	Susan Zaluski (JVDPS)

EXECUTIVE SUMMARY

This *Environmental Profile* is a synthesis of the state of the environment, near the end of the first decade of the twenty-first century, in the smallest of the British Virgin Islands—the island of Jost Van Dyke*—and in the immediately adjacent smaller islands of Little Jost Van Dyke, Green Cay, Sandy Cay, and Sandy Spit. It is the first such effort in the British Virgin Islands.

The *Profile* opens with an introductory description of the Profile islands (Chapter 1), focusing on their natural and physical features as well as the community setting, in order to provide the reader with an overview of “the place”. This is followed by a second introductory chapter (Chapter 2) which focuses on the institutional and legal framework for protecting and managing the environment in the BVI, particularly as resource management institutions and laws impact Jost Van Dyke and its satellite islands.

At the end of each of the six chapters that follow (Chapters 3-8) is a section in a double-column, framed format that highlights the priority resource management and protection issues surrounding each chapter’s central theme; alongside each issue are specific recommendations for action.

Chapters 3 and 4 focus on the terrestrial and marine natural resource sectors. “*Conserving the Biodiversity of Jost Van Dyke*” (Chapter 3) provides the first comprehensive inventory and assessment of the terrestrial environment of Jost Van Dyke, encompassing separate sections on floral and faunal resources and a further section on salt ponds as a critical ecosystem. “*Jost Van Dyke and the Sea*” (Chapter 4) moves to the marine and coastal environment to examine both the maritime traditions of the island as well as the economic primacy of the sea in the lives of Jost Van Dykians. The island’s marine biological communities—its beaches, mangroves, seagrasses and coral reefs—are examined, as well as the fisheries sector.

Chapters 5 and 6 turn to the man-made environment, focusing on the island’s historical heritage and its cultural traditions. The historic sites of Jost Van Dyke and Little JVD are inventoried and assessed in Chapter 5, while the non-tangible artefacts of JVD’s cultural heritage are explored in Chapter 6.

Chapter 7 looks at waste management and pollution control issues, while the last chapter of the *Profile* (Chapter 8) looks to the future, at priorities for protection and how a small place with a small population might participate more fully in the management of its commonly-shared resources.

The *Profile* provides easier access to environmental data, findings and recommendations than has ever been available for the targeted islands. It presents JVD as an island where resources and community are undergoing change as a result of economic growth. It identifies those resources most at risk and discusses current practices and policies that continue to place these resources in jeopardy. It links the healthy sustainability of the island’s resource base to its economic future, given the island’s economic dependence on tourism. It provides options and choices for Jost Van Dyke’s residents and stakeholders, and for the Government of the Virgin Islands as it shares responsibility for the island’s future with Jost Van Dykians.

As stated elsewhere in this *Environmental Profile*, Jost Van Dyke finds itself positioned between a past it does not want to lose or squander and a future that promises expanded growth, but with costs. Its citizens and Government need to find a balance between what they want to protect and how they want to grow. When assessing the limits of growth, Jost Van Dyke must ask: what can be removed from the environment and from the cultural patrimony, and how much can be put back in the way of pollution or extracted and lost forever for future use and enjoyment? This *Environmental Profile* is intended to help guide those choices and decisions by presenting **information**—perhaps the most precious resource of all.

* The spelling of Jost Van Dyke (with an upper or lower case “v” in Van) was not consistent in the various sources we consulted, including Government reports and topographic/naval maps. For this report, we have elected to capitalise the “V” throughout.

PREFACE

Environmental Profiles

The potential utility of Environmental Profiles in the Eastern Caribbean was first acknowledged during a seminar on Industry, Environment and Development sponsored by the Caribbean Conservation Association (CCA) and the University of the West Indies in August of 1986. Seminar participants confirmed the need to produce Profiles for each country in the Eastern Caribbean region, with particular attention given to a profiling process that would strengthen existing institutions and make maximum use of qualified local personnel and indigenous organisations. Additionally, Environmental Profiles were recognised as an effective means to help ensure that environmental issues were adequately addressed in the development planning process and would lead to greater advocacy of environmental considerations in public policy decision making.

Environmental Profiles were first produced in the Eastern Caribbean as part of a project implemented from 1987-1990 by the Caribbean Conservation Association with the technical assistance of the Island Resources Foundation (IRF). This effort was funded by the U.S. Agency for International Development (USAID) and resulted in publication in 1991 of six Environmental Profiles for the countries of Antigua and Barbuda,

Dominica, Grenada, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines. A synthesis of the six Profiles was provided in *Environmental Agenda for the 1990s*, also published jointly by Island Resources Foundation and the Caribbean Conservation Association in 1991.

Two years later, with funding from the United Nations Development Programme (UNDP), CCA and IRF undertook preparation of two additional Environmental Profiles, this time for the islands of Anguilla and Montserrat (published in 1993). No Environmental Profile has been produced for the British Virgin Islands (BVI), although UNDP had indicated a willingness to support a BVI Profile at the time it undertook funding for Anguilla and Montserrat.

These comprehensive Profile documents represent the most comprehensive environmental overviews prepared to date for each of the target islands. Although much of the data included is now outdated, the eight Profiles continue to be used extensively by natural resource managers, researchers, students, policy makers and development planners throughout the Caribbean.

The Jost Van Dyke Environmental Profile

In 2007, a partnership was established between the Jost Van Dykes (BVI) Preservation Society (JVDPS), a recently revived community-based organisation on the BVI island of JVD, and the Island Resources Foundation, a 35-year-old environmental NGO serving the insular Caribbean. A primary objective of the partnership was to develop an Environmental Profile of Jost Van Dyke, the fourth largest of the inhabited British Virgin Islands.

The two organisations recognised that the Jost Van Dyke community faced a growing challenge to balance its economic growth with sustainable use of its natural resources. However, they also acknowledged that there was little scientifically based information available for the community to employ in evaluating the short- and long-term impacts of growth.

A project was proposed that would bring a fresh approach to community awareness and understanding of the local environment. Phase 1 of the initiative would focus on development of a Jost Van Dyke Environmental Profile, including the surrounding islands of Little Jost Van Dyke, Sandy Cay, Green Cay, and Sandy Spit.

Phase 2 would draw upon Profile findings (1) to disseminate new information, in several formats, to JVD residents, stakeholders, visitors, and the BVI Government and (2) to initiate a long-term programme of education, outreach and environmental monitoring by the JVD Preservation Society.

Subsequently, an application was submitted by the Society to the UK Overseas Territories Environment Programme (OTEP) for funding of a new project, now entitled "Jost Van Dyke's Community-based Programme for Advancing Environmental Protection and Sustainable Development". The project was approved by OTEP in March 2008 and formally announced at a community meeting in Jost Van Dyke in May 2008 by His Excellency, Governor David Peary.

This *Environmental Profile*, constituting Phase 1 of the approved project, provides a description of the natural and historical resources of JVD and its nearby neighbouring islands. It assesses the current condition of this targeted environment and identifies natural features, species, sites, and ecosystems that require special protection.

Additionally, it reviews BVI and JVD institutions, legislation, policies and programmes for the environment as these apply to Jost Van Dyke and its neighbouring islands.

This document also identifies the major environmental issues, conflicts, and problems that currently affect the quality of life in Jost Van Dyke and assesses

options for improving the long-term environmental health of Jost Van Dyke and the smaller islands of Little Jost Van Dyke, Sandy Cay, Green Cay, and Sandy Spit.

Intended Audience

A focus audience of intended Profile users was identified early on by project planners. With this focus in mind, the JVD Environmental Profile was prepared to serve as:

- A primary reference document and information resource for the residents of Jost Van Dyke, including the Primary School.
- A planning resource for the Jost Van Dykes Preservation Society as it identifies and develops its future programmes and activities.
- An additional reference source for BVI government planners, technicians, resource managers, researchers, educators, and policy decision-makers, and for private-sector developers and consultants, NGOs, donor agencies, and the general public,

Intended Outcome

As we commenced the project, it seemed to be an opportune moment to examine not only the island's environmental resource base—upon which future economic growth will be established—but also to identify

and assess priority environmental issues and concerns and place these in a forward-looking context that supports sustainable growth. There seemed to be considerable value in taking a retrospective look at and reporting on environmental change on this emerging and promising island.

Moreover, a process that provides easy access to data, findings and recommendations will increase their visibility to a wider audience of resource users, stakeholders, and island leaders. In the long-term, project participants believe this effort will enable the community of Jost Van Dyke to apply broader environmental concepts and issues to daily life, civil discourse, and decision making about JVD's future.

Jost Van Dyke has been referred to elsewhere as a "microcosm" of the larger British Virgin Islands. In this context, the lessons learned about its environmental future through the profiling process might well provide a fresh approach to understanding environmental change in the BVI Territory as a whole and to improving channels of dialogue among those in search of workable solutions.

JUDITH A. TOWLE, PROFILE EDITOR
ISLAND RESOURCES FOUNDATION
SEPTEMBER 2009

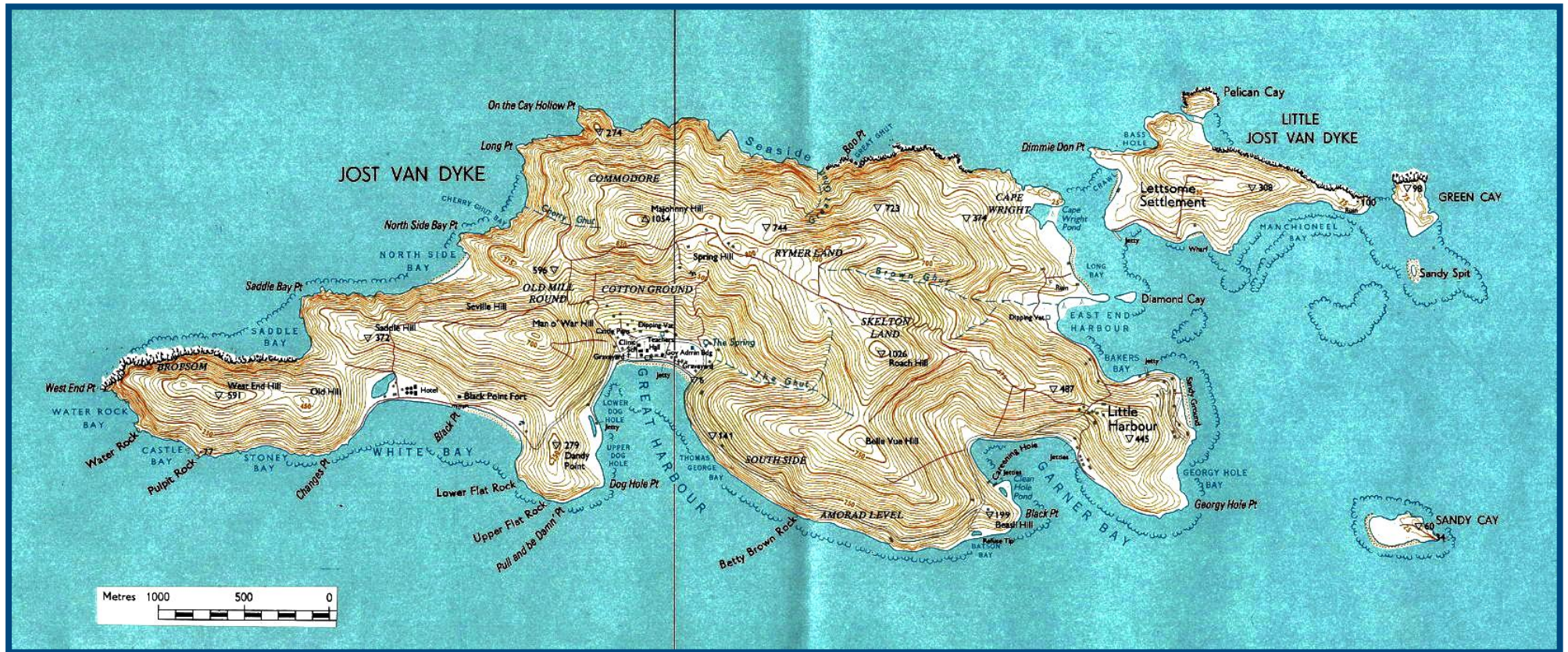


Figure 1.

Topographic map of Jost Van Dyke, Little Jost Van Dyke, Green Cay, Sandy Spit and Sandy Cay (map source: UK Directorate of Overseas Surveys, Series E 803 (D.O.S. 346); Edition 3-D.O.S. 1984).

1. DESCRIPTIVE OVERVIEW

INTRODUCTION TO THE PROFILE ISLANDS

Despite its three centuries of modern habitation, **Jost Van Dyke (JVD)** has only been lightly developed, with economic growth proceeding at a slower pace compared to its larger nearby neighbours—Tortola in the British Virgin Islands (BVI) and St. Thomas in the U.S. Virgin Islands (USVI). Much of the island's environmental and cultural elements remain relatively intact; its lifestyle seems less hurried and stressful than on more developed Caribbean islands.

Yet the pressures for change and growth are also evident, and Jost Van Dyke finds itself positioned between a past it does not want to lose or squander and a future that promises more options with expanded growth.

The island is approximately 8 square kilometres (3 square miles) in size and lies about 8 kilometres (5 miles) north-west of Tortola, the primary commercial and political centre of the BVI (**Figure 2**), about 11 kilometres (7 miles) northeast of St. Thomas, the commercial and

political centre of the USVI, and about 10 kilometres (6 miles) north of St. John, USVI, the site of the Virgin Islands National Park.

The island's population is small (less than 300 residents). A few from JVD work in Tortola and commute by ferry or private boat (about a 30-minute one-way trip). A larger number of Government and private sector workers commute in the opposite direction, from Tortola to JVD for a day's work. The Government operates one primary school, a public health services clinic, and police and fire facilities on the island, as well as providing postal services and Customs and Immigration services.

According to the JVD District Officer, approximately 15 workers are employed by

Government on the island, including employees in the Departments of Solid Waste, Environmental Health, and Conservation and Fisheries, as well as staff from Public Works and Water and Sewerage (*pers. comm.*, Carmen Blyden, 2009).

Economic pursuits were primarily limited to farming and fishing until the emergence of the BVI tourism sector in the 1960s and the recognition of Jost Van Dyke and its neighbouring isles and surrounding pristine waters as a key destination for yachting tourism in the BVI.

Little Jost Van Dyke (LJVD) is a smaller island, 66 hectares (163 acres), lying offshore of JVD's east end. It is uninhabited except for one family which has made the island home since 1981. There was a bar/restau-

rant facility on Little Jost dating to the 1960s, but it is no longer functional.

During the eighteenth century, a prominent Quaker family named Lettsom maintained a plantation on Little Jost, the ruins of which still remain (see Chapter 5). Dr. John Coakley Lettsom (1744-1815) was born on LJVD and

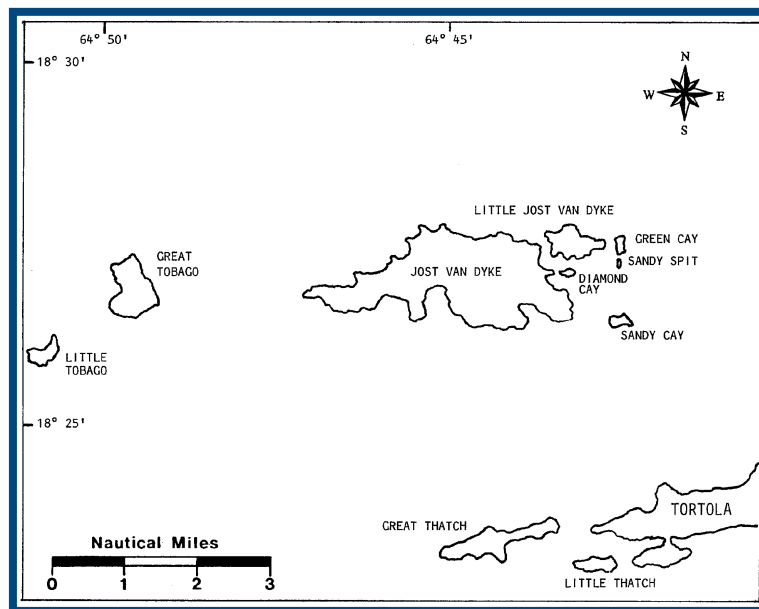


Figure 2. Location of Jost Van Dyke, Little Jost Van Dyke, Green Cay, Sandy Spit, and Sandy Cay.

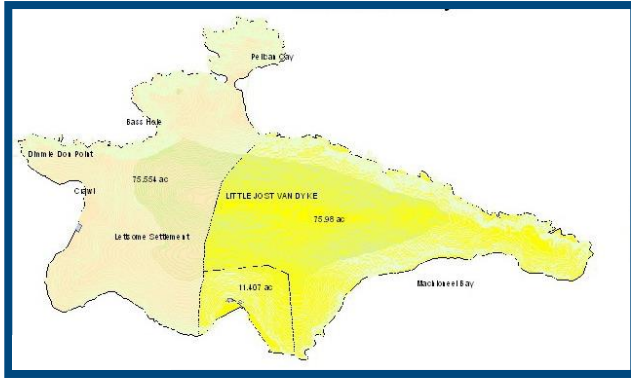


Figure 3. Little Jost Van Dyke, with Crown Land to the right shown in brighter yellow; the remainder of the island (to the left) is in private ownership (source: T&CPD).

later founded the Medical Society of London in 1773. Because of his prominence, there is continued interest in restoring and developing this site, including a negated development scheme for the entire island by a Canadian developer in the late 1960s.

A little less than half the island (31 of 66 hectares), including the Lettson plantation ruins, is part of a family estate owned by the Vanterpool family of JVD; the remainder of the island is government land (**Figure 3**). Pelican Cay (**Photo 1**), about 10



Photo 1. Pelican Cay, top of photo, is located along the north shore of Little Jost Van Dyke. It is connected to the larger island by a sandy/cobbly spit, except when the spit is breached by very strong storms.

acres in size, lies just off the northern shore of LJVD.

In the eighteenth century, the Lettson family of LJVD also owned **Green Cay** and **Sandy Cay**; the principal crop on these isolated islets was cotton. Nearby **Sandy Spit** was not farmed as a sandy beach covers about three-quarters of the tiny islet's coastline.

Sandy Cay (5.7 hectares/14 acres in size) lies a little less than a kilometre to the east of the southeastern point of Jost Van Dyke; Green Cay (6 hectares/15 acres in size) lies less than a kilometre off the eastern tip of JVD (a little more than six kilometres north of the western end of Tortola); and Sandy Spit (0.10 hectares/0.25 acres) is just south of Green Cay (**Figure 2**).

There is not evidence that any of the three ever had a resident population; no building

foundations, rock walls, turtle crawls, fencing or the like survive to give evidence of former habitation. In the case of the largest and most visited of the three—Sandy Cay—the island's last private owner did not build any structures, docks, jetties, or other physical attractions to accommodate visitation, except for a walking trail and an abandoned irrigation system.

For four decades, from the late 1960s, Sandy Cay was owned by international entrepreneur and conservationist, the late Laurance S. Rockefeller, who had purchased the island from the Smith brothers of Apple Bay, Tortola (*pers. comm.*, Premier Ralph O'Neal, May 2008). Mr. Rockefeller maintained the uninhabited island as a combination botanic garden, nature reserve, and low-key recreational site, always open to the public even though the island remained in private ownership.

Sandy Cay's privately maintained park became a public park when, in May of 2008, the Estate of Laurance S. Rockefeller donated the property as a protected natural area to the British Virgin Islands National Parks Trust (NPT), to remain in perpetuity as part of the Territory's System of National Parks and Protected Areas.

During Mr. Rockefeller's 40-year stewardship of the island, he put in place a management strategy that permitted him not only to practice conservation but also to experiment with improving the island's visual perspective and the aesthetics of

selected landscape features. His aim was to facilitate an understanding of what he termed the “wilderness qualities” of Sandy Cay (**Photo 2**). His vision included horticultural enhancement, clearing of underbrush, significantly increasing the number of coastal coconut palm trees, and making the island accessible by creating and maintaining a simple walking trail.

Now, as the BVI's newest national park, Sandy Cay will be maintained and protected by the National Parks Trust as part of the Sandy Cay Habitat Management Area.

In addition to Sandy Cay, and within the geographic area encompassed by this *Environmental Profile*, other officially protected areas include:

- Diamond Cay National Park, a one-half hectare/1.25 acre site occurring as the terminus of a small peninsula off Long Bay, JVD, a national park since 1991, and

- A fisheries protected area in the waters to the east of Green Cay and Sandy Spit (15.5 hectares/38.4 acres), so declared under the Fisheries Regulations, 2003.

Since the early 1980s, Green Cay and Sandy Spit have been proposed for protected area status. The *British Virgin Islands Protected Areas System Plan, 2007-2017* (Gardner, 2007) reaffirms the proposed designation of a larger management unit under the authority of the NPT to include Sandy Cay, Green Cay, and Sandy Spit as a marine and terrestrial protected area. With the Government's purchase of the formerly privately owned Green Cay and Sandy Spit (completed in 2005), this hopeful vision would seem to be closer to becoming a reality.

THE PHYSICAL AND NATURAL SETTING

Geology

Jost Van Dyke and its surrounding islands are relic mountaintops that lie on a geological structure known as the Puerto Rican Plateau. During the last Ice Age, about 10,000 years ago when sea level was well below the current level, the island of Puerto Rico formed a huge land mass that included all of the British Virgin Islands and all the U.S Virgin Islands, with the exception of St. Croix.

The current shape of JVD is the result of the interaction of geological tectonic forces (uplifts) and the opposing forces of mass wasting (weathering, erosion, landslides), and changes in the sea level attributed to glacial melting since the peak of glaciation. Evidence of geological activity is reflected along many JVD road cuts, particularly along the Ridge Road and along the exposed north coast (**Photo 3**).



Photo 2. Sandy Cay Vista, May 2008.

This photo of Sandy Cay displays the “managed wilderness” landscape that Laurance Rockefeller worked to achieve at the island. The primary attraction was always the accessible beach with gorgeous white sand. Yet, by shaping tree canopies and nurturing and exposing colourful flowering plants and clearing sight lines in the vegetative understory, he also sought to enable visitors to sense the complexity of the island's intermixed ecosystem.



Photo 3. Near-vertical and contorted layers of volcanic bedrock along Cape Wright (north-east coast of JVD), looking toward Little Jost Van Dyke.

occurring in the flats of the more important ghuts and valley bottoms such as the Great Harbour, White Bay, Garner Bay, and Long Bay areas.

No data are available on the thickness of these deposits, but it is likely that they are 5 metres (16 feet) or more in thickness,

becoming increasingly shallow inland. Other features found in low-lying areas include salt ponds, beachrock, and beaches with deposits ranging from coralline sand to cobble and rubble (Martin-Kaye, 1959).

The dominant bedrock geology for all the Profile islands (except Sandy Spit) is of volcanic origin and consists of two closely related formations. The "Shark Bay Formation" occupies the northern half of JVD, all of LJVD and Green Cay. It is mostly composed of glass-bearing andesitic breccias and tuffs (Helsley, 1960).

The "Hans Lollik Formation" covers the southern half of JVD and the eastern ridge on Sandy Cay. Dominant rock types include augite, andesitic breccias, and tuffs (Helsley 1960). Sandy Spit is an accumulation of coralline sand probably overlying a very shallow, hard-bottom reef system. No exposed volcanic bedrock is found on the island.

Other than volcanic bedrock, surficial deposits are found scattered throughout low-lying parts and around JVD's shoreline. They include valley fill and alluvium and are of restricted extent laterally,

Soils

With the exception of the lowlands, most of the surface area of Jost Van Dyke is comprised of a thin layer of soil and sediment overlying the bedrock. Bedrock outcrops are numerous and everywhere, particularly where slopes are very steep. In many areas goats have ravaged the ground and shrub vegetation, and, as a consequence, the soil layer has completely eroded away (**Photo 4**). In other areas, less frequented by goats and on



Photo 4.

This photo, taken along the Western Peninsula of JVD, illustrates ground that is completely devoid of soil. Plants are limited to Jumping Cacti (*Opuntia repens*) and Wild Pineapples (*Bromelia penguini*).

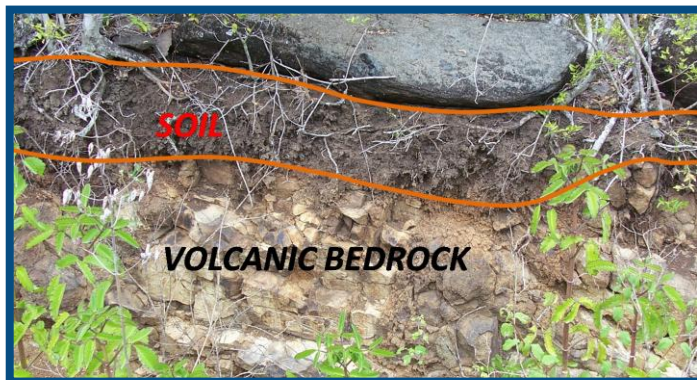


Photo 5. Above is an example of a well-developed soil profile with organic litter at the surface, underlain by more decomposed organic matter mixed with mineral content from underlying volcanic bedrock.

more gentle slopes, soils were found to be 10–15 centimetres (4-6 inches) thick as shown in **Photo 5**, taken east of Majohnny Hill along Ridge Road, JVD.

There is no soil map for the Profile islands. However, soils are similar to those found throughout much of the Virgin Islands. They tend to reflect the nature of the underlying bedrock, which is primarily volcanic (Mount, *et al.*, 1992).

Weathering processes, oxidation and other chemical reactions have produced an accumulation of inorganic minerals that form the basis of the soil structure. The addition of organic material in the form of decayed leaves and plant and animal parts form the soil structure we see today.

Topography and Drainage

Jost Van Dyke is higher than its neighbouring islands. Its highest peak, Majohnny Hill, reaches 321 metres (1,054 feet) in elevation, while LJVD's highest point is 94 metres (308 feet); Green Cay's highest is 30 metres (98 feet), and Sandy Cay's is 18 metres (60 feet). Sandy Spit is flat and barely 2 metres (6 feet) above sea level. **Table 1** provides known elevations for islands in the Profile group, excluding Sandy Spit.

With the exception of Sandy Spit and the western two-thirds of Sandy Cay, the Profile islands display a rugged topography

Table 1.
Known elevations for Profile islands.

Name	Island	Elevation
Majohnny Hill	JVD	321 m (1,054 ft)
Roach Hill	JVD	313 m (1,026 ft)
Old Mill Round	JVD	182 m (596 ft)
West End Hill	JVD	180 m (591 ft)
Little Harbour	JVD	148 m (487 ft)
Saddle Hill	JVD	113 m (372 ft)
Unnamed Highest Point	LJVD	94 m (308 ft)
Unnamed Highest Point	Green Cay	30 m (98 ft)
Unnamed Highest Point	Sandy Cay	18 m (60 ft)

Source: UK Directorate of Overseas Surveys, Series E 803 (D.O.S. 346); Edition 3-D.O.S. 1984.

with irregular coastline. The islands' turbulent geological past was marked by extensive seismic and volcanic activity and subsequent erosional forces. These forces produced the variety of landscape features we see today throughout the BVI—including JVD—which residents and visitors alike find so appealing.

The sheer cliffs that line most of the northern coastline of JVD, LJVD, Green Cay and Sandy Cay guarantee dramatic and panoramic views. One such example can be seen along the northern coastline of the Western Peninsula, JVD. Here the cliff face can reach 50 to 100 metres (160 to 320 feet) in height (**Photo 6**).

A single-site topographic feature of the island is **Bubbly**

Pool, a small inner cove located on the northeast of the island near Cape Wright Pond. This feature is caused by a rugged bedrock formation that funnels waves through a narrow passage into the small cove. The full power of the waves is broken as it moves through the passage causing bubbling white water from the waves to enter the pool, filling it with white, foaming jets of sea water—a natural Jacuzzi, so to speak.

Steep-sloping terrain is another topographic feature of these islands, especially the two largest. On JVD, from Majohnny Hill to Great Harbour, the average slope ranges between 35 to 40 percent, while on LJVD it is around 30 to 35 percent, but much less on Green Cay. Because of their size and low precipitation, there are no freshwater ponds and no perennial streams on any of the Profile islands. Intermittent streams, locally known as ghuts, are found only on JVD and only flow during intense rainfall.



Photo 6.

The dramatic north-facing cliffs along the Western Peninsula, JVD. West End Hill is the highest point on the Peninsula at 180 metres (591 feet). Further offshore is the island of Great Tobago.

The two most prominent streams are Brown Ghut and the Great Harbour Ghut. Both are approximately 1.5 to 1.7 kilometres (0.9 to 1 mile) in length, and both have two tributaries. Brown Ghut flows directly into East End Harbour (**Photo 7**), while the Ghut at Great Harbour flows indirectly into the salt pond. Most other ghuts on JVD (except for Cherry Ghut and Great Ghut) are unnamed and poorly developed.



Photo 7.
Dry stream bed of Brown Ghut,
Jost Van Dyke.

Climate

The Profile islands lie within the Trade Wind Climate Zone and possess a subtropical climate. Characteristically, winds originate from directions between east-northeast and southeast. The average wind direction varies throughout the year according to the following general patterns:

- *December to February:* winds blow from east-northeast (known locally as “Christmas winds”).
- *March to May:* winds blow from easterly directions.
- *June to August:* winds blow from east to southeast.
- *September to November:* winds blow mainly from the east to southeast.

Squalls are fairly common at certain times of the year, and, except for the occasional hurricane, highest wind speeds are experienced from December to February and again in June and July. Average wind speeds for the months of June–July are around 12-20 kilometres per hour (7-12 miles per hour), while, in October, average wind speeds can drop to 7 kilometres (4 miles) per hour.

The Profile islands also lie within the Hurricane Belt. These intense storms occur between June and November, with September being the most active month. Within recent years, several hurricanes passed sufficiently close to the BVI to cause moderate to significant damage (see **Table 2** for partial listing).

Hurricanes generate high winds and waves, storm surge, heavy rainfall and flooding. Hurricanes may approach from any direction, as was seen in November 1999 when Hurricane Lenny moved from west to east across the Caribbean Sea and more

recently Hurricane Omar (October 2008), which followed a similar pattern.

Table 2.
Recent storms and hurricanes in the BVI.

Date	Storm
1955 August	Hurricane Connie
1960 August	Hurricane Donna
1979 29 August	Hurricane David
1979 4 September	Hurricane Frederic
1984 November	Tropical Storm Klaus
1988 10 September	Tropical Storm Gilbert
1989 17 September	Hurricane Hugo
1995 19 August	Hurricane Iris
1995 4 September	Hurricane Luis
1995 15 September	Hurricane Marilyn
1996 6 July	Hurricane Bertha
1996 9 September	Tropical Storm Hortense
1998 21 September	Hurricane Georges
1999 21 October	Hurricane Jose
1999 17 November	Hurricane Lenny
2000 22 August	Hurricane Debby
2008 15 October	Hurricane Omar

Temperatures vary little throughout the year, with daytime temperatures that fall within the range of 25° - 29° C (77° - 84° F) and usually will drop by six degrees at night. Temperatures average an annual 27.2° C (81° F), with the winter lows averaging 24.4° C (76° F) and the

summer high reaching the upper 20 degrees C (low-to-mid 80s F). The temperature and climate are moderated by near constant on-shore breezes. Due to year-round high temperatures and nearly constant winds, the evapo-transpiration rate is generally high.

Typically, the Profile islands experience both a dry and wet season, with one longer than the other. The longer wet season generally coincides with the hurricane season and produces most of the annual rainfall.

Heavy rainfall sometimes occurs during the passage of easterly tropical waves, which are spurned off the West African coast from June to November of each year. Occasionally, these waves intensify into tropical depressions, tropical storms, or hurricanes.

The amount of rain varies monthly and annually, with the general trend of dry-to-wet from east-to-west, and south-to-north. The late Rowan Roy, a long-time resident of Hodges Creek (Tortola), recorded rainfall from 1974 to 1999. According to his records, the annual mean rainfall over a 25-year period was 97.9 centimetres (38.5 inches) (Roy, 1999). Roy's data correspond with records from the Development Planning Unit of the BVI Government, which identifies the average rainfall from 1996 to 2005 as 94.01 centimetres (37.01 inches) (<http://dpu.gov.vg/Indicators/rainfall1.htm>).

THE COMMUNITY SETTING

Population Characteristics

At approximately 8 square kilometres/3 square miles, Jost Van Dyke is the smallest of the four main islands of the BVI. Its population is roughly that of Anegada, although Anegada is 30 square kilometres larger than Jost.

According to the Government's **Development Planning Unit (DPU)** figures for 2008, Jost Van Dyke's population of permanent residents is 297 (many residents argue that this government-derived population figure is too high and believe that citizens who actually live in St. Thomas are being included). The official figure indicates a continued trend in population growth (up from 244 in 2001), albeit the island's resident community continues to represent only one percent of the Territory's total population (see **Table 3**). Before the island was electrified in 1992 and the roads paved, the population stood at less than 150, a figure that has doubled in the intervening two decades.

Almost two-thirds of the island's permanent residents were born in the BVI; 90 percent of the residents are of African descent, which is roughly the same percentage for the Territory as a whole.

Approximately an equal number of men and women reside on JVD. The age demographics point to a fairly

young population, with almost one-half (46%) of the residents under the age of 35 and almost 70 percent under the age of 50. One-third of the residents of JVD are over the age of 50, with eleven hardy souls having reached age 85 or older (**Table 4**). However, as with the total population figure cited earlier in this section, local residents dispute whether there actually are eleven persons still living on the island over the age of 85.

The labour force comprises 186 employed individuals (almost two-thirds of the population), with only nine persons listed as "unemployed" in 2008 (DPU data).

Table 3.
Population figures for JVD compared to total BVI population, 2001-08
(source: BVI Government, DPU).

Year	JVD	BVI
2001	244	23,161
2002	250	23,774
2003	257	24,432
2004	265	25,153
2005	273	25,940
2006	282	26,787
2007	290	27,518
2008	297	28,213

Table 4.
Age distribution of Jost Van Dyke population, 2008
(source: BVI Government, DPU).

Age Group	% of Population
0 - 19	21%
20 - 34	25%
35 - 49	22%
50 - 85+	32%

Historical Development

The historical background for Jost Van Dyke in the following section was provided by Michael D. Kent of the H. Lavity Stout Community College, who based this write-up on his historical study of the BVI. References have been used as provided by Mr. Kent; the two long quotations are from British Colonial Office reports, copies of which are in Mr. Kent's personal collection.

The name Jost Van Dyke most likely had its origins during the Dutch occupation of the BVI between 1650 (± 2 years) and 1672. Jost is a misspelling of the Dutch first name Joost, a variant of the name Justin, whilst Van Dyke is both Dutch and Flemish and as common a surname in Holland today as Hodge is in Tortola.

Who Jost Van Dyke was, however, remains a mystery, and erroneous information reported on the Internet suggesting that he was an early seventeenth-century pirate has no academic foundation.

It is more probable that, like the residents of Tortola during this period, Van Dyke had originally migrated to the West Indies from the Zeeland Peninsula in Holland and was subsequently one of the frontier colonists dispatched to the Virgin Islands by Governor Abraham Adrienssen of St. Eustatius in 1648. The decision by the Spanish to dismantle their fortifications on St Maarten a year later, making the Leeward Island region (including the BVI) safer, was also probably an important factor influencing Governor Adrienssen's decision to send settlers to the BVI.

The Dutch occupation was not, however, an officially sanctioned company settlement, and Tortola was privately sold in February of 1663 for the sum of £400 to a Rotterdam merchant named William Hunthum.

Whether this sale included Jost Van Dyke is not recorded. However, based on the fact that Tortola was only inhabited by 80 Irish, English and Welsh under the Dutch in 1668, it is likely that any occupation of JVD was sparse and probably short lived. For one thing, settlers without either fortifications or a militia were extremely vulnerable to attack during a period when piracy was rife in the Eastern Caribbean.

Although the English captured the Virgin Islands in 1672 and have maintained sovereignty ever since, initial development during the plantation period (approximately 1710 – 1840 in the BVI) was slow. It seems likely that Jost Van Dyke was ignored for the most part until the mid-eighteenth century. A map drawn of the BVI in 1717 by a Captain John Walton does not depict either Jost Van Dyke or Little Jost Van Dyke.

There were some small-scale settlements, however, the most notable being that of the Lettsom family on Little Jost Van Dyke dating from as early as 1741. Woolrich (1789) recorded that the smaller "outer" islands of the BVI were cleared in the late 1750s, and, from this date, JVD would have been mostly planted with cotton.

The remains of a sugar works on the ridge above Great Harbour (see Chapter 5) provide archaeological evidence that some sugar canes were propagated and processed, but probably not in any great amount. In 1815, 140 acres of Jost Van Dyke were under cotton cultivation, producing 21,000 pounds annually. There was a population of 428 represented by 25 whites, 32 free coloureds and 371 slaves.

By 1825, production of cotton had decreased to 17,000 pounds, but the population of the island had increased to 506, represented by 34 whites, 76 free coloreds and 396 slaves. Curiously, whilst the larger island of Tortola experienced a decrease in population during the early eighteenth century, the population of JVD gradually increased.

Little Jost Van Dyke is recorded to have had a population of five slaves in 1815 and was producing a paltry 450 pounds of cotton annually. Like its larger neighbour of similar name, the smaller island experienced a gradual increase in production and in 1823 was producing 750 pounds of cotton grown by three free coloureds and seven slaves. This atypical mix is indicative of the fact that free black people owned slaves throughout the British Virgin Islands.

In harmony with other islands in the region, the BVI, including JVD and LJVD, saw a gradual and irreversible economic decline throughout the eighteenth century; curiously though, the population of JVD continued to

increase. Like nearby Great Thatch Island (**Figure 1**), this population growth is probably attributable to the freedom of travel enjoyed by the former slave population after Emancipation in 1838. Thereafter, many BVI Islanders from islands like JVD, situated closest to the nearby Danish West Indies (now USVI), regularly commuted to St. Thomas to seek work at the Royal Mail Steam Packet Company's coaling wharves. By 1853, Dookhan (1975) attributes a population of 1,235 residing in Jost Van Dyke, 196 of whom died in a devastating cholera outbreak during the same year.

In common with all of the BVI, the Wesleyan missionaries had a profound influence on the population of JVD. They provided much needed spiritual nourishment and later shouldered the responsibility of education. In 1857, Samuel Simons, the resident BVI missionary, reported that:

In [Jost Van Dyke] the Wesleyan Methodists have a day and Sunday school. In the former there are twenty nine children; eight of them are writing in copy books, and eighteen of them can read very correctly. The school held on the Sabbath numbers fifty, the majority of which can read sufficiently correct as to be able to use the payer book during the morning service on the Lord's [D]ay.

The gradual economic decline that took place in the British Virgin Islands throughout the nineteenth century also affected Jost Van Dyke, which

the Commissioner of the BVI, N.G. Cookman, reported upon forty years later in 1897. He observed that:

[Jost Van Dyke] is inhabited by a typical smuggling community, who scarcely ever pay any duties, and live in a miserable state of pauperism, mainly by raising cattle and fishing. The condition of the island is becoming worse yearly, no new houses being erected, and those now on the island falling into decay. There is absolutely nothing to suggest to improve its condition.

The island of Jost Van Dyke and its neighbour, Little Jost, drifted into the twentieth century in a state of poverty until expanded tourism development in the BVI Territory beginning in the 1960s offered an alternative to agriculture and fishing. A number of guest houses, restaurants and bars were constructed, primarily in White Bay, Great Harbour and Little Harbour, providing a destination alternative to the more developed islands of Tortola and Virgin Gorda. Just 103 years after Commissioner Cookman had reported that there was “*nothing to suggest to improve its condition*”, Jost Van Dyke hosted one of the most famous Millennium parties anywhere in the world.

Economic Trends

As noted in the previous section, following the BVI's decline at the end of the plantation period, Jost Van Dyke—unlike most of the territory—enjoyed a period of population expansion in the mid-nineteenth century as enterprising islanders commuted from residences on Jost to St. Thomas, finding ready employment on that island's coaling wharves. However, the boom was not sustainable over time, and Jost Van Dyke had fallen into decline by the end of the century.

Another period of some prosperity emerged briefly during the years of Prohibition in the United States (1920-1933), which saw the sale of alcohol outlawed in nearby U.S. possessions—the American Virgin Islands and Puerto Rico. Many JVD fishermen with boats found monetary gain by smuggling liquor to St. Thomas or Puerto Rico, an economic venture that came to an end with the repeal of Prohibition in 1933. But while it lasted, according to the late J.R. O'Neal, BVI businessman and historian, “prohibition made a few here fairly well-off compared to their fellow citizens,” not only on JVD but also in Anegada, Virgin Gorda, and East End, Tortola (Maurer, 1997).

Without the stimulus provided by events beyond its shores, the island of Jost Van Dyke entered the last half of the twentieth century with few economic options beyond farming and fishing. The earlier export of cattle from JVD, especially to St.

Thomas, had declined as the neighbouring island acquired modern supermarkets. As one JVD resident remarked, “The opening of Grand Union and Pueblo supermarkets [in St. Thomas] was the death knell for cattle ranching” (*pers. comm.*, Ivan Chinnery, resident of JVD, 2009).

It was not until after the development of a successful BVI tourism sector that Jost Van Dyke began to prosper again. Its tourism product would focus on yachting and on providing a unique destination stop for the many “pleasure sailors” who were discovering the waters of the U.S. and British Virgin Islands.

When yachting tourism emerged in the 1960s and early 1970s as a specialised segment of Caribbean tourism, the BVI was not a key destination. At that time, only a few private or crewed yachts based in St. Thomas sailed to the BVI, including Jost Van Dyke.

It was the concept of bare-boat chartering (a boat charter without captain or crew)—as pioneered in the BVI by Dr. Robin Tattersall and refined by Charlie and Ginny Cary and others—that placed the Territory at the heart of the Caribbean’s chartering industry. The handful of visiting yachts in the 1950s and 1960s grew to hundreds and then thousands of yachts sailing the waters of the British Virgin Islands every year.

As yachting expanded as an industry in the BVI, entrepreneurs on JVD saw new opportunities. In 1968, Philiciano “Foxy”

Callwood opened the first tourism enterprise on the island, a bar and restaurant in Great Harbour. While local rum shops already served the local population, Foxy recognised the business potential of catering to visiting yachts.

It was not long before charter boats sailing from the U.S. Virgins would include Foxy’s Tamarind Bar—and JVD—on their cruising itinerary. Other tourism infrastructure and amenities, including overnight accommodations and recreational facilities, followed, gaining an international reputation for the island among “yachties”, in part, because of annual island events such as the celebrated New Year’s Eve party and the Wooden Boat Regatta.

The increase in visiting yachts prompted the BVI Government to establish an official port of entry at Great Harbour in JVD. The island currently enjoys the distinction of having more boat entries than any other port in the Territory; in 2008, nearly 7,000 boats cleared through the island’s port. Today, tourism—especially yacht chartering—represents the economic mainstay of Jost Van Dyke.

Great Harbour has emerged as the commercial centre of the island (see **Figure 1**). It houses the Government Administration Building, the ferry dock, and a Customs and Immigration facility. The waters of Great Harbour provide the most frequent mooring destination for boaters visiting the island, while the strip of beach around the harbour—in effect, its Main

Street—is lined with many small businesses, including stores and boutiques, a scuba shop, and bars and restaurants frequented by visiting yachters. Most of the island’s residents, who are primarily employed in tourism, live in the Great Harbour area.

While Great Harbour was previously the centre of day and night tourism activities, day tourism has now shifted to **White Bay** (see **Figure 1**), which boasts a resort hotel and other guest accommodations, including a campground, plus additional restaurants and bars and other tourism-oriented businesses.

Additional restaurants and bars, as well as villas and an anchorage with moorings, can be found at **Little Harbour** and **East End Harbour** (see **Figure 1**, which shows Little Harbour as **Garner Bay**). Nearby attractions are Diamond Cay National Park and Bubbly Pool.

The neighbouring islets of Sandy Cay, Green Cay, and Sandy Spit further enhance the JVD tourist’s experience, providing idyllic settings for day anchoring, snorkeling in shallow reefs, and the enjoyment of pristine beaches.

Thus, Jost Van Dyke has entered the twenty-first century on a firmer economic foundation than it had experienced at the turn of the last century. The island is a well-known tourist destination, offering a tranquil environmental setting for visitors, which, in turn, provides a relatively secure economic future for its resident community.

2. INSTITUTIONAL FRAMEWORK

THE PUBLIC SECTOR

The British have maintained sovereignty in the BVI since 1672, although, in the beginning, the colony was not one of Great Britain's more profitable overseas enterprises. As a British colony, the BVI was administered as part of the Leeward Islands Federation from 1872 to 1956, at which time British colonial rule in the Caribbean began to break up and the Leeward Islands Colony was dissolved.

In the 1960s and into the early 1970s, the possibility of a political merger was explored by the governments of both Virgin Islands (UK and US), a not unreasonable concept given that the two territories share social, cultural, economic, and geographic ties. Eventually, the possibility of a political union was dropped and is no longer pursued by either territory (O'Neal and Cohen, 2001).

Constitutional reform in 1967 eventually established the BVI as a British Dependent Territory (now named Overseas Territory), with a locally elected legislature and chief minister. The U.S. dollar was also established as the official national tender.

As a Crown Colony, the BVI Head of State is the British Monarch, represented locally by a Crown-appointed Governor who is responsible for external affairs, internal security, defense, and the public service.

The BVI also enjoys a high level of self-government, based on a Westminster Parliamentary model of government. A new Constitution Order in 2007 further defined the political relationship between the United Kingdom (UK) and the BVI.

The legislative functions of government reside in a 13-member, elected House of Assembly (replacing the Legislative Council in 2007). The Cabinet (replacing the Executive Council in 2007) is charged with the general management of Government and is collectively responsible to the House of Assembly. The Premier (replacing the office of Chief Minister in 2007) is appointed by the Governor from the elected members of the House.

The Government comprises six ministries and a collection of specialised departments to administer selected portfolios. In October of 2008 the Premier announced changes in the portfolios of certain ministers, including the addition of climate change, global warming, and alternative energy as new responsibilities for the Minister of Natural Resources and Labour.

Sister Islands Programme

The Sister Islands Programme was established in 2003 as part of the Deputy Governor's Office to monitor, promote and facilitate the delivery of

Government services to the sister islands, including Jost Van Dyke, Anegada, and Virgin Gorda. To achieve that objective, the Programme Coordinator works with and supervises District Officers on each of the three main sister islands. The Coordinator acts, in effect, as an administrator for the sister islands, while also serving as a liaison for the Deputy Governor's Office with the District Officers.

The District Officer for Jost Van Dyke was the last to be appointed; the incumbent, Carmen Blyden, is the first to hold the post. Her duties include:

- Processing requests and transfer of information from/to the Government in Tortola.
- Collection of land taxes.
- Supervision of designated Government employees in JVD.
- Oversight of postal services.
- Facilitating visits and other activities of Government officials in JVD.
- Coordination of various Government services such as water delivery, disaster management, dissemination of Government payments to the island's elderly, and distribution of tourism promotion materials.

A cursory perusal by IRF's project team of BVI media sources during the last half of 2008 provided evidence of a periodically strained relationship

between the primary island unit (Tortola) and the secondary island unit (Jost Van Dyke) (see **Box 1**). Such tension is not uncommon in the Caribbean, equally manifest in the relationships between, for example, St. Thomas and St. Croix, Antigua and Barbuda, St. Kitts and Nevis, and—in the BVI—between Tortola and Virgin Gorda. One area of conflict is the continuing disruption of JVD’s water supply and the seeming inability of the authorities in Tortola to address the problem to the residents’ satisfaction. The inadequacy of on-island medical services is also a continuing source of tension.

During a recent water crisis, one resident was quoted as saying, “For an island that brings in as much revenue as [JVD] does between customs and immigration [taxes from charter boat arrivals] and some of the most famous bars in the BVI, it is a shame how we have to live” (www.bvinews.com, July 15, 2008).

Additional grievances were on display at a community meeting in October where frustration with the approach of the Government in Tortola was openly aired. As lamented by one concerned participant, “They keep promising and promising, [but] there is nothing behind it. We are in need of proper medical care, schools, roads and I could go on and on” (*The Virgin Islands StandPoint*, October 2, 2008).

Box 1 JOST VAN DYKE AND TORTOLA

The relationship between any central unit of authority, such as that in Tortola, and a satellite dependency, such as Jost Van Dyke, will almost inevitably lead to feelings of perceived neglect on the part of the community associated with the satellite unit, as well as an assumption of inequity in the distribution of public resources. It is a longstanding factor, and will likely continue to be a dynamic, in the social and economic development of Jost Van Dyke, even as the island assesses its future options for both economic expansion and environmental protection. A key question will remain: how effectively and how successfully—and to what extent—can Jost Van Dyke determine its own future?

The Environmental Units of Government

While overall responsibility for the environment resides within the **Ministry of Natural Resources and Labour** (MNRL), there are other units of government that also have responsibilities related to the environment. These include the **Town and Country Planning Department** (T&CPD), within the Premier’s Office, charged with executing the Physical Planning Act, 2004, including responsibility for Environmental Impact Assessments, and the **Ministry of Health and Social Development**, which handles environmental health and solid waste management.

However, it is the Ministry of Natural Resources and Labour that carries primary responsibility for the Territory’s environmental resources. Within the Ministry, there are three agencies that execute specific responsibility for the management and protection of the environment.

(1) Department of Conservation and Fisheries (C&FD)

The Department was established in 1989 and has a strong conservation mandate to protect the natural resources of the BVI; at present, the C&FD manages 14 protected areas, all fisheries reserves. The Department also carries out an equally compelling resource development mandate in the area of fisheries development. Much of the Department’s focus has traditionally been on the coastal and marine environment. In addition to fisheries management, the department’s primary functions include environmental monitoring, environmental education, and environmental information management.

(2) National Parks Trust (NPT)

Unlike the C&FD, the Trust is a statutory body, established by legislation in 1961 and governed by a Minister-appointed board (the same Minister to whom the C&FD is answerable). The Trust is legally responsible for the Territory’s Protected Areas

System, including the 21 specific sites under its direct jurisdiction.

(3) Department of Agriculture

In addition to its primary mission to develop the agricultural sector, the Department is also mandated to designate areas for the protection of watersheds and water sources and the prevention of deforestation.

Seven such protected areas are currently under the management authority of the Department.

Since early in this century, Government has considered a more comprehensive approach to environmental protection and management. Most recently, the Law Reform Commission drafted a new framework for environmental management in the BVI that would bring together many public sector environmental responsibilities—particularly those identified with the C&FD and the NPT—under a single new management authority. Proposed legislation, encompassing a new environmental management framework that

utilises an OECS model, has been drafted by the Law Reform Commission and currently is with the Attorney General's Chambers undergoing review.

A summary of the *primary* BVI public agencies that currently manage and protect the environment of Jost Van Dyke and the other Profile islands is provided in **Table 5**. (Please note that Table 5 is not a representation of the Government's territory-wide environmental responsibilities.)

Table 5. Current JVD interaction with the primary environmental units of the BVI Government.

UNIT OF GOVERNMENT	ENVIRONMENTAL FUNCTIONS THAT AFFECT JOST VAN DYKE, LITTLE JOST VAN DYKE, SANDY CAY, GREEN CAY, AND SANDY SPIT
Department of Conservation and Fisheries (Ministry of Natural Resources and Labour)	<ul style="list-style-type: none"> – Wildlife protection. – Water quality monitoring of inshore waters. – Inventory and monitoring of beaches, coral reefs, mangroves, seagrass beds. – Beach maintenance (especially heavily used beaches) and beach surveillance (to prevent sand removal). – Management of Green Cay/Sandy Spit Fisheries Protected Area. – Promotion of fisheries development. – Promotion of environmental education and public awareness programmes.
National Parks Trust (Ministry of Natural Resources and Labour)	<ul style="list-style-type: none"> – Management of the Diamond Cay National Park and the Sandy Cay Habitat Management Area. – Leadership for the incorporation of the following sites into the BVI Protected Areas System, as these are designated in the <i>Protected Areas System Plan, 2007-2017</i> (Gardner, 2007): Green Cay, Sandy Spit, Thomas George Bay (JVD), Cape Wright, East End Harbour (JVD), and Lettsom Plantation House (LJVD). – Partnership with the JVD Preservation Society for site maintenance and invasive species monitoring at Sandy Cay. – Promotion of environmental education and public awareness programmes.
Department of Town and Country Planning (Premier's Office)	<ul style="list-style-type: none"> – Responsibility for Environmental Impact Assessments for proposed JVD development projects, as authorised under the Physical Planning Act. – Responsibility for compilation of a list of buildings or sites in the Territory (including JVD) which are of special interest, for the purpose of determining buildings that should be preserved or protected. – Responsibility for issuing plant preservation orders for the purpose of protecting plants or plant species designated for preservation, including plant species in JVD. – Preparation of development plans such as those prepared for White Bay (Local Area Plan) and Great Harbour (Civic Improvement Plan).
Department of Solid Waste (Ministry of Health and Social Development)	<ul style="list-style-type: none"> – Responsibility for the management of solid waste.
Department of Environmental Health (Ministry of Health and Social Development)	<ul style="list-style-type: none"> – Responsibility for environmental pollution control.

ENVIRONMENTAL LEGISLATION

A number of legal and regulatory instruments related to the protection of the environment in the BVI have relevance for Jost Van Dyke and the adjacent satellite islands included in this *Environmental Profile*. These are outlined in **Table 6**, along with certain global treaties and regional agreements that pertain to the BVI. Three fairly recently enacted laws are of particular relevance.

(1) Fisheries Act (1997) and Regulations (2003)

The purpose of this legislation is to make provision for the promotion, management and conservation of fisheries resources in the Territory. The legislation authorises actions with respect to the conservation of fish and protection of the marine environment. Fourteen fisheries protected areas were declared under the 2003 Regulations, one of which is at Green Cay.

Under the legislation, the Minister also has broad authority to control pollution in the marine environment from any source, including land-based sources.

The legislation also authorises the Minister to declare by Order any type of fish as a protected species. Pursuant to this authority, the Fisheries Regulations prohibit disturbing or interfering with turtle eggs, turtle nests, and any turtle that is nesting; turtles have been known to nest on Jost Van Dyke, Little Jost Van

Dyke, and Sandy Cay (Eckert, 1992).

(2) Physical Planning Act, 2004

The Territory's new Physical Planning Act, among other things, governs the Environmental Impact Assessment (EIA) process for development activities in the Territory, including future JVD development projects. It includes a number of provisions related to protecting the environmental, historic, and cultural values of a proposed development site. Because Regulations have not yet been approved for this law, the effectiveness of implementation will be lessened until the controls and procedures are in place to guide all parties—public and private—when taking action under the law.

(3) National Parks Act (2006) and Regulations (2008)

The BVI's new National Parks Act and Regulations provide a forward-looking framework for protected area management in the Territory. The legislation incorporates modern concepts of protected area management, including an internationally recognised system of categories for designating protected areas. Sandy Cay is the first site to be declared under the new Act and will be managed as a Habitat and Species Management Area (section 15(d) of the Act), which signifies a protected area managed mainly for conservation through management intervention.

Other environmental laws are noted in **Table 6**. The authority to regulate activities that protect and manage the environment in the BVI is dispersed among the laws and ordinances listed in this Table. All legislation included is applicable to Jost Van Dyke and the satellite cays and islets studied in this *Profile*.

The Table illustrates that, although important law and policy tools for environmental management have been established in the BVI, many challenges still lie ahead. The Physical Planning Act requires regulations and until then, the law will function more as a set of guidelines than as enforceable policy. The area of pollution control needs to be strengthened, particularly in a community like the BVI that is growing and developing at a rapid rate. Also, there is limited legal authority for protecting wildlife and critical ecosystems and habitat outside of formally protected areas.

Lastly, the future of effective resource protection and environmental management in the BVI **will depend on Government's commitment to full implementation of existing laws and full support for the authority of those agencies executing the laws.**

Table 6.
BVI legal and regulatory instruments
related to the protection and management of the environment. *

NATIONAL LEGISLATION		
PLANNING AND DEVELOPMENT CONTROL	<i>Physical Planning Act</i> (2004) (no regulations to date)	See text for details.
COASTAL RESOURCES	<i>Fisheries Act</i> (1997) <i>Fisheries Regulations</i> (2003) <i>Beach Protection Act</i> (1985)	See text for details. See text for details. The Act requires a permit for dumping on and removal of material from the foreshore and removing any natural barriers against the sea.
AGRICULTURE	<i>Protection of Trees and Conservation of Soil and Water Ordinance</i> (1954/1965)	Authorises designation of protected forest areas, protected water areas, and protected trees. Seven protected areas have been established under this Ordinance, none on JVD.
PROTECTED AREAS	<i>National Parks Act</i> (2006) <i>National Parks Regulations</i> (2008)	See text for details. See text for details.
WILDLIFE	<i>Wild Birds Protection Ordinance</i> (1959/1980) <i>Turtles Ordinance</i> (1959) <i>Protection of Endangered Animals, Plants, and Articles (Removal and Possession) Ordinance</i> (1981)	The law protects listed birds, their eggs, nests, and young. Bird Sanctuaries Orders in 1959 and 1997 designated 20 bird sanctuaries in the Territory (none on JVD), which provide full protection for all species of wild birds within the sanctuaries. The Ordinance protects turtles from being disturbed or taken during nesting periods and prohibits the taking of turtle eggs, but does not address general protection of habitat for turtle nesting or feeding grounds. This law was enacted specifically to prohibit the removal without a license of listed corals; it does not address protection of coral reefs <i>in-situ</i> .
WASTE MANAGEMENT	<i>Public Health Ordinance</i> (1967)	Authorises regulations to prevent, abate, and control environmental pollution. Environmental pollution is not defined, and regulations providing environmental standards have not been enacted.
NATIONAL POLICY		
ENVIRONMENTAL SUSTAINABILITY	<i>St. George's Declaration of Principles for Environmental Sustainability in the OECS</i> (July 25, 2001)	The Declaration was signed by the Chief Minister, on behalf of the Government, in 2001. The document contains 21 Principles and recognises, among other things, the need for an integrated approach to managing land and marine areas as a single unit.
ENVIRONMENTAL SUSTAINABILITY	<i>British Virgin Islands Environment Charter</i> Signed by UK and BVI Governments (September 26, 2001)	Guiding principles for the UK Government, Government of the BVI, and the people of the BVI.
REGIONAL AGREEMENTS		
MARINE ENVIRONMENT	<i>Cartagena Convention</i> , commonly known as the Caribbean Regional Seas Agreement , came into force in 1986 and was extended to the BVI in 1987	The Convention encourages Contracting Parties to undertake agreements and protocols for the protection of the marine environment in the region.

GLOBAL TREATIES

BIODIVERSITY	<i>Convention on Biological Diversity</i> (1992), extended to the BVI in 1994	The Convention contains a series of far-reaching obligations related to the conservation of biological diversity and the sustainable use of its components.
WETLANDS	<i>Convention on Wetlands of International Importance especially for Waterfowl Habitat</i> (1971), also known as Ramsar	This international Convention was extended to the BVI in 1999 with the acceptance by the Ramsar Secretariat of the BVI's application to list the Western Salt Ponds of Anegada as a "wetland of international importance especially for waterfowl". One of the obligations triggered by the Convention is that the BVI promote wise use of all wetlands within the Territory.
MIGRATORY SPECIES	<i>Convention on Migratory Species</i> (1983) also known as the Bonn Convention , extended to the BVI in 1985	The Parties to the Convention acknowledge the importance of migratory species being conserved and the need to take action to avoid any migratory species becoming endangered.
LAW OF THE SEA	<i>United Nations Convention on the Law of the Sea</i> (1982) Convention came into force in 1994, was ratified by the UK and extended to the BVI in 1997	Part XII of the Convention ("Protection and Preservation of the Marine Environment") sets out a fundamental obligation of the BVI to protect and preserve its marine environment, and to take all measures necessary to prevent, reduce, and control pollution of the marine environment from any source.
TRADE IN ENDANGERED SPECIES	<i>Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)</i> Convention entered into force in 1975, extended to the BVI in 1976	Requires national legislation as the Convention is not self-executing. See above (National Legislation section of this Table), the <i>Protection of Endangered Animals, Plants, and Articles (Removal and Possession) Ordinance</i> , which is outdated and does not fully comply as CITES legislation. Additionally, the BVI does not have general wildlife conservation legislation to reinforce compliance.

* For a more detailed discussion, see Lausche (2005).

ENVIRONMENTAL NGOS (NON-GOVERNMENT ORGANISATIONS)

In the area of the environment, the NGO sector in the BVI has not been particularly vibrant, broadly based, or long-lasting—particularly when compared to non-profit, private-sector conservation organisations seen elsewhere in the region. In the BVI, a few conservation-focused NGOs evolved in the

1980s and into the 1990s, among them, the **BVI Historical Society** and the **BVI Botanic Society**. However, none have survived as active organisations today and none displayed—when active—a broad environmental agenda. Instead, the programmatic focus was a single "cause" (e.g., the Botanical Gardens) or a single issue (e.g., the preservation of historical and archaeological resources). One NGO that attempted to take on a more broadly based

environmental agenda was the **Association of Reef Keepers (ARK)**. Founded in the late 1990s, ARK was dedicated to promoting the conservation and preservation of the marine environment. However, its marine-based focus soon expanded, and the organisation became known not only for its annual coral reef monitoring exercise (Reef Check), but also for its non-partisan voice on behalf of environmental issues

that extended beyond the marine sector.

ARK began to take on a variety of environmental activities and programmes which, in larger countries, might have been dispersed among several NGOs. An offshoot of ARK was a subsidiary programme that became known as **Island Erosion**, a collaboration of environmentalists and business sector interests—e.g., building contractors, architects, and engineers—who sought, together, to promote best management practices in construction to reduce soil erosion and sediment run-off.

Both ARK and Island Erosion fell victim to a not atypical phenomenon seen in many small organisations, particularly those staffed primarily by volunteers—they quickly become over-extended, over-committed, and over-exhausted. ARK has been mostly non-operational for the last three years, and Island Erosion as an organised initiative has disappeared.

At about the same time that ARK was moving off-stage as an institutional voice for environmental issues, two new NGOs emerged: the **BVI Heritage Conservation Group** (BVIHCG) and the **Virgin Islands Environmental Council** (VIEC).

BVIHCG is an association led by BVI citizens and residents and supported by visitors, all of whom “are passionate about the preservation of the BVI’s natural resources, history and

culture,” which the group maintains are threatened by widespread physical development in the Territory (see Mission Statement at www.bvihcg.com). Through its website, the organisation provides information about pending development projects in the BVI and about eco-friendly, sustainable solutions.

At the present time, **VIEC** is primarily a single-issue NGO; in this case, its objective is to turn around Government support for a mega-resort development at Beef Island on the eastern end of Tortola. In July of 2007, VIEC initiated legal action seeking



Photo 8.
Sign outside of the office of the Jost Van Dykes Preservation Society in Great Harbour, JVD.

judicial review of the Government’s decision to grant planning approval to the Beef Island Development Project. The case is still pending in the courts, but its outcome could very well become a landmark ruling, not only in the BVI but in the Caribbean.

More recently within this organisational mix, two new groups have emerged: the first in Virgin Gorda called **Virgin Gorda Green Team**, which is affiliated with the Clean Up the World Programme and whose mission focuses on keeping Virgin Gorda and its marine environment clean and, the second, **Green VI**, founded in Tortola to help eliminate solid waste in the Territory.

The environmental NGO in Jost Van Dyke—the **Jost Van Dykes (BVI) Preservation Society**—is new, yet it is also old. In about 1992, Foxy Callwood, a businessman in Great Harbour,

launched the idea for a Preservation Society with his wife, Tessa, and other island residents who hoped to preserve the island’s unique environment and traditions.

After a period of relative inactivity throughout most of the 1990s, the Society has been revived, with its legal establishment as a BVI not-for-profit organisation taking place in July of 2004. It now boasts an office and projects manager based in Great Harbour and a new community-based research and education programme and project staff funded by the UK’s Overseas Territories Environment Programme.

Although focused on the environment of Jost Van Dyke and its satellite islands, the Society may, as it develops, elect to seek assistance from or work collaboratively with other

NGOs in the Territory who share similar goals. Its programme objectives may change with time; its leadership may not include the same persons tomorrow as today. Yet, as Island Resources Foundation has learned during its 37-year history in the Caribbean, there is a body of accumulated wisdom already available to help the Society as it grows and changes.

As summarised over a decade ago in a Foundation publication on NGO development in the Eastern Caribbean (Towle, 1995), successful NGOs often demonstrate certain common characteristics, and the JVD Society might focus on these **(Box 2)** as it seeks to strengthen its institutional potential.

Box 2 Successful NGOs Exhibit ...

- a sound management capacity
- focused leadership, particularly in the early years of development
- ability to adapt to change by growing incrementally
- a limited number of connected projects
- creative funding strategies to meet core costs
- a people-centered growth style

3. CONSERVING THE BIODIVERSITY* OF JOST VAN DYKE

This chapter is based on preliminary field work and research carried out on Jost Van Dyke and other Profile islands in July and October of 2008 by IRF scientists Kevel C. Lindsay and Jean-Pierre Bacle. Unless otherwise noted, the findings presented are based on IRF's 2008 field studies and analysis.

Few areas of comparable size anywhere in the world are endowed with a floral and faunal heritage as diverse and as interesting as the plants and animals found on the Caribbean's assemblage of islands. For naturalists, however, the region can be a difficult taxonomic, ecologic and biogeographic puzzle, in part because of the region's checkered geologic past, the intermix of high and low, wet and dry, volcanic and limestone islands, and in part because of the proximity of—and species input from—the islands of the Greater Antilles to the north and the South American mainland to the south.

The small size of Caribbean islands often belies the rich biodiversity these landscapes support. Standard assessment methodologies can obscure the high density of insular biodiversity. However, the global conservation community now acknowledges that insular regions, like the Caribbean, are among the most threatened biodiversity hotspots in the world. Hotspots

are identified as areas where exceptional concentrations of endemic (native) species are undergoing exceptional loss of habitat, thus putting these species at great risk.

This chapter of the *Environmental Profile* will look at one small cluster of islands in the wider Caribbean region to examine species diversity and terrestrial biodiversity as they are reflected in the floral and faunal heritage of Jost Van Dyke and its neighbouring cays and islets.

FLORAL HERITAGE

Walking along the main ridge of Jost Van Dyke, an observer may enjoy the spectacular views of the islands of the BVI stretching to the horizon in the east and to the U.S. Virgins in the south and west. The walk is pleasant, though steep in some areas, and the sounds of birds and the occasional tree frog add to the natural theatre of the place.

But few may be impressed by the vegetation of the island. Compared to the forests of Sage Mountain on Tortola, with



Photo 9.
A lone Tyre or Thatch Palm (*Coccothrinax alta*) towering along the Western Peninsula of Jost Van Dyke.

its lush wet landscape of ferns, large towering trees along the steep ghuts and a myriad of exotic-looking species, the flora of Jost may leave the observer somewhat disappointed.

The landscape of Jost Van Dyke that is visible today bears little resemblance to the island of 500 years ago. Over the many intervening decades, the original evergreen and semi-green forests of the upper slopes, the dry forests of the lower coastal areas and the woodlands with their thousands of waving **Thatch (Tyre) Palms** (*Coccothrinax alta*) (Photo 9) have given way to open grassy areas, human settlements and a few remaining tracks of forests, albeit quite degraded.

* **Biodiversity**, short for biological diversity, refers to the variety and variability (that is, the diversity) of animals, plants, ecosystems, ecosystem functions, genetic diversity and landscapes in a given area. The most frequent measure of biological diversity is a list of the species occurring within an area (species diversity), but the concept of diversity can also refer to the gene pool of a given species (genetic diversity) or to the habitats (ecosystem diversity) where that species occurs.

On the steep northern slopes of JVD and the rocky uplands of Little Jost and Green Cay, the combination of goats, loose sandy soils and seasonal rains have resulted in the loss of rich soils; in some areas, severe erosion has set in. Today, goats are the main agents of change affecting the landscapes of Jost Van Dyke, Little Jost Van Dyke, and Green Cay. Throughout the three islands, much of the remaining forest has lost its understory as the free-roaming animals have eaten most of the edible growth. In many areas, even the leaf litter is gone. One local resident (*pers. comm.*, Vancito George, June 2009) remembers how proud people used to be of their Guinea Grass and that JVD was once all grass.

In contrast, Sandy Cay—which is goat free—displays a much healthier flora. The island's former owner, Laurance S. Rockefeller, sought to maintain the 14-acre cay as a kind of “insular garden” that blended the island's mostly intact, coastal dry tropical forest vegetation with horticulture, landscape architecture and conservation. His approach was:

... to enhance both the substance and image of the island by optimizing vistas to surrounding islands, nurturing and exposing naturally colorful flowering plants, and clearing sight lines in the vegetative understory. The ongoing objective was to augment the canopy effect, enabling a visitor to sense the complexity of the intermixed natural plant, tree and wildlife communities that constitute the island's ecosystem. The long-

term goal was to encourage the growth of a virtually natural setting with as few non-natural distractions as possible (Bacle and Towle, 2008).

Vegetation Communities

There are 13 terrestrial vegetation or plant communities found today on Jost Van Dyke and its neighbouring islands (**Table 7**). These communities have all undergone visible change—human- or livestock-induced—over the last 500 years of colonisation, although the Amerindian peoples undoubtedly also had some impact on native vegetation.

Table 7.
List of the thirteen plant communities of Jost Van Dyke.

Semi-deciduous Forest	Mixed Dry Shrubland
Gallery Semi-deciduous Forest	Pasture/Grassland
Drought-deciduous Dry Forest	Rock Pavement
Semi-deciduous Woodland	Beach (sand, cobblestone, rubble/coral)
Coastal Hedge	Wetlands
Sclerophyllous Evergreen Shrubland	Built Areas (gardens, cultivars, ornamentals)
Thicket/Scrub	

Much of the vegetative landscape of Jost Van Dyke and the neighbouring islands is secondary in nature, meaning it has undergone tremendous changes in species composition, structure and ecology over the years as a result of human intervention and activities. Ad-

ditionally, some community types are not indigenous to the islands, for example, much of the pasture and vegetation on the slopes above Great Harbour and Little Harbour or the vegetation communities found around homesteads and hotels.

Some of these communities are naturally uncommon to rare, meaning limited in size and distribution. Communities such as beach, wetlands, natural grassland, semi-deciduous forest and gallery semi-deciduous forest were always rare and therefore more vulnerable to human-related activities. Continued adverse impact on these communities may threaten their very existence as well as the species of animals that depend on them.

The plant communities of the Profile islands are described in **Table 8** (employing the vegetation classification system from CDC, 2004).

A Great Diversity of Plants

For their size, Jost Van Dyke and the other Profile islands display a diversity of plants. Together, the islands host at least 332 plant species, of which approximately 84 percent are native and naturalised species (see Appendix 2). Because of its size and elevation, JVD is the most diverse and has most of these species, but all the islands offer a beautiful array of Virgin Islands' species, some of which are quite rare.

Table 8.
Vegetation communities of Jost Van Dyke and the satellite Islands.

Vegetation Community Type	Location	Brief Description
Semi-deciduous Forest	Found on the steep ridge between Belle Vue Hill and Roach Hill, from Spring Hill to Majohnny Hill, and from Majohnny Hill to Man o' War Hill	<p>A rare community limited to the highest peaks on the island where moisture and humidity levels seem to be at their greatest. This plant community consists of a mix of evergreen (about 25%) and deciduous (about 75%) tree species.</p> <p>Tallest and most dominant tree species include: Turpentine (<i>Bursera simaruba</i>), Genip (<i>Melicoccus bijugatus</i>), Manjacks (<i>Cordia</i> spp.), Pigeon Berry (<i>Bourreria succulenta</i>), Fishpoison (<i>Piscidia carthagenensis</i>), Water Mampoo (<i>Pisonia subcordata</i>), Black Mampoo (<i>Guapira fragrans</i>), Autograph Tree (<i>Clusia rosea</i>) and White Cedar (<i>Tabebuia heterophylla</i>).</p> <p>In the understory, especially on large boulders, are <i>Anthurium crenata</i>, the orchid <i>Epidendrum ciliare</i> and the bromeliad <i>Aechmea lingulata</i>.</p>
Gallery Semi-deciduous Forest	Found along Brown, North Side Bay, and Saddle Bay ghuts on Jost Van Dyke, and the upper reaches of "The Ghut" that drains into Great Harbour	Similar to Semi-deciduous Forest (see above), it is found along steep ghuts where, given the higher humidity and moisture availability, the trees grow a bit taller than usual.
Drought-deciduous Dry Forest	Found on mid-slopes of the northern side of Jost Van Dyke, and on the eastern slopes of Roach Hill and some small patches at Western End Hill	<p>This community is dominated by deciduous species (up to 75% or more) such as <i>B. simaruba</i> and <i>Pisonia</i> spp.</p> <p>This is the most dominant forest type on the island of Jost Van Dyke.</p>
Semi-deciduous Woodland	In patches throughout Jost Van Dyke and Little Jost on abandoned agriculture/pasture lands; on Jost, found above Great Harbour and White Bay, and in small patches on the lower slopes of Little Jost Van Dyke	An open tree canopy community sometimes interspersed with pasture and shrubland. Trees provide 25%-60% of the land cover and include many native and naturalised plant species.
Coastal Hedge	Found on the lower northern-facing slopes of JVD and Little JVD	Found on lower steep coastal slopes exposed to high winds and salt spray, which inhibit the growth to a low sculpted hedge (hence the name). Most of the species in this community are evergreen types (75%) found widely throughout the island across many other plant communities, and under normal circumstances these species would grow taller.
Sclerophyllous Evergreen Shrubland	<p>Small patches on Jost Van Dyke, including at West End Hill (north side), East End, and east of Roach Hill</p> <p>On Little Jost, found in small scattered patches throughout the island</p>	Plants in this community are usually thorny, have small leaves and display sclerophylly (stunted growth due to wind exposure and dry conditions). The plants have hard leaves (which allows the leaves to stay stiff even during severe dry periods) and short internodes between leaf and stems. Deciduous species may be more common (75%) as compared to evergreens (25%).

Vegetation Community Type	Location	Brief Description
Thicket/Scrub	<p>On Jost Van Dyke, at East End, on slopes above East End Harbour and in small patches above Great Harbour</p> <p>On Little Jost, above Machioneel Bay</p>	<p>Low shrubby vegetation, often with "thorny" interlocking branches, vines and scandent growths, forming thick, sometimes impenetrable ground cover. May include both native scrub and secondary communities and a number of introduced species.</p> <p>On JVD and Little Jost, the ground may be covered by dense cover of the introduced <i>Bromelia pinguin</i>. Other species may include <i>Croton</i> spp., <i>Lantana</i> spp., <i>Leucaena leucocephala</i> and <i>Cassine xylocarpa</i>.</p> <p>This community may actually be an early stage of a taller more mature plant community.</p>
Mixed Dry Shrubland	<p>On Jost Van Dyke, in small patches on the north-facing slopes; small patches on the southern slopes of West End Hill and on the East End</p> <p>On Little Jost, on the north-facing slopes and small patches at Machioneel Bay and the eastern end of the island</p> <p>On Green Cay, small degraded patches on western slopes</p> <p>On Sandy Cay, on northern summit of the island</p>	<p>Somewhat similar to the above community type (and may integrate), but characterised by a mixture of evergreen and deciduous species, including cacti and other succulent thorny species.</p> <p>The native agave (<i>Agave missionum</i>) is characteristic of this community, although in recent years, the species has seriously declined due to an attack of the introduced Sisal Weevil (<i>Scyphophorus acupunctatus</i>), native to Mexico.</p>
Pasture/Grassland	<p>On Jost Van Dyke, above Great Harbour, along the main Ridge and scattered patches throughout the island</p> <p>On Little Jost, in scattered patches along or near the coast and eastern end of the island</p> <p>On Sandy Cay, along main ridge and small patches near the shore</p>	<p>This community type includes grass and forb plant vegetation growing on abandoned agricultural and cleared lands, as well as livestock pastures.</p> <p>In the past, these islands would have included native grasslands, but the goats have likely destroyed these.</p>
Rock Pavement	<p>Found on all Profile islands except Sandy Spit, especially along the coast</p>	<p>Limited to the rocky outcrops and coastal cliffs. The vegetation is usually sparse, sometimes covering less than 10% of the surface. All species are influenced and affected by strong winds, thin soils and salt spray, and are therefore shaped by this environment, growing as low shrubs. Under less harsh conditions, these species would grow taller.</p>
Beach (sand, cobblestone, rubble/coral)	<p>Found on all five islands</p>	<p>Low vegetation found along beaches, often sparse ground cover, which may include a number of grass and forb species.</p>
Built Areas	<p>On Jost Van Dyke at Great Harbour, White Bay and East End</p> <p>Only one residence on Little Jost and none on the other three islands</p>	<p>The species of plants found in this community type result from deliberate plantings and careful management of the landscape. Most of the dominant species are non-native fruit and ornamental species.</p>



Photo 10.
Leaves of the JVD Indian Mallow
(*Bastardiopsis eggersii*).

As an example, there is the wild hibiscus relative, the **Jost Van Dyke Indian Mallow** (*Bastardiopsis eggersii*), first recorded on Jost in 1969 by Dr. Elbert Little of the then Institute of Tropical Forestry in Puerto Rico (see Little, 1969). The species is named after Jost Van Dyke, and the IRF Profile survey team discovered one lone specimen, along the upper reaches of Brown Ghut on the eastern end of the island (see **Photo 10**). Dr. Little also noted how rare the species was on the island, and he too found only one specimen.

This tree, which grows to about 10-15 metres in height, has somewhat heart-shaped leaves that are covered in short soft

hairs, giving the leaves a silvery, velvet-like look from a distance.

The Indian Mallow is endemic (native) to the British Virgin Islands and Culebra (PR), and is only found on JVD and Little JVD in the BVI. Although recorded for Tortola, it is believed to be extinct there. It is most common on Little Jost



Photo 11.
Cockspur in bloom (*Erythrina eggersii*).

Van Dyke, where it was recorded for the first time by the IRF Profile team. There are about 50 trees on that island. However, this most beautiful tree is endangered by goats, on both JVD and Little JVD.

Another spectacular species, and another Virgin Islands and Puerto Rican endemic, is the **Cockspur** or **Coral Tree**

(*Erythrina eggersii*), named after Henrik Franz Alexander von Eggers, its discoverer (about 1870) and a Danish army captain who published on the flora of the Virgin Islands. Many other plants in these islands also bear his name, including *Bastardiopsis eggersii* (JVD Indian Mallow).

The one specimen on Jost Van Dyke located by the IRF research team was in the ravines on the steep slopes of the northern coast. It showed obvious signs of severe damage from goats and the resulting erosion of surrounding slopes.

The Cockspur has a brilliant bright-red, inflorescence flower that it displays in the dry season when it sheds most of its leaves (**Photo 11**). This characteristic is the reason that related species are often referred to as the "immortelle" or the immortal tree. It seems to come

back to life during the most severe season of the year.

This is the first record of this species from JVD. It is quite rare in all of the Virgin Islands, and every effort should be made to ensure that this species survives.

On the steep slopes of Little Jost was found a new species for the British Virgin Islands, the **Simple-leaf Bushweed** (*Flueggea acidoton*). This Euphorbe is a relative of the Manchioneel Tree

(*Hippomane mancinella*), and its discovery by Profile scientists is another new record for the BVI (it is rare in the USVI).

The beautiful thorny small tree with small leaves and arching branches survives in dry forest near the coast. It is quite rare throughout the Virgin Islands but is endemic (native) to the Greater Antilles and the Bahamas.

One of the most impressive of the Profile islands' rare trees is the **Lignum Vitae** (*Guaiacum officinale*). A number of medium-sized specimens were discovered in heavy fruit on the southern slopes of the Western Peninsula of JVD (see **Photos 12 and 13**).

The Lignum Vitae tree has attained almost mythical distinction in the USVI and BVI, being one of the heaviest and densest woods in the world (it sinks in water).

It has been over-harvested in the past because of its popularity in the production of ball bearings and pulley components used in ship rigging; its by-products were also used in the treatment of Syphilis. Because of the huge demand for this resource, by the late 1700s the species had become quite rare in the West Indies; in some islands, it became extinct. In the British Virgin Islands, it is recorded from Anegada. This recent sighting by IRF researchers is the first record for Jost Van Dyke.

Early settlers also named the tree Buckwood or Pockwood. Apparently, the area known as Pockwood Pond on the south shore of Tortola was named because of the abundance of this tree (Gibney, 2008). Today, due to its rarity in the wild, the tree is protected under CITES, the Convention on International Trade in Endangered Species.

Lignum Vitae is a popular landscaping species, although slow growing; it is highly prized by gardeners for its beautiful purple flowers and bright yellow fruits, the seeds of which are covered by a red aril. The species is found throughout the West Indies, northern Venezuela and Colombia.

One of the BVI's most spectacular and economically important plants is the **Tyre or Thatch Palm** (*Coccothrinax alta*), an endemic species only found in the Virgin Islands and Puerto Rico. This beautiful palm with its fan-shaped leaves is now very rare on the Profile islands, having been eaten into extinction by goats. The goats eat the seedlings and ripe fruits, thereby depriving the species of regeneration. They strip the fronds from young trees, and over time the plant eventually



Photo 12.
Fruiting Lignum Vitae (*Guaiacum officinale*).

Photo 13. Lignum Vitae is easily distinguishable by its trunk.

succumbs to constant “pruning” by these animals.

However, this was not always so. Islanders today remember that within their lifetimes the species declined rapidly as goats were allowed to roam free. In the past, the palm was an important crop for making crafts and broom and as thatching for roofs. As the species declined, islanders had to travel to Thatch Cay to the south (west of Tortola) to obtain the fronds to meet their needs.

Today, only a few dozen specimens of this species cling to existence on the Western Peninsula of JVD, with a few specimens also observed on Sandy Cay. A few seedlings were identified on JVD’s Western Peninsula and Sandy Cay (see **Photo 14**). Only one scraggly specimen was observed on Green Cay.



Photo 14. Tyre Palm (*Coccothrinax alta*) seedling, Western Peninsula, JVD.

There are at least six species of cacti on most of the study islands. Two species—the **Barrel Cactus** or **Turk’s Cap Cactus** (*Melocactus intortus*) (**Photo 15**), and the **Tree Cactus**, also named **Tree Prickly Pear** (*Opuntia rubescens*)—are considered species of special concern.

The Tree Cactus in particular is quite rare and endangered. It is easily identified by its elongated pads and tree-like trunk. On JVD, only five specimens were found, all located near Lower and Upper Dog Holes, along the western shores of Great Harbour (**Photo 16**). Sandy Cay has at least half-a-dozen on the East Ridge. One specimen was also recorded for Little Jost Van Dyke and for Green Cay. The lonely tree cactus on Green Cay is in precarious condition, due to unstable slopes caused by goat-induced erosion.

Table 12 in the final chapter of this *Profile* provides a list and locational information on 13 plants of “**special concern**” found on Jost Van Dyke and the other Profile islands.



Photo 15. Barrel Cactus or Turk’s Cap (*Melocactus intortus*) is more common on the dry coastal cliffs of JVD.



Photo 16. A flowering Tree Cactus (or Prickly Pear Cactus) (*Opuntia rubescens*) at Great Harbour, JVD.

SALT PONDS: A CRITICAL ECOSYSTEM

The salt ponds of the Profile study area are like time machines into the past. The enclosed ponds, with tons of sediment built up over thousands of years, are witnesses to the changes that have occurred in the environment across time; they provide us with a window through which to look back and examine natural history.

It is the ponds' sediments that hold these secrets, sealed away in millenniums of deposits. For example, as scientists try to understand the impacts of global warming and climate change, some have turned to sediment cores from salt ponds to understand the sequence of events stretching back as far as the last Ice Age, some 10,000-12,000 years ago.

However, salt ponds offer far more than clues to the past. These ecosystems are also integral to our current understanding of the environment of Jost Van Dyke and the other Profile islands, and, as well, they provide important environmental services for the protection of coastal areas.

For example, many forms of wildlife depend on these ponds. Migrant waterfowl and shorebirds and the resident White-cheeked Pintail Duck nest in the roots of pond mangroves and feed on the aquatic plants and insects they find there. Edible land crabs and shrimp and other invertebrates survive because of their access to viable

ponds. And, as tropical storms and torrential rains release their fury on the islands, the ponds act as retention systems and hold back potentially destructive flood waters and slowly pass the excess on to the ocean (see also **Box 3**).

The ecology of salt ponds is complex and only partly understood. We do know that this type of ecosystem is dynamic, experiencing constant change in response to continuous fluctuations in salinity, temperature, turbidity, oxygen levels, and even water levels.

There are currently seven salt ponds on Jost Van Dyke and one on Sandy Cay (see **Figure 4** and **Table 9**). None of JVD's salt ponds were studied by BVI ecologist Dr. Lianna Jarecki in her definitive study of BVI salt ponds (Jarecki, 2004), although she did investigate the Sandy Cay pond as part of the IRF resource characterisation study of the cay in 2000-2001 (IRF, 2001b).

In the not-too-distant past, sea salt was collected from a few of JVD's salt ponds, e.g., Cape Wright and White Bay salt ponds. The sea salt obtained from these ponds is particularly tasty and healthy, containing all the minerals present in the sea which are also essential to the human body (see also **Box 4**).

Box 3

WHY SALT PONDS ARE IMPORTANT

On JVD, salt ponds provide a number of useful benefits to humans and the surrounding environment. The two primary benefits are:

- (1) Salt ponds act as **SEDIMENT TRAPS** for runoff from surrounding uplands, thereby preventing sediment and pollution from reaching sensitive coral reefs, seagrass beds, and other important coastal habitats.
- (2) Despite drastic fluctuations in pond salinity, due to the influx of both fresh and sea water, salt ponds provide an important **HABITAT FOR MANY SPECIES OF FAUNA AND FLORA**. For example:
 - ✓ Many crabs, insect larvae and some halophytic (salt-loving) plants can only be found living in ponds.
 - ✓ Up to four mangrove species can be seen in this ecosystem: Red Mangrove (*Rhizophora mangle*), Black Mangrove (*Avicennia germinans*), White Mangrove (*Laguncularia racemosa*), and the Buttonwood (*Conocarpus erectus*).
 - ✓ Wading birds (such as herons, stilts, and sandpipers) and waterfowl (such as ducks, teal, and coots) feed on organisms in the ponds. Other species of perching birds (such as kingbirds, martins, swallows, and warblers) feed on insects that fly over the salt ponds, and many of them nest or roost in the surrounding vegetation, safe from predators.
 - ✓ Even insect bats such as the Roof Bat and Fishing Bat can be seen foraging in this ecosystem.

However, as pressures increase for additional land for coastal development activities, surviving salt ponds are being placed at greater risk. In the Caribbean, they have too often been the first critical ecosystem to be sacrificed to the requirements of coastal development expansion. For example, not long ago, JVD had eight salt ponds. Unfortunately, the salt pond located south of Beasli Hill along Batson Bay was converted to the island's official waste disposal and landfill site and no longer functions as a pond.

Box 4




SALT PONDS AND SEA SALT PRODUCTION




On JVD, not all salt ponds produce salt.


For sea salt to form in a salt pond, a number of conditions have to be present. Initially, salt water enters a pond from the sea through seepage at high tides and/or by waves breaking over the shoreline during storms. If the pond is below sea level, this will prevent water from flowing back to the sea. The constant, intense sunlight and windy conditions encourage a very high rate of evapo-transpiration. During extended dry periods, pond water will become extremely salty. Water can only hold a certain amount of salt in solution and when the salinity of the pond reaches that point, salt crystallizes.

As the water level continues to drop and as arid and windy conditions prevail, a layer of salt is left along the edges of the pond. The longer the dry period, the more this salt layer will extend toward the center of the pond and the thicker the layer becomes (Singer, 2006). On JVD, Cape Wright and White Bay ponds are likely to produce sea salt under these conditions.

Table 9. Salt ponds of JVD and other Profile islands, listed from west to east.

No.	Name	Location	Type/Classification	Issues/Impacts
1	White Bay Pond	White Bay, southwestern coast of Jost Van Dyke	 <p>Photo 17. White Bay Pond, wet season.</p>  <p>Photo 18. White Bay Pond, dry conditions.</p> <p>This is the second largest salt pond on JVD, with fringing White, Black and Buttonwood Mangroves. The pond is flooded most of the year and receives much of this from hillside runoff. There is some inundation from heavy storm surges.</p>	<p>This pond receives considerable runoff from steep hillsides. Heavy rains usually result in flooding that affects the tourism facilities and residences on the south and southeastern edges of the pond.</p> <p>Along the margins, the pond is used to dump refuse of all kinds, and this contributes to problems of flooding and an increase in the number of rats, feral cats and mongooses.</p>
2	Upper Dog Hole Pond	Western Side of Great Harbour, to the east of Dandy Point	<p>This is one of the smallest salt ponds on JVD and is nearly filled with sediments and mostly tree covered. Buttonwood is the dominant mangrove species followed by White Mangroves. It remains dry most of the year as its rain catchment from the hillside is rather small.</p>	<p>The salt pond exhibits no sign of impact, but its location—south of the Ferry Dock—makes it vulnerable to future development.</p>
3	Lower Dog Hole Pond	Western side of Great Harbour, Jost Van Dyke	<p>Located just north of Upper Dog Hole, this salt pond is slightly larger and is fringed with Black, White and Buttonwood Mangroves. It is usually dry for most of the year but becomes flooded during heavy storm surges and when impacted by upland runoff.</p>  <p>Photo 19. Lower Dog Hole Pond, in dry conditions.</p>	<p>The northern end of the pond is being back-filled with rocks, rubble and construction waste. The northwest side of the pond is currently being encroached by fill and residential structures. Its proximity to the Ferry Dock makes it the more vulnerable of the two Dog Hole Ponds.</p>

No.	Name	Location	Type/Classification	Issues/Impacts
4	Great Harbour Salt Pond	Great Harbour, south coast, Jost Van Dyke	<p>A tidal and runoff-flooded mangrove forest system with deep drainage channels that also allow high swells to inundate the pond. Mangroves present include all four species (Red, Black, White and Buttonwood).</p>  <p>Photo 20. Great Harbour Pond, located just east of the Primary School, has standing water all year.</p>	<p>The town of Great Harbour is situated in the middle of the mangrove system and has sectioned the once large mangrove forest into two units. Much of the original size of the pond has been reduced due to ongoing encroachment and landfill.</p>
5	Clean Hole Pond	West side of Garner Bay, southeastern end of JVD	<p>Salt pond with fringing mangroves, including White, Black and Buttonwood Mangroves. The pond has water for most of the year as a result of salt water seepage through the narrow coral rubble and sand berm, as well as from runoff from the surrounding slopes.</p>  <p>Photo 21. Clean Hole Pond.</p>	<p>The perimeter of the pond is filled with refuse discarded by nearby businesses and residents.</p>
6	Cape Wright Pond	North of Long Bay, northeast coast of Jost Van Dyke	 <p>Photo 22. View of the north and east sides of Cape Wright Pond.</p> <p>The largest salt pond on Jost Van Dyke, with all four species of mangroves (Red, Black, White and Buttonwood). Clumps of Red Mangroves also occur along the coastline.</p>	<p>A section of the pond was extensively back-filled with dredge materials in the past, thereby transforming the shallow coastal bay and mangrove systems. The pond is in good condition and remains very attractive to wildlife.</p>
7	Georgy Hole Bay Pond	Georgy Hole Bay, eastern tip of JVD	<p>Perhaps one of the smallest ponds, it has yet to be investigated due to its remoteness and inaccessibility. The pond has water for most of the year as a result of salt water seepage through the narrow coral rubble and sand berm, as well as from runoff from the surrounding slopes.</p>	<p>There are no adjacent developments that affect the health of the pond. The status of the flora and fauna has yet to be determined.</p>

No.	Name	Location	Type/Classification	Issues/Impacts
8	Sandy Cay Salt Pond	Sandy Cay, south of Sandy Spit	<p>This pond covers about a third of Sandy Cay and consists of mangrove woodland and forest, as well as a small area of salt flat. The two mangrove species found are the White Mangrove and the Buttonwood. The pond is in the advanced stages of conversion from a wetland to a terrestrial plant community. It is dry for most of the year except after very heavy rains.</p>  <p>Photo 23. Sandy Cay Pond. The Sandy Cay salt pond remains dry for most of the year; however, during the rainy season, a standing body of water may linger for many weeks.</p>	

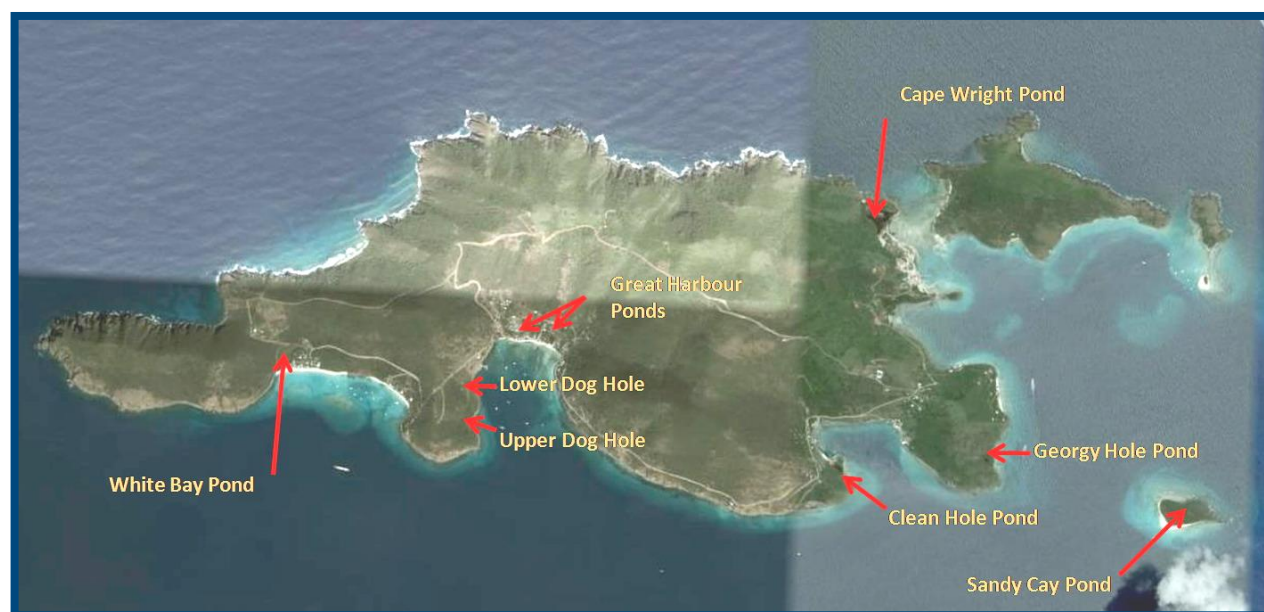


Figure 4.
Location of salt ponds, Jost Van Dyke and Sandy Cay (map source: Google Earth, 2008).

FAUNAL HERITAGE (Terrestrial)

The fauna of Jost Van Dyke and the nearby cays is typical of the islands of the wider Virgin Islands region. Many species are widely distributed in a number of the islands on the Puerto Rico Bank and are as familiar to a Tortolan or St. Thomian as they are to the residents of Jost Van Dyke.

Nevertheless, Jost Van Dyke, Little Jost, Sandy Cay, Green Cay and Sandy Spit are unique entities with their own endemic features that distinguish them from the larger Islands in the BVI. But, like the larger islands, the faunal heritage that characterises Jost Van Dyke and its satellite cays is at risk—as a desire to protect the land and natural resources is weighed along side equally compelling desires to achieve a modern identity and a sustainable economy.

Because of the lack of written records, we can only speculate on what animal species lived on Jost Van Dyke and the nearby isles prior to European settlements. We do know that Amerindians moved quite freely among the islands of the region and often transported faunal species from island to island as food and as pets. Birds, reptiles, amphibians and mammals were introduced throughout the Caribbean, and it is likely that species such as the Agouti were once a part of the fauna of Jost Van Dyke.

Other animals were important food sources, including:

- the **Puerto Rican Hutia** (*Isolobodon portoricensis*), an extinct mammal resembling a large Agouti, another rodent to which it was related;
- the small insectivore, the **West Indian Shrew** (*Nesophontes*), endemic (native) to the Greater Antilles, and now extinct;
- the now quite rare and endangered **Puerto Rican Parrot** (*Amazona vittata*), and
- the **Anegada Iguana** (*Cyclura pinguis*).

Animals were easily moved about and “cultivated” or allowed to “stock” forested areas for later retrieval. We know that this was a common practice of the Amerindians throughout the region, and it is likely that Jost Van Dyke, Little JVD, Green Cay and Sandy Cay were treated similarly. Quite possibly, by the time of European colonisation, many of the native animals had started to decline and even disappear; but additional archaeological and paleontological work is needed to help define the past faunal assemblage.

Today, the terrestrial fauna we find on Jost Van Dyke and its neighbouring cays is a jig saw puzzle of recent immigrants and native fauna. Most of the amphibians, reptiles, birds and mammals are native, meaning that they existed on the island naturally or had been there for

long periods prior to the arrival of Old World peoples.

For invertebrates (species without a backbone, such as insects), relatively little is known about the native species, but we do know that following colonisation, many new species were introduced, and, with modern trade, many more have arrived and will undoubtedly continue to arrive.

To the casual observer, JVD's most obvious animals are birds, especially seabirds, plus the island's goats and sheep and the ubiquitous mongoose—all recent imports brought to the island from elsewhere. They roam the island landscape freely and are often seen in Great Harbour or on the main road leading to the eastern end of the island.

The fauna of Jost Van Dyke and the satellite islands are discussed below within the following broad categories:

1. **Birds**
2. **Mammals**
3. **Amphibians**
4. **Reptiles**
5. **Invertebrates**

Table 13 in the final chapter of this *Profile* provides a list and locational information on faunal species of “**special concern**” found on Jost Van Dyke and the other Profile islands

1. BIRDS

For the scientific names of birds mentioned in this subsection, consult Table 10.

When first-time visitors to Jost Van Dyke disembark from the public ferry or private yacht in Great Harbour, the first faunal group they are likely to encounter will be the island's bird population. From the reptilian-appearing **Brown Pelican**, seen as it glides effortlessly over the mast of the yachts, to the **Brown Booby**, with its drab brown colour and horn-like, yellowish-brown bill, or the raucous **Laughing Gull** with its jarring cackle, the waters around JVD and the nearby cays abound with the cries and calls of hundreds of seabirds, especially during the spring and summer months when they come to the Virgin Islands to breed.

A walk along the main roads in Great Harbour will find heads turning to spot the ubiquitous **Pearly-eyed Thrasher** as it calls from its perch atop the tallest trees or from the tangle of vines and thorns. The area to the rear of Foxy's Restaurant is always a spot to view this very curious species. It can easily be called into view by using "swishing" or "squeaking" noises.

There are at least 60 species of birds recorded for Jost Van Dyke and the nearby cays (see **Table 10**), including one of the most secretive, the **Bridled Quail Dove**, or Turtle Dove as it is sometimes called locally (see **Photo 24**). This very rare species inhabits the last remaining



Photo 24.

Bridled Quail Dove (*Geotrygon mystacea*), locally named Turtle Dove.

tracks of forest on the northern slopes of Jost Van Dyke. In fact, many of the bird species found on the Profile islands are among the Territory's rarest. For example, consider the **Red-billed Tropicbird**, a species that spends most of its adult life far out at sea, but during the breeding season it nests on the northern inaccessible cliffs of both Jost Van Dyke and Sandy Cay, in small cavities and overhangs. From these often sheer walls, this beautiful white bird—with its long tail streamers and red bill—can sometimes be seen, darting from the rocks and over the waves in search of squid and other prey to feed its chicks.

On the eastern end of Jost Van Dyke and on the nearby cays, the uncommon to rare **Northern Mockingbird** can occasionally be seen flitting from the tops of trees, especially along the coast, in search of insects. This mimid (from the family Mimidae) is a relative of the

Pearly-eyed Thrasher. It mimics the calls of other birds and is itself an impressive singer. It is a drab grey species and is primarily found on the eastern coasts of the Profile islands, although it is sometimes found throughout all coastal areas of Jost Van Dyke.

The **White-crowned Pigeon**, with its slate-grey body and white crown (hence its common name), can sometimes be found on Sandy Cay and undoubtedly, from time to time, on the other Profile islands. This is now a rare migrant, but was once a relatively common nesting species that was hunted to near extinction. It may be seen occasionally, especially during the spring and summer months.

Table 10.
Bird species identified for Jost Van Dyke,
Little Jost Van Dyke, Green Cay, Sandy Cay, and Sandy Spit.

COMMON NAME	SCIENTIFIC NAME	JVD	LJVD	GC	SC	SS
Red-billed Tropicbird	<i>Phaethon aethereus</i>	X			X	
White-tailed Tropicbird	<i>Phaethon lepturus</i>				X	
Brown Booby	<i>Sula leucogaster</i>	X	X	X	X	
Brown Pelican	<i>Pelecanus occidentalis</i>	X	X	X	X	X
Magnificent Frigatebird	<i>Fregata magnificens</i>	X	X	X	X	X
Great Egret	<i>Ardea alba</i>				X	
Little Blue Heron	<i>Egretta caerulea</i>	X			X	
Great Blue Heron	<i>Ardea herodias</i>	X				
Green Heron	<i>Butorides virescens</i>	X			X	
Yellow-crowned Night Heron	<i>Nyctanassa violacea</i>	X			X	
Cattle Egret	<i>Bubulcus ibis</i>	X				
White-cheeked Pintail	<i>Anas bahamensis</i>	X			X	
Red-tailed Hawk	<i>Buteo jamaicensis</i>	X		X		
Osprey	<i>Pandion haliaetus</i>	X			X	
Merlin	<i>Falco columbarius</i>	X				
American Kestrel	<i>Falco sparverius</i>	X			X	
Wilson's Plover	<i>Charadrius wilsonia</i>	X			X	
Lesser Yellowlegs	<i>Tringa flavipes</i>	X				
American Oystercatcher	<i>Haematopus palliatus</i>	X		X	X	
Black-necked Stilt	<i>Himantopus mexicanus</i>	X				
Black-bellied Plover	<i>Pluvialis squaterola</i>				X	
Semipalmated Plover	<i>Charadrius semipalmatus</i>				X	
Solitary Sandpiper	<i>Tringa solitaria</i>				X	
Ruddy Turnstone	<i>Arenaria interpres</i>	X			X	
Sanderling	<i>Calidris alba</i>				X	
Spotted Sandpiper	<i>Actitis macularia</i>	X				
Semipalmated Sandpiper	<i>Calidris pusilla</i>				X	
Stilt Sandpiper	<i>Calidris himantopus</i>				X	
Laughing Gull	<i>Larus atricilla</i>	X	X	X	X	X
Gull-billed Tern	<i>Sterna nilotica</i>				X	
Royal Tern	<i>Sterna maxima</i>	X			X	
Sandwich Tern	<i>Sterna sandvicensis</i>			X	X	X
Roseate Tern	<i>Sterna dougallii</i>	X		X	X	X
Common Tern	<i>Sterna hirundo</i>				X	
Least Tern	<i>Sterna antillarum</i>	X			X	
Bridled Tern	<i>Sterna anaethetus</i>				X	

COMMON NAME	SCIENTIFIC NAME	JVD	LJVD	GC	SC	SS
Sooty Tern	<i>Sterna fuscata</i>				X	
Brown Noddy	<i>Anous stolidus</i>				X	
Scaly-naped Pigeon	<i>Columba squamosa</i>	X	X		X	
White-crowned Pigeon	<i>Columba leucocephala</i>				X	
White-winged Dove	<i>Zenaida asiatica</i>	X				
Bridled Quail Dove	<i>Geotrygon mystacea</i>	X				
Zenaida Dove	<i>Zenaida aurita</i>	X	X	X	X	
Common Ground-Dove	<i>Columbina passerina</i>	X	X		X	
Mangrove Cuckoo	<i>Coccyzus minor</i>	X	X		X	
Green-throated Carib	<i>Eulampis holosericeus</i>	X	X		X	
Antillean Crested Hummingbird	<i>O. cristatus</i>	X			X	
Belted Kingfisher	<i>Ceryle alcyon</i>	X			X	
Caribbean Elaenia	<i>Elaenia martinica</i>	X			X	
Gray Kingbird	<i>Tyrannus dominicensis</i>	X	X	X	X	
Caribbean Martin	<i>Progne dominicensis</i>	X			X	
Barn Swallow	<i>Hirundo rustica</i>				X	
Northern Mockingbird	<i>Mimus polyglottos</i>	X				
Pearly-eyed Thrasher	<i>Margarops fuscatus</i>	X	X	X	X	
Black-whiskered Vireo	<i>Vireo altiloquus</i>	X				
Yellow Warbler	<i>Dendroica petechia</i>	X	X		X	
Prairie Warbler	<i>Dendroica discolor</i>				X	
American Redstart	<i>Setophaga ruticalla</i>	X				
Northern Waterthrush	<i>Seiurus noveboracensis</i>				X	
Louisiana Waterthrush	<i>Seiurus motacilla</i>	X				
Bananaquit	<i>Coereba flaveola</i>	X	X		X	
Lesser Antillean Bullfinch	<i>Loxigilla noctis</i>	X	X			
Black-faced Grassquit	<i>Tiaris bicolor</i>	X			X	

SOURCES:

Jost Van Dyke (JVD):

IRF Fieldwork for Environmental Profile Project (2008); EConcerns, Ltd. (2006).

Little Jost Van Dyke (LJVD):

IRF Fieldwork for Environmental Profile Project (2008).

Green Cay (GC):

IRF Fieldwork for Environmental Profile Project (2008); Lewis & Associates, Ltd. (1999).

Sandy Cay (SC):

Bacle and Towle (2008).

Sandy Spit (SS):

Lewis & Associates, Ltd. (1999).

Many of the species of birds of Jost Van Dyke and its neighbouring cays are relatively common and widely distributed throughout the wider Caribbean and, in the case of some migrants, in North America. During the fall, winter and early spring, the local bird populations are augmented by many species of migrant warblers, shorebirds, waterfowl and herons, who spend the cold winter months in the tropics.

Some of these species include the bright red and black **American Redstart**, one of North America's most iconic warblers; the **Solitary Sandpiper**, a species found at the shallow edges of mangrove ponds and along the beach; and wading birds that often mingle in mixed flocks with the resident **White-cheeked Pintail** in the mangrove ponds.

Some species of resident birds are rather common and are the best known of the local species. These include the **Black-faced Grassquit**, the **Bananaquit**, the **Yellow Warbler**, the **Scaly-naped Pigeon** (a close relative of the White-crowned), and the **Zenaida Dove**.

A local resident that is easily observed around Great Harbour, although it is not a common species in any of the Virgin Islands, is the **Lesser Antillean Bullfinch**. This species, which arrived in the Virgin Islands and Puerto Rico from the Lesser Antilles in the 1950s and 1960s, is locally common around the beach area and homes in Great Harbour. It is also found in smaller numbers at White Bay

and on the eastern end of JVD and on Little Jost, although in lesser numbers.

Another recent arrival to JVD and other Virgin Islands is the **White-winged Dove**. This species arrived naturally in large numbers in the late 1990s and early 2000s, and is now well established as a resident. It sometimes mixes in flocks with the long-established Zenaida Dove, and the two species seem to coexist rather well.

Other relatively common species include the **Grey Kingbird**, the **Caribbean Elaenia**, the less common, though often heard but not seen **Black-whiskered Vireo**, and the **Mangrove Cuckoo**.

2. MAMMALS

The most visible and dominant mammals on Jost Van Dyke are **goats** (*Capra hircus*), **sheep** (*Ovis aries*), and the small, introduced **Indian Mongoose** (*Herpestes javanicus*). Cattle raising on the island was discontinued in the 1980s.

While the goats and sheep roam freely on the island, they are the private property of local residents and represent important individual investments; their presence has long been a part of respected social and economic practices on Jost Van Dyke. Unfortunately, the animals also continue to degrade the natural landscape by:

- aiding the ongoing deforestation of the island,

- eliminating plant and animal species,
- preventing seedling growth, and
- eventually causing considerable soil loss, desiccation, and erosion.

Much of the landscape of JVD, Little JVD, and Green Cay has been transformed into what can be termed "goat climaxed" plant communities. These communities are rather depauperate and resemble nothing like the lush, semi-evergreen forests and shrublands that were native to these islands. Such is not the case at Sandy Cay, which has remained free of goats.

Although not present on Sandy Cay and Sandy Spit, and not seen on Green Cay or Little Jost Van Dyke, the Indian Mongoose is certainly ubiquitous on Jost Van Dyke, especially in Great Harbour, White Bay and Little Harbour, where it thrives around human activity. The mongoose was introduced to JVD in the mid-to-late 1970s (*pers. comm.*, Susan Zaluski, JVDPS, 2009) apparently to control the snake population. Unfortunately, its continued presence and the increase in its resident population have negatively affected faunal biodiversity, particularly by reducing native species of snakes, lizards and birds.

Common on all of the Profile islands, with the exception of Sandy Cay, is the **Black Rat** (*Rattus rattus*), also named **Tree Rat** because it is an agile climber and frequently nests in trees. They arrived in the

Caribbean region beginning in the fifteenth century, unwittingly transported from the Old World aboard European sailing ships. Ecologically this species is extremely adaptable; it is able to live in a wide variety of habitats and exploit many different food sources.

Many of the small islands in which the Black Rat was introduced lacked native ground predators, leaving many other species extremely vulnerable to rat attack and, in some cases, subject to eventual decline. The invasive Black Rat was eradicated from Sandy Cay in late 2002 (Varnham, 2003). Since the removal of rats, a resurgence of avifauna and lizards has been noted at the island.

Feral cats (*Felis catus*) were observed at the JVD waste disposal site. They were scavenging on recent piles of trash and appeared to be in such poor health that they should probably be trapped and taken to the BVI Humane Society. In general, feral cats prey on birds, amphibians and reptiles, having a negative effect on the size and well-being of these populations. An effort should be made to prevent cats from reproducing and wandering in the wild on Jost Van Dyke.

At night, bats fill the skies over Jost Van Dyke, and, most probably, Little Jost. These are the only native mammals remaining in all of the British and U. S. Virgin Islands. As part of the Profile team's field surveys in 2008, researchers often manned

bat nets at night, with the nets strung across paths to capture bats for analysis. When JVD residents encountered the researchers, they often expressed surprise and even apprehension to learn that bats were so plentiful throughout the island.

We now know that there are at least four bat species on JVD (Kwiecinski, *et al.*, forthcoming). These are:

- the small **Roof Bat**, also named Pallas' Mastiff (*Molossus molossus*) (**Photo 25**), most often seen leaving its roof roosts just before dusk;
- the common **Jamaican Fruit Bat** (*Artibeus jamaicensis*) (**Photo 26**);
- the **Antillean Cave Bat** (*Brachyphylla cavernarum*); and
- the **Fishing Bat** (*Noctilio leporinus*).

Many residents see this latter species fishing for its customary prey of small fish near the shores of Great Harbour, but, surprisingly, take little notice and do not realise that this animal actually resides on the island.

As the bats wing their way through the darkness of night, little noticed by most Jost Van Dykians, these winged denizens are either clearing the skies of pesky insects such as mosquitoes—a job for the small insectivorous Roof Bat—or are munching on the fruits, leaves and nectar of many species of



Photo 25.
The Roof Bat (*Molossus molossus*), common on Jost Van Dyke.



Photo 26.
The Jamaican Fruit Bat (*Artibeus jamaicensis*), common on Jost Van Dyke.

plants in the upland forests and in gardens.

Bats help to control insect pests, keeping numbers much lower than if they were not present. Fruit bats such as *Artibeus* and *Brachyphylla* help spread the seeds of many forest plants, keeping the forest alive and healthy. Bats also help in the pollination of certain plants that flower at night, such as the Pipe Organ Cactus (*Pilosocereus royerii*). Without bats, life would be less comfortable and less ecologically full, not only on Jost

Van Dyke but on all of the British Virgin Islands.

3. AMPHIBIANS

For the scientific names of amphibians mentioned in this sub-section, consult Table 11.

If birds capture the attention of Jost Van Dykians in the day, the night truly belongs to the frogs. Jost Van Dyke comes alive after sunset when thousands of these tiny amphibians call from their perches—their whistles, beeps and peeps echoing down the steep valleys or slowly carried on the air like a mist at the bottom of Great Harbour. Their calls are almost deafening.

There are at least five species of frogs on Jost Van Dyke. None are known from the nearby cays, although LJVD may have a few species. The species of frogs of Jost Van Dyke include:

- the **Virgin Islands Coqui**;
- the **Antillean Frog** (or **Churi Coqui**);
- the **Mute Frog** — Its name is somewhat of a misnomer since the animal does vocalize, although it is mostly silent. It is known only from Great Harbour, and is believed to be a recent introduction to the island (Perry, forthcoming);
- the **Whistling Frog**; and
- the **White-lipped Frog**, a species of small freshwater pools and damp places.

Some of these species are among the rarest in all of the Virgin Islands. The **Virgin Islands**

Coqui species is a Virgin Islands endemic (native to the Virgin Islands) and is believed to be extinct on the U.S. Virgin Islands. It, and the **Mute Frog**, are classified as endangered (E) on the IUCN Species List (IUCN, *et al.*, 2004). Trade of this species is strictly prohibited, and efforts should be made to protect the habitat and populations of this rare gem.

Although the **White-lipped Frog** is relatively common in most of the Virgin Islands, on JVD, it is rare; it is limited by the availability of suitable habitat, including freshwater. The species is found around human settlements such as Great and Little Harbour where freshwater is more commonly available.

Another amphibian, the **Virgin Island Worm Lizard** is a secretive burrower that lives primarily below ground. This worm-like species is believed to be native on Jost, but no specimens were available for study.

4. REPTILES

For the scientific names of reptiles mentioned in this sub-section, consult Table 11.

The most well-known reptiles of Jost Van Dyke and its satellite islands are its lizards. There are several species, some of which are well known to residents, while others are more secretive and reclusive. The more common species include three anoles:

- the **Crested Anole** (or **Man Lizard**), the largest

anole species on JVD and most of its sister cays;

- the **Grass Anole**, a species that hides among the tall grasses and shrubs; and
- the **Barred or Bark Anole**, commonly seen on large rocks, boulders and along the trunks of trees.

Jost Van Dykians have grown up with a local legend concerning the **Common Woodslave** (also known as the House Gecko). It is believed that this gecko can attach itself to human skin and the only way the individual so afflicted can be rid of the gecko (before it can place a curse!) is to use hot water to pry it loose. This is entirely false, and the animal is virtually harmless. The gecko is a relatively recent import to the Profile islands, transported, we believe, to the Caribbean from Africa during the slave trade. This animal is common in homes as well as the forests of Jost Van Dyke and Little JVD.

Another gecko, the **Dwarf Gecko**, is a diminutive species found in leaf litter and under rocks and logs in forests and gardens (see **Photo 27**). This species is found throughout the



Photo 27. Dwarf Gecko
(*Sphaerodactylus macrolepis*).

Virgin Islands and Puerto Rico, and, in some places, it is believed to be one of the most abundant vertebrates on earth.

However on Jost, Little Jost, Green Cay and Sandy Cay, it is relatively uncommon to rare. This is likely due to the limited leaf litter available to the species. Severe erosion caused by grazing goats has washed away much of the necessary detritus that this species relies on for survival. In some places, the species is entirely absent.

This is unfortunate since this small but beautiful species is one of the most enigmatic members of Jost Van Dyke's native fauna, and its slow decline is a sad end note to its past habitation of Jost Van Dyke, Little Jost, Green Cay and Sandy Cay.

Among the most uncommon of Jost Van Dyke's reptiles is the **Ground Lizard** or Ameiva. The survey team noted a very low population on JVD; it is more common on Little Jost and rare to extinct on Green Cay. This species has been decimated by the mongoose, and is only found sparingly at Great Harbour. The Ground Lizard is very common on Sandy Cay due to the absence of mongoose and rats.

One of the most feared of all of JVD's animals is the **Tree Boa**. This very rare endemic snake is a harmless, docile creature that hunts by night. It eats rats, mice, lizards, insects and small birds. However, stories often repeated by islanders tell tales of a predator that is vicious to

humans and able to kill with its glassy stare. In truth, the species is deliberate in its efforts to avoid human confrontations and, instead, spends its days hidden among rock heaps, crevices and holes and comes out after dark to feed on sleeping animals.

In the mid-to-late 1970s, the small **Indian Mongoose** was introduced to JVD and Little JVD in an attempt to rid the islands of the pestilent snakes. In this, the mongoose has been quite effective, though not entirely. Snake species survive on Jost, although precariously, and much more effort is needed to save the **Tree Boa**—a unique Virgin Islands native— from extinction. Residents need to be aware that the snakes of JVD are harmless, and, in fact, the mongoose has done more harm to the island's natural heritage than the snake ever has.

Other species of snakes on Jost Van Dyke and nearby islands include the **Blind Snake**, which is a small worm-like snake that lives primarily below ground and is almost entirely blind. There is also the **Puerto Rican Racer**, now confined to Green Cay. This species is quite rare and in danger of becoming extinct on this island due to habitat destruction by goats.

5. INVERTEBRATES

In the minds of many, invertebrates, such as insects, are merely pests, somewhat loathsome creatures that carry disease, inflict bites, or infect food.

Insects such as mosquitoes and flies would assuredly be high on human-compiled lists of "most annoying and despised" animals. But most insects are not bothersome, and, in fact, we still do not know most of the species that inhabit JVD and other nearby islands.

Yet, the irony is that Invertebrates make up the largest number of species of living things on JVD; they comprise the largest biomass, that is, the largest weight of living and dead matter on the island. Along with fungi, mosses lichens, and bacteria, they are the real "movers and shakers" of the island, *i.e.*, they are the most abundant of the island's species and therefore play a significant role in the ecology of Jost Van Dyke and its satellite islands.

The invertebrates of Sandy Cay are the best known of the five Profile islands (although there is still much we do not know about them). In 2000, as part of an IRF-led study of Sandy Cay (IRF, 2001b), Dr. Michael Ivie, one of the most knowledgeable experts on Eastern Caribbean invertebrates, undertook a survey of Sandy Cay's fauna. His report on the invertebrates of Sandy Cay (included in the IRF study) provides a comparative overview and case study of the complexity of the fauna, the number of species, and analysis of how much work remains to detail the true nature of the resident species.

During the field surveys for the Profile project, as the team of ecologists set out to search JVD's landscape for details on

what makes the island truly functional as an ecological whole, the team encountered fascinating species of insects and other invertebrates in the wilds of the island. Because they are small in size and generally disliked by the human inhabitants of this shared landscape, the deeply intricate and complicated life cycles of these animals and their inter-connectedness to the overall fabric of insular life mostly goes unnoticed.

On Jost Van Dyke and Sandy Cay, **scorpions** abound, but most people never see a single specimen. This is testament to just how secretive these animals are and how much they shun humans. At least one species in the genus *Centuroides* is found on JVD and is undoubtedly to be found on all of the nearby islands (see **Photo 28**).

Along with centipedes, spiders are some of the most feared of what some residents might term the “creepy crawlies.” On Jost Van Dyke and most of the satellite islands, spiders are widespread. Some of the common forms include members of the family Mygalomorphae, which build silk-lined holes in the ground. Some species are also found under logs and rocks.

Also present are more typical spiders, such as the Orb Weavers. One species on JVD and throughout the Virgin Islands builds rather large webs and can often be seen perched in the middle of its trap as it awaits prey. This species can



Photo 28. The most common scorpion.

grow up to more than 12 centimetres (5 inches) across.

Of the more noticeable invertebrates of these islands is the large millipede. There are two species on these islands, and both can often be found in gardens, homes, backyards and more natural areas. Both species belong to the genus *Anadenobolus* and are widely distributed throughout the Virgin Islands and Puerto Rico. There are several subspecies of these animals, but very little else is known about them on Jost Van Dyke and the other Profile islands.

Of the larger invertebrates, crabs are the most prominent and dominant. Several species occur, and these include the beloved **Hermit Crab**—or **Soldier Crab** as it is locally called. The species lives in forests and woodlands but occasionally may go into yards. It feeds on decaying leaves, fungi, fruits and flowers, and is often collected by local fisherman and used as bait.

As the Hermit Crab grows, it discards its shell for a larger one. Its preferred replacement shell is usually that of the West Indian

Top Shell, a species of marine mollusk that has been severely over-collected for the pot and is now very threatened throughout the Caribbean. As a result, Hermit Crabs cannot find suitable shells to grow into. On maturity, these animals make the long and difficult trek from high slopes down to the coast to deposit their eggs in the ocean, and afterwards make their way back up to the hinterlands.

Other members of the crab family include the **Land Crab** and **Giant Land Crab**. The former is quite easily observed by the dozens behind Foxy's Restaurant in Great Harbour.

Another family of crabs typically found along the coast—on the beaches, on coastal rocks, in mangrove and salt ponds—includes the **Ghost** and **Fiddler Crabs**. These belong in the family Oxypodidae, and several species inhabit most of the Profile islands.

The more recognisable insects are what non-scientists might simply call “bugs”. These belong to the class Insecta, as opposed to spiders, for example, which have eight legs—not six—and belong to the order Arthropoda. Among the myriad of diverse insects with which Jost Van Dykians would be very familiar is the cockroach, in its many shapes and sizes. Most species avoid human habitations and prefer forested areas. There are many forest species of roaches, some even wingless. These belong to the order Blattodea.

Some of the more spectacular insects of Jost Van Dyke are members of the order Hemiptera. These are the **Jewel Bugs**, a group of richly coloured insects with iridescent greens, reds, yellows and blacks belonging to the genus *Pachycoris*. They are usually forest insects.

Of the more recognisable pestilent species, flies are perhaps the second most obvious after mosquitoes. There are several native species, and many of these are critical to the pollination of native plants. Without them, many plants would not be able to survive.

Beetles, despite their seeming scarcity to most observers, are actually quite abundant. There are many species on Jost Van Dyke and the satellite islands; some are very brightly coloured, even in iridescent green like the **Chrysomelid Beetle**, found on the leaves of Crotons in large

colonial masses during the summer and fall months.

One of the most despised insects is the termite, simply because it can eat its way into island homes and residents' belongings in a very short time. There are several species of termites found in the Profile islands, but the most well known is the architect of the large arboreal nests so often seen in forested areas, sometimes high up in trees. These termites can construct homes that weigh over 45 kilos, and well over 120 centimetres in diameter.

A termite-control programme has been carried out at Sandy Cay since the mid-1990s; it was implemented following a series of hurricanes and the subsequent proliferation of termite populations due to the abundance of dead wood. A policy was established to allow termite nests to remain in the interior of the island, but to be eliminated from the island's walking trail.

Termite colonies play an important role in the ecology of Sandy Cay and other islands in that they break down fallen branches and plant debris that would otherwise accumulate and be a fire hazard. They are also an important source of food for a number of insect-eating birds and lizards (Bacle and Towle, 2008).

But the most colourful and celebrated insects of Jost Van Dyke and the satellite cays are members of the order Lepidoptera, the butterflies and moths. There are many species, including the **Red Rim**, the **Gulf Fritillary** and the **Zebra**, with its horizontal black and yellow-green banding.

The more common species of mammals, amphibians, reptiles, and invertebrates found on Jost Van Dyke and its satellite islands are listed in **Table 11**.

Table 11.
Common mammals, amphibians, reptiles, and invertebrates for Jost Van Dyke,
Little Jost Van Dyke, Green Cay, Sandy Cay, and Sandy Spit.

STATUS:

EN Endangered **U** Uncommon **A** Abundant **NO** Does Not Occur
R Rare **C** Common **NS** Not Seen

COMMON NAME	SCIENTIFIC NAME	JVD	LJVD	GC	SC	SS
MAMMALS						
Goat	<i>Capra hircus</i>	C	C	C	NO	NO
Sheep	<i>Ovis aries</i>	C	NO	NO	NO	NO
Indian Mongoose	<i>Herpestes javanicus</i>	C	NS	NS	NO	NO
Cat (Feral Cat)	<i>Felis catus</i>	U	NS	NO	NO	NO
Black Rat	<i>Rattus rattus</i>	C	C	C	NO	NS
Roof Bat (or Pallas' Mastiff)	<i>Molossus molossus</i>	C	NS	NS	NS	NS
Jamaican Fruit Bat	<i>Artibeus jamaicensis</i>	C	NS	NS	NS	NS
Antillean Cave Bat	<i>Brachyphylla cavernarum</i>	U	NS	NS	NS	NS
Fishing Bat	<i>Noctilio leporinus</i>	U	NS	NS	NS	NS
AMPHIBIANS						
Antillean Frog	<i>Eleutherodactylus antillensis</i>	C	NS	NO	NO	NO
Whistling Frog	<i>Eleutherodactylus Cochranæ</i>	C	NS	NO	NO	NO
Mute Frog	<i>Eleutherodactylus lentus</i>	EN	NS	NO	NO	NO
Virgin Islands Coqui	<i>Eleutherodactylus schwartzi</i>	EN	NS	NO	NO	NO
White-lipped Frog	<i>Leptodactylus albilabris</i>	R	NS	NO	NO	NO
REPTILES						
Crested Anole (Man Lizard)	<i>Anolis cristatellus</i>	A	C	C	A	U
Barred Anole	<i>Anolis stratulus</i>	C	C	NS	NS	NS
Grass Anole	<i>Anolis pulchellus</i>	C	C	NS	NS	NS
Ground Lizard	<i>Ameiva exsul</i>	U	U	NS	C	NS
Dwarf Gecko	<i>Sphaerodactylus macrolepis</i>	A	C	US	C	U
House Gecko (Wood Slave)	<i>Hemidactylus mabouia</i>	C	C	NS	NS	NS
Blind Snake	<i>Typhlops richardi</i>	C	NS	NS	NO	NO
Virgin Island Tree Boa	<i>Epicrates monensis</i>	E	NS	NO	NO	NO
Puerto Rican Racer	<i>Alsophis portoricensis</i>	NS	NS	R	NO	NO
INVERTEBRATES						
Tree Snail	Family <i>Pleurodontidae</i>	C	NS	NS	NS	NS
Scorpion	Genus <i>Centuroides</i>	C	C	C	C	NS

COMMON NAME	SCIENTIFIC NAME	JVD	LJVD	GC	SC	SS
Orb Weaver Spider	Order <i>Araneophae</i>	C	C	NS	NS	NS
Millipede	Order <i>Anadenobolus</i>	C	C	NS	NS	NS
Hermit Crab (Soldier Crab)	<i>Coenoloita clypeata</i>	C	C	C	C	NS
Land Crab	Genus <i>Gecarcinus</i>	C	NS	NS	NS	NS
Giant Land Crab	<i>Cardisoma guanhumi</i>	C	NS	NS	U	NS
Fiddler Crab	Family <i>Oxypodidae</i>	C	NS	NS	NS	NS
House Fly	<i>Musca domestica</i>	C	C	C	C	NS
Jewel Bug(s)	Genus <i>Pachycoris</i>	C	NS	NS	NS	NS
Chrysomelid Beetle	Genus <i>Altica</i>	C	C	C	C	NS
Termite	<i>Nasutitermes costalis</i>	C	C	C	C	NS
Red Rim Moth	<i>Biblis hyperia</i>	C	C	C	C	NS
Gulf Fritillary	<i>Agraulis vanillae</i>	C	C	C	C	NS
Zebra Moth	<i>Heliconius charitonia</i>	C	C	NS	NS	NS

SOURCES:

Jost Van Dyke (JVD):

IRF Fieldwork for Environmental Profile Project (2008).

Little Jost Van Dyke (LJVD):

IRF Fieldwork for Environmental Profile Project (2008), Teytaud (1983), Lazell (1980).

Green Cay (GC):

IRF Fieldwork for Environmental Profile Project (2008), Teytaud (1983), Lazell (1980), Lazell (1980).

Sandy Cay (SC):

Additional information available in IRF (2001b), Bacle and Towle (2008).

Sandy Spit (SS):

Teytaud (1983), Lazell (1983).

BIODIVERSITY ISSUES	ACTION OPTIONS AND OTHER RECOMMENDATIONS
<p>BIODIVERSITY ISSUE ONE</p> <p>Invasive Species: Jost Van Dyke currently faces the considerable challenge of how best to manage the invasive faunal species that have become a part of island life.</p> <p>Of primary concern is the issue of free-roaming goats in all of the Profile islands except Sandy Cay and Sandy Spit. Uncontrolled, free-grazing livestock have significantly contributed to land deterioration in the form of soil loss and erosion and have caused considerable reduction in the island's biodiversity, particularly its vegetative land cover.</p> <p>The introduction of the mongoose has also contributed to a reduction in wildlife. The health plight of feral cats scavenging at the waste disposal site represents a further invasive issue that needs to be addressed.</p>	<p>To deal with these issues effectively, the community must first reach agreement about a course of action. This will be a challenge but could be accomplished by employing steps similar to the following:</p> <ul style="list-style-type: none"> ✓ increasing public awareness about the short- and long-term impacts of invasive species on the islands' environment and the consequences of inaction; ✓ identifying options and alternatives to remedy each issue and assessing the pros and cons of each, and ✓ seeking government assistance or external expertise when community resources are not adequate to meet desired outcomes. <p>More specific recommendations are provided below, categorised by type of invasive.</p> <p>Goats (See also Chapter 8, Issue One in the Recommendations section.)</p> <ol style="list-style-type: none"> 1. An initial step in remedying the environmental damage caused by the free-roaming goat population might be the establishment of an experimental programme for Green Cay, designed to eliminate or remove all goats from that island. <p>Green Cay is currently the property of the BVI Government (Crown Land), and is targeted as a future protected area within the BVI's <i>Protected Areas System Plan</i> (Gardner, 2007). The difference in the level of biodiversity on Green Cay (with goats) compared to nearby Sandy Cay (goat free) is dramatic, especially considering that both islands are approximately the same size. The JVD community could seek support from the NPT to remove goats from Green Cay as the National Parks Trust has experience in this process.</p> <p>Little Jost Van Dyke, which has similar conditions to Green Cay, should also be considered for a goat-removal programme.</p> 2. To manage the goats on JVD will require more involvement by the community in order to achieve common purpose. A first step in this process should be the assemblage of information about the numbers and ownership status of the island's goat population, including the population that can be identified as property of a specific owner and the population that is free-ranging. <p>Individual goat owners will need to be encouraged to maintain their goats within their own property; how to accomplish this is perhaps the primary environmental challenge faced by the JVD community. Additionally, free-ranging goats should be removed from critical habitats or natural areas that require restoration because of previous goat impact.</p> <p>All of these recommendations require compromise and agreement within the community that action is required before more of the island's natural resources have been lost.</p>

BIODIVERSITY ISSUES	ACTION OPTIONS AND OTHER RECOMMENDATIONS
	<p>Mongoose</p> <ol style="list-style-type: none"> 3. The mongoose-control programme in and around the Great Harbour community should be revived, including local training to jumpstart the effort. Training exercises should emphasise: (1) current mongoose impact on wildlife and the long-term consequences of inaction; (2) alternatives for controlling and monitoring the mongoose population; and (3) assessment of costs and sources of support to maintain the programme. 4. Consideration might be given to preparing a mongoose control-and-monitoring manual specific to the requirements of the JVD community. <p>Feral Cats</p> <ol style="list-style-type: none"> 5. The small population of cats that is currently scavenging at the public waste disposal site should be removed due to the poor state of their health (perhaps with the assistance of the BVI Human e Society).
<p>BIODIVERSITY ISSUE TWO</p> <p>Salt Ponds: Many JVD salt pond habitats are under serious threat from the dumping of refuse and waste into the ponds, including construction waste and sediments to reclaim wetlands. Not only does this negatively impact the ecology of mangrove forests and wildlife habitats, but the practice also increases the risk of pests such as rats, feral cats and mongooses and reduces the capacity of the ponds to contain floods, protect the coastline, and sustain local fisheries.</p>	<ol style="list-style-type: none"> 1. Salt ponds and mangrove forests that have been used as waste deposit sites need to be cleaned up, and waste and refuse should be removed, perhaps as part of a targeted "island clean-up" or "anti-litter" campaign. Priority ponds are those at White Bay and Great Harbour and the Clean Hole Pond. 2. The Department of Solid Waste should consider relocating garbage disposal sites at the edges of salt ponds, as their presence near these wetlands encourages users to dump additional materials into the ponds. 3. Throughout the Caribbean, salt ponds have been under-appreciated for the valuable environmental services they perform, often viewed as little more than a nuisance. In this context, recent educational programmes sponsored by the JVDPS s are very positive and timely. A specific emphasis on wildlife, (such as participating in NPT's bird count programmes, with an emphasis on bird counts at JVD's salt ponds) can be a particularly useful focusing device for stimulating more general interest and concern about broader environmental issues, such as the importance of protecting salt ponds. 4. Because they serve as valuable avian habitats and provide storm wave buffering protection, the filling of ponds should always be avoided. 5. Mangrove seedlings could be planted in degraded mangrove areas. The JVD Primary School could be involved, with assistance from C&FD and NPT.

BIODIVERSITY ISSUES	ACTION OPTIONS AND OTHER RECOMMENDATIONS
<p>BIODIVERSITY ISSUE THREE</p> <p>Loss of Plant Diversity and Deforestation: Over the years, feral and free-roaming livestock have expanded their range into the forests and woodlands of JVD, LJVD, and GC. Their destructive practices have negatively impacted many plant species, the growth and recovery of surviving forests, and the wellbeing of animal species that depend on healthy forests and woodlands to survive.</p>	<ol style="list-style-type: none"> 1. The concept of community stakeholders sharing or collaborating on management tasks where complex natural resources are intermixed with other land uses is not a new one but has been little practiced in the British Virgin Islands. The idea is to employ a process of stakeholder collaboration that leads to a shared commonality of purpose in the community, within a larger framework that sometimes is referred to as "co-management". Community management can be a government-led initiative or it can be an initiative led by community leaders or community organisations. <p>To implement this approach, the JVD community would collaboratively assess options for establishing "management zones" on the island. Such areas would be similar to "management zones" already in place for Sandy Cay (the Sandy Cay Habitat Management Area) and for the marine areas of Green Cay and Sandy Spit (Fisheries Protected Area).</p> <p>Terrestrial "management zones" could be established to protect sensitive landscapes and vegetation areas on JVD; other areas could be earmarked for recreation such as a trail from Cape Wright westward along the north shore. More restricted "management zones" should be considered for some areas of forest habitat, including all ghut corridors. Goats would be excluded from these areas, thus allowing the forests to recover.</p> <p>The implementation of any type of community management strategy for JVD would require time, education, and consensus (see also Chapter 8, Issue 1).</p> <ol style="list-style-type: none"> 2. The JVDPS, perhaps coordinating its efforts with ongoing programmes of the NPT and the C&FD, could begin to collect seeds and cuttings for rare and endangered plants (such as the JVD Indian Mallow and the Tyre Palm) to ensure that the local genetic stock survives. In time, these can be replanted in selected areas on JVD, Little JVD, and Green Cay. Assistance could be requested from the Royal Botanic Gardens Kew, which has provided such assistance elsewhere in the Territory.
<p>BIODIVERSITY ISSUE FOUR</p> <p>Loss of Soils, Erosion, and Increased Sedimentation: Due to loss of vegetation from the over-grazing of animals, land slippage, rock falls and mass movement of sediments, JVD, LJVD and GC are experiencing considerable loss of soil, which ultimately is washed into coastal environments.</p>	<ol style="list-style-type: none"> 1. Key erosion-prone areas need to be better identified (perhaps in cooperation with the Department of Disaster Management). Areas especially vulnerable include along the road corridor from Bakers Bay to East End Harbour and along the ghut corridors draining into Great Harbour and White Bay. Best management practices, including sediment control measures, need to be established, but will require technical support from the BVI Government or other external-to-JVD organisations and individuals. 2. Much of the road drainage on JVD needs to be improved, especially along the road to East End Harbour. Current drainage along this road is not adequate. Sediment control devices could be installed to reduce sediment loads to coastal areas. Guidelines for sediment control practices in the

BIODIVERSITY ISSUES	ACTION OPTIONS AND OTHER RECOMMENDATIONS
	<p>insular Caribbean are available (for example, see IRF, 1994), but this is an issue that cannot be fully addressed without expert technical assistance and Government direction.</p> <ol style="list-style-type: none"> 3. A reforestation programme on steep vulnerable slopes to stabilise soils should be undertaken. The Department of Agriculture would need to take the lead in this on Jost Van Dyke and Little Jost; if Green Cay is eventually vested in the National Parks Trust as a protected site, then the NPT would take the lead in any reforestation effort there. 4. The community of JVD should encourage the BVI Government to pave or surface all roads on the island in an effort to reduce sediment runoff on unpaved surfaces. Scientists working at Fish Bay, St. John in the USVI agree that increased erosion is associated with unpaved road networks (see Ramos-Scharrón, <i>et al.</i>, 2007). Road siting and cutting, especially for residential roads and paths, also need to be planned with more care and concern for the environment.
<p>BIODIVERSITY ISSUE FIVE</p> <p>User Impacts: The use of All Terrain Vehicles (ATVs) and other forms of off-road vehicles in sensitive ecological areas is a detriment to the healthy survival of these fragile natural systems.</p>	<ol style="list-style-type: none"> 1. ATVs and other off-road vehicles should be discouraged in sensitive ecological areas such as sandy beaches, salt ponds, ghut corridors, and wildlife foraging and nesting areas. ATV access to steep terrain that is vulnerable to erosion should also be discouraged. Priority "sensitive" areas will need to be identified. 2. Since ATV use is not currently regulated and most sensitive ecological areas are not protected from use by ATV operators, any immediate change in user behaviour will be the result of education. The development of educational activities and materials could help to teach ATV users, owners, and rental businesses about the damage caused to fragile ecosystems by these vehicles; alternative routes and options for recreational operators of ATVs could be promoted.

JOST VAN DYKE AND THE SEA

Unless otherwise noted, the information in this chapter is drawn from the knowledge and research of the chapter's primary author, Clive Petrovic, a BVI marine biologist and ecologist with over 20 years of Virgin Islands-based experience.

THE PEOPLE OF JVD AND THEIR BOND WITH THE SEA

Most small islands in the Eastern Caribbean share similarities in their environments, culture, and history. Most are volcanic in origin, steep-sided and originally covered by dry tropical forests. They are fringed by tropical coral reefs, seagrass meadows, mangroves and calcium-carbonate beaches. Their waters are clear but relatively barren of the minerals and nutrients necessary for rich plant growth.

The islands were once populated by pre-Columbian Amerindians who looked to the surrounding seas for food and for transport to more distant shores. Beginning in the late fifteenth century, the native populations were largely supplanted by Europeans and Africans. The European land owners and their enslaved labourers soon began to take advantage of the true wealth of the West Indies—its natural resources. In the region's coastal waters, the harvesting of nearshore marine species began in earnest.

While many marine species have suffered from centuries of exploitation, many others survived in ecologically functioning populations. Perhaps artisanal fishing techniques and lack of large-scale coastal development permitted their survival. That however began to change in the latter half of the twentieth century. More recently, poorly planned land use practices in upland watersheds, the over-harvesting of marine resources, and waste disposal into coastal waters have all resulted in significant damage to coastal and marine environments in the Caribbean.

Jost Van Dyke, one of the smallest populated Caribbean islands, has shared a similar past. A limited land area resulted in a substantial reliance on the sea. The sea served as an avenue of transportation and communication and a source for food for those living on JVD; it also became a waste disposal site and—more recently—a playground for visitors. As it has been in the past, the sea is intertwined with the lives of Jost Van Dyke islanders.

Maritime Traditions

The desire for trade and social interaction with nearby islands stimulated the development of

seafaring skills and traditions throughout the Caribbean, including Jost Van Dyke. Sailing, rowing, fishing and boat construction flourished. Islanders became skilled sailors as they frequented neighbouring shores for trading and socializing. Craftsmen on populated islands built sailing boats, and their designs reflected local needs and materials. Unique styles often emerged, such as the Tortola Sloop in the BVI.

On the island of Jost Van Dyke, with few terrestrial resources to support its population—and prior to the recent emergence of tourism— islanders sustained themselves primarily through artisanal fishing and small-scale agriculture. The products of farming and fishing were exported to nearby islands, especially St. Thomas, and this activity emerged as a primary source of revenue.

Thus, Jost Van Dykians turned to the sea to facilitate trade. Sail craft became an integral part of commerce and communication, while older residents can also remember relatives who rowed to Cane Garden Bay in Tortola and the nearby islands of Great Tobago and Thatch Cay (*pers. comm.*, Susan Zaluski, JVDPS, 2009). In fact, the residents of Jost Van Dyke have long enjoyed a reputation as skilled boatmen and fishermen:

It is said locally that [boatmen from JVD] are so confident of their ability as sailors that they have never taken the trouble to learn how to swim. So, whenever there is a mishap to any boat from these islands, the members of the crew who are natives of Jost Van Dyke are the ones drowned (DeBooy, 1918).

Over time, seafaring traditions became an integral part of the island's development, perhaps best reflected in the rich maritime heritage that evolved around sailing, fishing, sailing vessels, and the surrounding sea.

Tourism and the Sea

As tourism began to develop in the decades following World War II, opportunities, lifestyles and expectations began to change. The primary economic force leading to change in JVD, and throughout the BVI, was tourism, particularly the "sun, sea, and sand" variety associated with coastal and marine environments.

The combination of geography, climate and a congenial population encouraged foreign investors to develop the Territory's natural resources. Slowly, hotels, resorts, and marinas were built on the major islands and several of the smaller islands too, including Jost Van Dyke. Tourists, arriving by air and (in JVD) by sea, helped fuel economic growth and prosperity. But, with prosperity, came change—including environmental change.

Since JVD's tourist population extensively utilises the marine environment, any negative environmental impacts are most readily visible there—in anchor damage to coral reefs and seagrass beds, discharge of untreated sewage from boats, and injury to marine communities by inexperienced snorkelers and swimmers.

Additionally, when fishing and resource extraction were traditionally limited to local consumption and minimal exports to nearby islands, over-fishing was rarely a problem. With growing demands by tourists for fresh local seafood, there are new incentives that encourage fishermen throughout the BVI to harvest marine species at levels that may be beyond the limits of resource sustainability. In the opinion of one experienced BVI ecologist (*pers. comm.*, Clive Petrovic, 2009), most species of economic importance have been heavily exploited in the BVI, and the effect on biological communities has been significant.

Finally, coastal- and marine-based tourism has also exacted substantial social costs within small, previously isolated island communities like JVD. While interactions with tourists provide needed economic opportunities, such interactions also may alter the traditional social fabric, standard-of-living expectations, and lifestyle behaviours.

THE MARINE ENVIRONMENT

The marine environments surrounding Jost Van Dyke and its satellite isles and cays are similar to those around most islands in the Lesser Antillean archipelago. Both the physical and biological characteristics of the land/sea interface are typical for tropical oceanic islands.

Physical Conditions

A combination of topography and oceanographic conditions have produced the rocky headlands, sandy beaches, and sheltered bays we see around Jost Van Dyke today. Offshore, the sea bottom slopes gently to the edge of the continental shelf to the north. Between the islands, depths rarely exceed 50 metres (164 feet) and are generally much shallower (Street, 1999).

The American and British Virgin Islands lie on a bank that extends from the eastern end of Puerto Rico for 144 kilometres (90 miles) in an east-north-easterly direction. Depths over the bank are less than 182 metres (595 feet). Anegada lies to the northeastern end of the bank, while most of the other islands lie near the southern edge. During the most recent glacial period, the entire bank was shallower, and, because of lower sea levels, the islands were connected by land bridges (Heatwole, *et al.*, 1981).

Substrates underwater and near the shore are primarily calcium carbonates of marine origin. The erosion of the bedrock contributes inorganic minerals to the sand composition. Depending on exposure to sea conditions, beaches may range from fine-grained particles, rocky gravel and cobbles to large boulders. The contrast between the exposed, high-wave-energy north coast and the sheltered south side bays produces very different shoreline characteristics.

Oceanographic conditions also influence the physical environments around the island and therefore the biological communities that are present. The entire Virgin Islands archipelago is affected by the equatorial currents sweeping in from the tropical Atlantic Ocean.

As the ocean currents strike the islands and the underwater plateau on which they sit, eddies, counter-currents and shifting water masses impact all marine habitats. While the equatorial current moves from east to west, currents between the islands may move in any direction. The added impacts of tides and surface winds may greatly influence the distribution of marine organisms.

In addition, periodic winter ground seas and tropical storms may further alter physical conditions around the island. During the winter months (October to April), high-swell waves from the north are likely to be experienced along the north coasts of islands in the BVI group. These "ground seas," as they are known locally, are generated by intense storms in the North Atlantic Ocean, which cause waves to move south as swells to impact the islands of the Eastern Caribbean. Such ground sea events may last for between one day and one week, with an average of six such events every winter season. They result in high-energy, long-period waves that approach from the north and commonly have heights in excess of 1 metre (3 feet) and occasionally as high as 5 metres (16 feet).

These waves often cause considerable beach erosion. Sandy Cay, for example, is very exposed to winter swell waves approaching from directions between north and northeast; and while the north and northeast coasts are most affected, the waves can be refracted to affect the other coasts of the island as well. As is noted in the *Yachtsman's Guide to the Virgin Islands*: "On the

southwest side ... a heavy winter ground swell can cause breaking waves on the beach that will make landing [almost] impossible" (Fields, 1991).

In recent years, human activity—in particular, sedimentation from onshore coastal development—has greatly impacted the marine environment. The addition of pollutants such as sewage, oil and fuel, chemicals and other toxic materials further damages these habitats.

An increase in sewage and nutrients can lead to localised eutrophication, which is the over enrichment of water resulting in a change of habitat characteristics, usually undesirable. It is very much like over fertilising a house plant. A little is good, while too much can be fatal. The end result is that changes to physical water chemistry are then reflected in an alteration of plant and animal communities.

A good example can be seen in Great Harbour where runoff of nutrients, possibly sewage, produces a dark green algal covering of nearshore rocks in several places. The algae absorb the excess nutrients and grow so fast that they smother all the species of plants normally found in that habitat.

Biological Communities

Much of the information that follows and in Appendix 3 is based on in-water observations of marine habitats by the principal investigator, Mr. Clive Petrovic, in November of 2008, including swimming and roving-fish surveys, with qualitative assessments of mangrove systems near Diamond Cay National Park and the area around Green Cay and Sandy Spit. Additionally, the principal investigator has carried out prior qualitative surveys at White Bay, around Sandy Cay, at the western tip of Jost Van Dyke, around Green Cay, and along JVD's northern coast.

The coastal and marine habitats surrounding JVD and the

satellite islands are discussed below (see also **Figure 5** and **Appendix 3** for species lists):

1. **Beaches:** comprising sand, gravel, and rocks.
2. **Coastal Mangroves:** restricted to the east end of the island and a few sheltered bays.
3. **Seagrasses:** scattered, but most common in sheltered bays and to the east of JVD.
4. **Coral Reefs:** different types of soft and stony coral reefs; hard substrates and corals are the most widespread of the shallow nearshore habitats around Jost Van Dyke and the satellite islands.
5. **Sand Patches:** scattered, but most extensive in deeper waters north of the island.

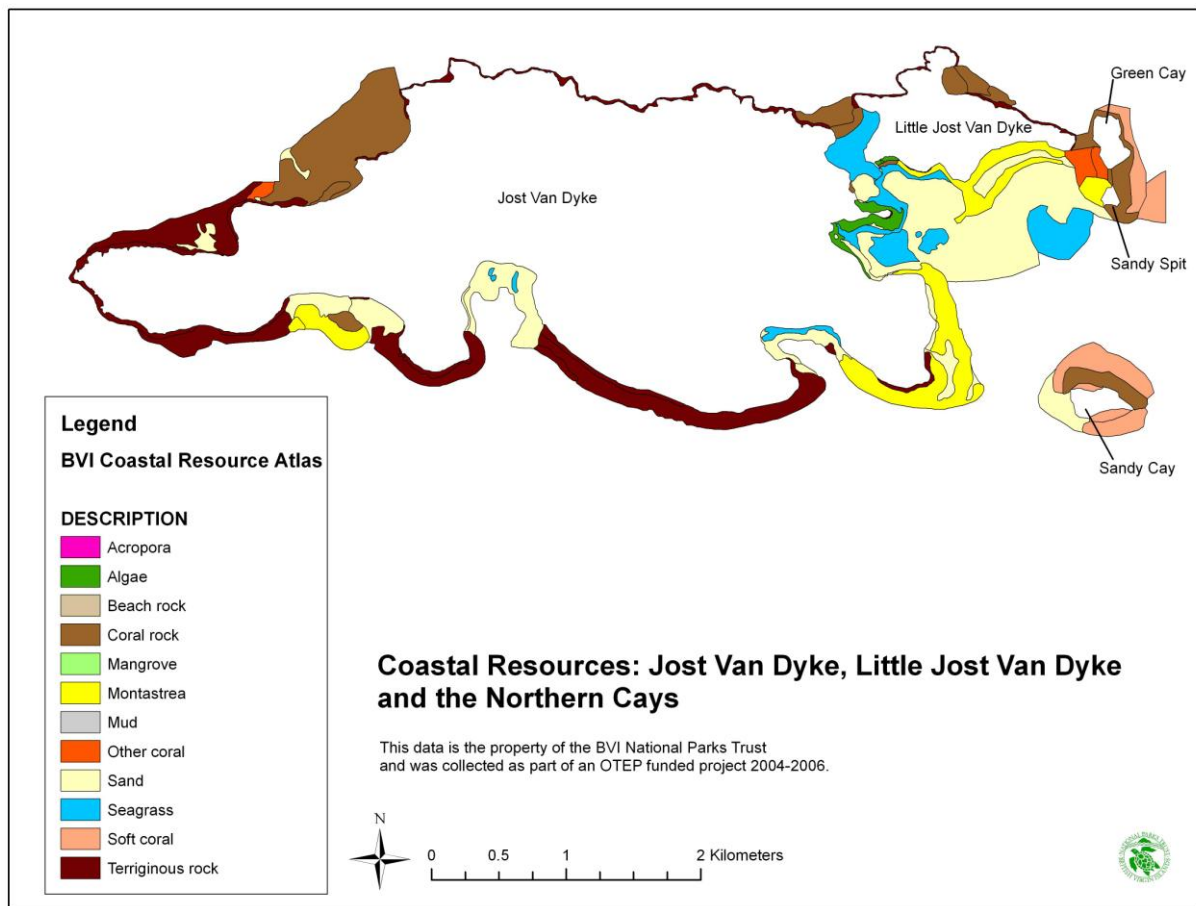


Figure 5.

A generalized overview of the coastal resources of Jost Van Dyke, Little Jost Van Dyke, Sandy Cay, Green Cay, and Sandy Spit (courtesy of the BVI National Parks Trust).

The composition and distribution of most nearshore marine habitats surrounding the Profile islands have undoubtedly changed in recent years. The combination of reclamation, sediment runoff, domestic sewage discharge and other impacts have changed the physical environments and altered the biological communities. The rate of change has accelerated as economically stimulated development has increased (Box 5).

1. BEACHES

Sand beaches are largely restricted to sheltered sites, especially on the south side of JVD. The south side bays, particularly White Bay, contain sandy beaches with salt ponds and wetlands on the landward side.

Along the northern coast of Jost Van Dyke, sheer rock cliffs and all pockets of gravel and boulders provide evidence of the high-wave energy present much of the year. Fauna are restricted to small interstitial organisms, such as worms, clams, and mole crabs that burrow into the sand for protection, or mobile animals, such as crabs and birds, which can exploit the environment during favourable conditions.

Box 5 ENVIRONMENTAL MONITORING

Long-term monitoring of coastal and marine habitats is needed if the scale of change and the level of impact on JVD's biological communities are to be properly assessed. Optimum resource management depends on the availability of a continuous flow of information about the status of the resource and its response to the impact of development activities. The establishment of a baseline of current conditions is the critically important first step to the establishment of any environmental monitoring programme for JVD.

Sea turtles depend on beaches to lay their eggs. Historically, all the beaches on JVD and surrounding islands were important turtle nesting sites. Today, despite greatly reduced popula-



Photo 29.

To the left in above photo is the southern rocky coast of Green Cay, an important roosting site for Brown Pelicans. Also pictured is Sandy Spit, with its wide sandy beach, varying between 20 and 45 metres (22-49 yards) from the vegetation line to the low water mark. The centre of Sandy Spit is vegetated with coconut palm, seagrape and sea purslane vegetation. An underwater bar joins Green Cay to Sandy Spit and consists mainly of stones and hard substrate, with little sand.

tions, turtles have been known to nest on the beaches of Jost Van Dyke, Little Jost Van Dyke, Sandy Cay and Sandy Spit (Eckert, *et al.*, 1992; Bacle and Towle, 2008).

Since all species of marine turtles are endangered, it is especially important to protect the remaining nesting sites by: (i) enforcing restrictions on the removal of beach sand for construction aggregate, (ii) controlling trash dumping on beaches, and (iii) reducing the trampling of nest sites by vehicles or excessive foot traffic. (See Chapter 2 for information on relevant legislation.)

The satellite islands of Sandy Cay and Sandy Spit contain extensive beaches (Photo 29). The beaches of Sandy Cay were studied in 2000-2001 and have been documented in Island Resources Foundation's detailed *Resource Characterisation of Sandy Cay's ecosystems* (IRF, 2001b).

In its study, IRF noted that what appears at times to be a serious erosion problem and loss of sand on the long sandy south-westerly stretch of beach is, in fact, the result of a movement of the widest section of the beach. The tongue or mini-peninsula

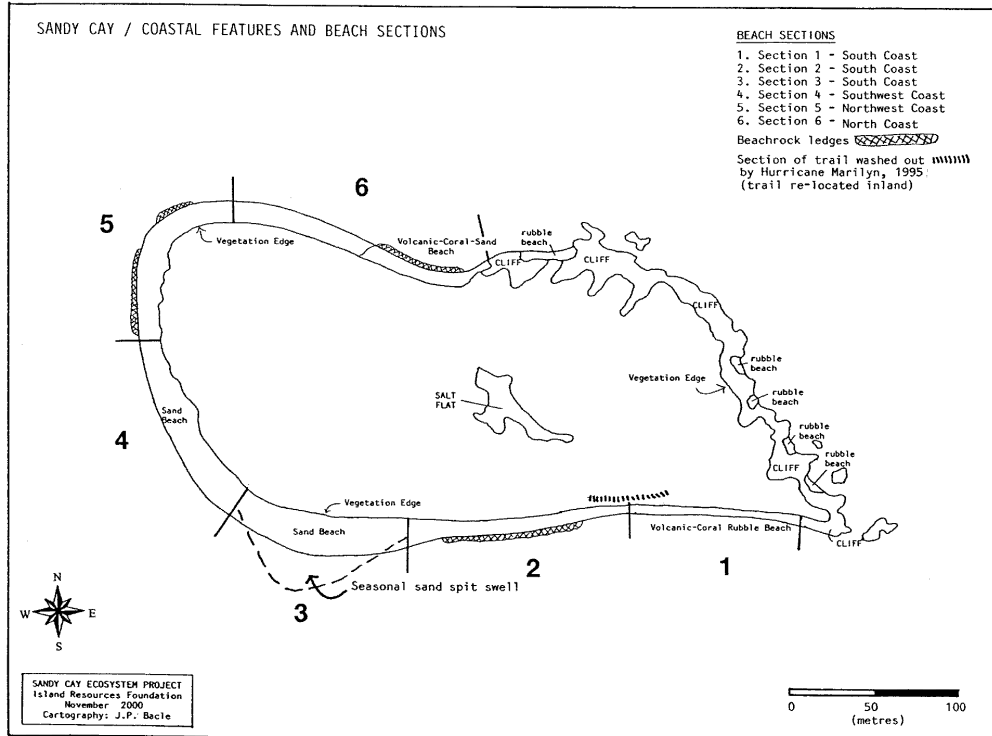


Figure 6. Coastal features of Sandy Cay, from Island Resources Foundation (2001b).

seasonally oscillates due to the annual cycling of the ocean swell direction and the seasonal occurrence of heavy ground swells from the north-northeast. It appears that there is little or no net loss of sand resulting from this phenomenon.

A map of the coastal features and beach sections of Sandy Cay, taken from IRF's 2001 report is provided as **Figure 6**.

2. MANGROVES

Coastal mangroves are restricted to a few sheltered bays and along

the east end of Jost Van Dyke, primarily south of Diamond Cay, where the most extensive cover of fringing mangroves in the study area can be found (see **Photo 30**). The coastal fringe is

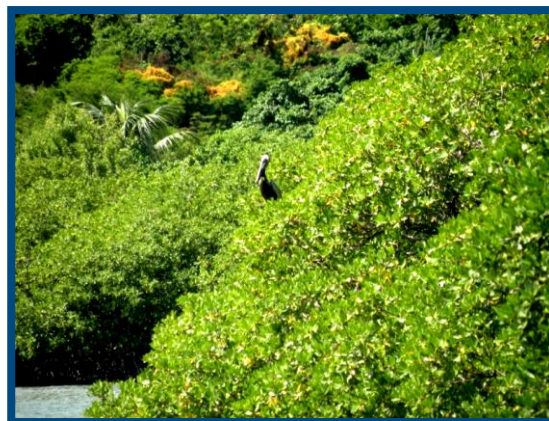


Photo 30. Brown Pelican roosting in fringing Red Mangroves, south of Diamond Cay, East End Harbour, JVD.

comprised of Red Mangroves along the water's edge with Black Mangroves behind them where the conditions are calmer and a bit drier.

Elsewhere, small patches of coastal mangrove occur at the north of the ghat that drains into Garner Bay (Little Harbour). At this site, all four species of mangrove trees are represented. A smaller fringe of Buttonwood Mangrove lines the beach in Saddle Bay.

Additional mangroves occur in the vicinity of the seven salt ponds scattered along the south and east side of JVD, plus one on

Sandy Cay. (For more details about these salt pond habitats, see Chapter 3).

Mangroves are important to fisheries because they contain nutrients for fisheries production. The prop roots of Red Mangroves provide breeding and nursery areas for some fish species. Equally important is the tendency of mangroves to trap and retain sediments that would adversely affect seagrass and coral habitats. A further environmental service provided by mangroves is the protection they afford coastal areas from erosion by storm waves; for this reason, mangroves are often associated with “protected anchorages” used by small vessels in severe storms (for example, Paraquita Bay in Tortola).

The productivity and species diversity associated with mangrove communities were confirmed during the field surveys for this project. Many species of juvenile fish and invertebrates were seen near the roots of coastal Red Mangroves on the east end of JVD near Diamond Cay. Pelicans and other birds foraged along the shoreline wherever mangroves were growing.

While the coastal mangroves appear to be in relatively good condition, most of the mangroves in the interior ponds have been lost or degraded. Most ponds exhibit evidence of reclamation, sewage and chemical pollution, and use as waste disposal sites. Continued habitat degradation of the wet-

lands may result in the loss of important environmental services performed by mangrove systems.

A few clumps of coastal mangroves are found on the south shore of Little Jost Van Dyke; however, the mangroves on JVD are the most extensive and at greatest risk.

3. SEAGRASS BEDS

Seaward of mangrove roots along the coastline, seagrass beds cover the soft sand and mud bottoms. The most abundant and widespread seagrass noted is Turtle Grass. In more sheltered bays the Turtle Grass observed had formed dense “meadows” that were teeming with life. Many juvenile fish that find shelter in mangrove roots move into the grass beds to feed, particularly at night. Consequently, larger predatory fish forage in the grass beds looking for smaller prey. Occasional marine turtles were noted in the seagrass habitats.

The most extensive grass beds are located east of Jost Van Dyke in the direction of Green Cay, Sandy Spit and Sandy Cay. The seagrasses occur mostly near JVD and Sandy Spit; the bottom nearer Sandy Cay is mostly sand with some rock outcrops and patches of seagrasses. In the area where yachts anchor, the bottom probably contained more seagrasses in the past. Seagrasses also occur in sheltered bays along Jost Van Dyke's southern coast and as

isolated patches in deeper locations between coral reefs.

In deeper or more exposed areas the grasses are sparse and less dominated by Turtle Grass. Manatee Grass and Shoal Grass are common as are many species of calcareous green algae. In the deeper offshore waters north of the JVD, seagrasses are found in small isolated patches, often near reefs or rock outcrops.

Many of the nearshore seagrass habitats have been damaged or lost through past dredging and coastal reclamation, sedimentation and pollution, and mechanical damage from boat anchors and fishing gear. Most of the remaining seagrass habitats show signs of stress and are at risk of further degradation. The resulting negative impacts—on the fishery and other important marine processes—should be carefully considered as part of any resource management programme focused on Jost Van Dyke.

4. CORAL REEFS

Hard substrates and corals are the most widespread of the shallow nearshore habitats around Jost Van Dyke and the satellite islands. The physical conditions found on the extensive and shallow Puerto Rican Plateau are ideal for coral growth. Variations in oceanographic conditions, depths, availability of bedrock or suitable substrates, and other characteristics determine the diversity and abundance of reef

types. **Figure 5** depicts the various reef types and marine and coastal habitats surrounding JVD and its satellite islands. It is noted that the marine environment around Jost Van Dyke is similar to that around the U.S. Virgin Islands, which has been much better studied (see, for example, Rogers, *et al.*, 2008).

Most of JVD's north coast is a high-energy zone exposed to open Atlantic Ocean conditions. During storms and winter ground seas, large waves exert tremendous forces on all shallow water communities.

Evidence of the force of these waves can be seen in the scoured cliffs and the vegetation line many metres above the shore. The erosive forces have scalloped sea caves along the shore and undermined the cliff in many areas. The underwater substrate is comprised of large boulders eroded from the cliffs with smaller rocks and gravel in protected pockets.

The bedrock forms the substrate for colonisation by many species of marine plants and animals. The most conspicuous are the soft corals, gorgonians and sponges. The dominant corals in this north coast area are the star corals and other boulder corals that are the primary reef-building corals in high-wave-energy areas.

Much of the area is characterised as a Montastrea Reef, named after the most common and conspicuous boulder coral. Such reef types tend to grow in exposed areas with lots of wave action. Some Acropora corals, such as Elkhorn Coral and Staghorn Coral, grow on the large boulders. Marine life is abundant with schools of Grunt, Snapper and numerous reef species present.

Along the sheltered south coast and between the islands to the east, coral growth is quite different. While soft corals, stony

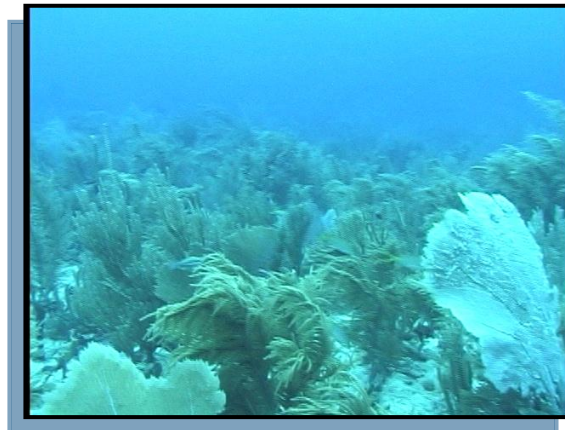


Photo 31.
Gorgonian-dominated habitat,
north shore reef of Sandy Cay.

corals, gorgonians and sponges are still common, there is greater diversity of species. Interspersed in the sand and sea-grass habitats are numerous coral outcrops. These are often dominated by Porites corals and calcareous algae. Sea Urchins and other invertebrates are more abundant and conspicuous. Habitat diversity appears greatest on the eastern

end of the island and near the satellite cays.

The marine systems of Sandy Cay were studied in 2000-2001 by Island Resources Foundation. Researchers found that the cay is surrounded by well-developed coral reefs, dense gorgonian-covered platforms, patch reefs, and large sand-covered areas (**Photo 31**). See **Figure 7**, which displays the marine communities of Sandy Cay as identified by IRF (IRF, 2001b).

Most of the coral reefs around JVD show evidence of degradation by natural processes and anthropogenic, or human-caused, impacts. Often the causes are difficult to separate and clearly are connected. Hurricane and storm damage is visible in many exposed sites. However, it is likely that human-induced changes in the reef ecology have weakened corals and made them more vulnerable to natural forces.

The visible characteristics of partially bleached coral were observed in many areas during the 2008 underwater survey for the Profile project, although it was not possible to determine when the bleaching events occurred. Bleaching refers to the colour change of coral from brown or orange to white. It occurs when unusually warm sea temperatures stress corals and cause them to expel microscopic algae that live

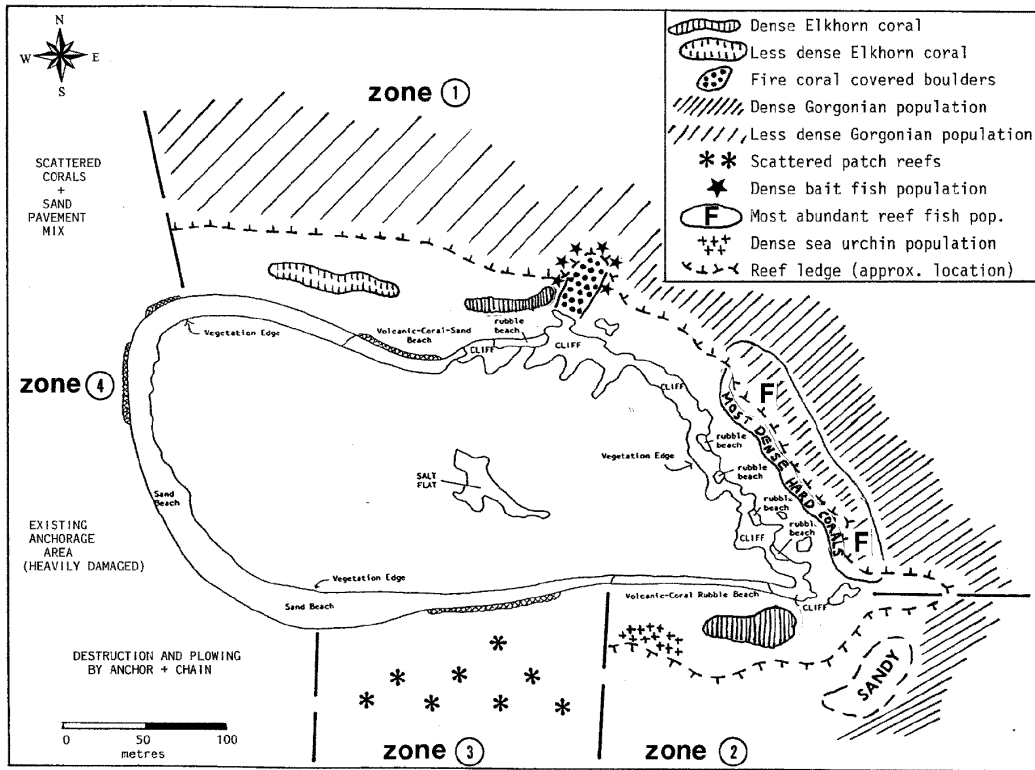


Figure 7.

Marine features of Sandy Cay, with identification of four marine system zones, from IRF, 2001b.

within their tissues. The algae are responsible for the various colours of coral colonies. Without the algae, the corals will sicken and eventually die. Even corals that have recovered from bleaching events become susceptible to infection by disease. Diseases such as Black-band Disease are found on many boulder corals and are responsible for increased mortality.

Bleaching and disease events are not restricted to Jost Van Dyke; in the last 15 years, coral diseases have become an increasing threat to the persistence of reefs in the

Caribbean, including the U.S. and British Virgin Islands. Coral reefs in the USVI, Puerto Rico, and at least some areas in the BVI (*pers. comm.*, Shannon Gore, C&FD, 2009) suffered large declines in living coral (in some cases, over half the living coral) as a result of bleaching in 2005 and a subsequent disease outbreak. It is likely that the Profile islands had similar losses (Wilkinson and Souter, 2008; Rogers, Miller and Muller, 2008; Rogers, *et al.*, 2008).

Both bleaching and disease permit algae to colonise the corals and out-compete them for space. Parrotfish and other

species of algal grazers may have been over-harvested and therefore are unable to keep the algae in check. These factors, and others, act in combination to stress corals to the point where reef habitats may not continue to function as they have in the past.

Such changes have serious consequences. Examples include the collapse of fisheries, loss of shoreline protection, changes to water chemistry and quality, and negative impacts on sea turtles and even migratory pelagic species. Equally important to the BVI and JVD economy is the impact on

the tourism industry. Clean, clear water and thriving coral reefs are a major attraction for tourists. Without them, JVD and the BVI become less attractive, and the economy will likely suffer.

5. SAND PATCHES

Damage to the coastal and nearshore ecosystems can even impact more distant locations. To the north of Jost Van Dyke, the bottom slopes gradually to the edge of the underwater plateau and from there dropping precipitously to the Puerto Rican Trench, some 8,845 metres (29,000 feet) beneath the surface. This area is known as the “north drop” and is renowned for migratory game fish.

The several miles between the island and shelf edge is comprised primarily of bare sand with numerous coral out crops and patches of grasses and algae. These areas serve as habitat for reef fish, lobster, conch, and many other species. In turn, they attract migratory game fish and even marine mammals such as Humpback Whales, which were observed in this area as recently as February of 2009. All are ultimately dependent on shallow, nearshore mangroves, seagrasses and coral reefs.

FISHERIES RESOURCES

The earliest fisher folk around Jost Van Dyke were probably visiting Amerindians in pre-Columbian times. Hunting in shallow lagoons and bays, they likely targeted larger animals, particularly Manatee and Caribbean Monk Seals. Fish, turtles, and any edible marine life were certainly harvested and formed an essential part of their diets. Since human populations were small with only minimal disturbance to coastal habitats, there was likely little impact on marine animal resources.

However, following European colonisation, the numbers of several species were depleted by hunting. Within two centuries, the Manatee and Monk Seals were extirpated from much of their former ranges. The Monk Seal was finally driven to extinction, while the Manatee survives only in remnant populations.

Numerous turtle kraals (crawls) around the Virgin Islands, including one in White Bay (see Chapter 5), attest to the importance of turtles in the inhabitants' diet. While turtles still nest on JVD beaches, their numbers are small. In recent years, turtles have nested on beaches at White Bay, Great Harbour, Sandy Ground, Sandy Spit and Sandy Cay (Eckert, 1992; Bacle and Towle, 2008).

Box 6

IMPACT OF CLIMATE CHANGE ON FISHERIES

A recently released report from the Centre for Resource Management and Environmental Studies (CERMES) at the University of the West Indies, Cave Hill Campus, examines the impact of climate change on the livelihoods of fisher folk from the Caribbean region.

The report points out that, while much attention has been paid to the devastating impact of climate change on coral reefs in the region, little research has been initiated into the potential impact of this global phenomenon on small-scale fisheries.

Based on a Fishers Forum at the Gulf and Caribbean Fisheries Institute Conference in Guadeloupe in 2008, the report highlights likely impacts from climate change on Caribbean fisheries:

- Changes to migratory patterns of fish and bird species throughout the Caribbean.
- The invasion of marine species previously unknown in regional waters.
- The increase in ciguatera poisoning of fish in the northeastern Caribbean.
- The impacts of sea level rise and warmer waters on fishing activity.
- The vulnerability of fishing communities in coastal areas to sea level rise, storm surges, and the increased violence and frequency of hurricanes.

CERMES and its partner organisations are planning more research and public outreach initiatives to address how climate change may influence Caribbean fisheries in the years ahead.

[Source: “Impact of Climate Change on Caribbean Fisheries Sector” from www.caribbean360.com/ March 4, 2009.]

Fish and other marine creatures were also harvested around JVD. Traditional artisanal fishing practices have changed little over time. Fish traps were originally constructed of sticks, palms fronds and other natural materials. Such traps were generally fragile and degraded quickly. Any lost traps quickly decomposed.

Eventually, however, the wooden trap gave way to the wire mesh fish pot. Now traps are more rugged and survive sea conditions much longer. Unfortunately, lost traps continue catching and killing marine life. Efforts are underway to encourage the use of biodegradable panels so lost "ghost traps" do not continue to entrap fish.

While the trap remains the most popular fishing gear, other techniques are utilised as well, for example, hand lining with hook and line. Limited diving for conch, lobster and other animals takes place in shallow nearshore areas. Since spear fishing is illegal in the BVI, hand collection or the employment of nets and seines are more often used in sheltered bays and off beaches.

JVD fishers are not limited to any single fishing ground, although because of the distance and travel time involved, they do not generally fish off Virgin Gorda or other more distant islands. Trap-and-hook and line fishermen fish mostly around the island and to the north of the island, around the deeper part of the northern bank. Seine fishing is carried out in the shallows nearer shore. Generally, most do not fish beyond five to ten miles from Jost Van Dyke.

In addition to the usual fish and invertebrates harvested for food, other marine creatures and products have been collected for human use. The Gorgonian coral known as Sea Fan was used as a sieve for sifting flour. There was also a limited harvest of sponges, although most were collected on the beach after storms. Some sea salt was gathered from the pond at White Bay.

Prior to the growth of tourism, virtually everyone on JVD was engaged in some aspect of fishing. In the "old days", several men would fish from one boat, each man with his own traps but all taking turns pulling in the traps. Any catch beyond what was needed for local consumption was exported to St. Thomas.

While actual data on catches and landings are scarce, local fishermen can estimate their successes. Anecdotal evidence suggests fishers from the JVD community

land approximately 2,000 lbs. of lobster, 1,000 lbs. of fish, and only small numbers of conch annually. Such modest landings are probably a result of a de-

Box 7 WOODEN ISLAND SLOOP

In an effort to preserve an important piece of Jost Van Dyke's maritime tradition, the JVD Preservation Society has embarked on an ambitious plan to build and sail a wooden island sloop. The sloop, christened *Endeavor II*, is under construction in Great Harbour. The building project is an educational effort that involves local school children. They learn the history of the boats as they help to build the sailing craft from the keel up. Once launched, students, residents, and perhaps visitors as well will have an opportunity to sail into history.

This is not the only initiative aimed at preserving the BVI's boat building traditions. The Centre for Applied Marine Studies at the H. Laverty Stoutt Community College in Tortola has spearheaded several initiatives focusing on the Territory's maritime history, including the craft of traditional wooden boat building and the history of the Tortola sloop.



Photo 32.

Sloop *Endeavor II* under construction on Jost Van Dyke.

creased fishing effort due to better-paid, alternative livelihoods for those who formerly fished full time.

Today, there are only about 20–30 part-time fishers on JVD. Fishing is now more a part-time activity, perhaps retained to some extent for its cultural associations.

One such fisherman is Foxy Callwood, a JVD businessman who continues to fish primarily to retain his cultural roots. In the 1960s, Foxy and his friend Vernon Soares fished together for a living. That early bond of friendship and their strong connection to the sea and fishing remains, despite business success in the field of tourism.

On JVD, such a story can be repeated many times, of individuals engaged in private enterprises promoting tourism but still keeping a hold on their more traditional link to the sea, to fishing, and to a renewed interest in historical sailing boats (see **Box 7**).

As indicated earlier in this chapter, the people of the BVI learned early on to build sailing vessels out of local materials and developed seamanship skills to navigate their sailing craft. Trees such as the White Cedar, the national tree of the BVI, were harvested for boat construction, often crafted in the unique style that came to be known as the Tortola Sloop.

In time, bays throughout the British Virgins filled with sloops engaged in fishing—as well as trading and transportation. Some of the sloops based in JVD included: *Lolita*, *Valencia*, *Providence*, *Sylvanita*, *Sunlight*, *Endeavor*, *Reliance*, *Reindeer*, and *Mistress*. These represent only a few of the small vessels still remembered by Jost Van Dykians. The island's residents relied on such sail craft for more than a century and a half.

In Jost Van Dyke, the symbiotic connection between fishing—as an occupation, as a source of food, as a pastime—and the small sailing crafts that take the fishers to sea remains as strong as in the past.

SUMMING UP — THE INTERCONNECTEDNESS OF IT ALL

The marine habitats around Jost Van Dyke and its satellite islands are diverse and still reasonably intact. The variety of shorelines and the topography permit the existence of numerous habitats, from exposed, high-energy coasts to calm, sheltered bays. The diversity is remarkable for such a small island.

Numerous underwater habitats are available close to the island, often from the shore. While this provides a major attraction for tourists, it also makes the environments more vulnerable to exploitation and degradation.

The marine species within the Profile study area have been continuously harvested for decades. Now, many are experiencing impacts from development activities. Habitat loss, pollution, sewage discharge, improper waste disposal, and sediment runoff all contribute to a declining environmental quality in JVD's nearshore marine environment. If these issues are not more fully addressed, they will continue to place stress on coastal and marine resources and will in the end impact tourism—the economic mainstay of the island's future.

MARINE/COASTAL ISSUES	ACTION OPTIONS AND OTHER RECOMMENDATIONS
<p>MARINE/COASTAL ISSUE ONE</p> <p>Like most islands in the Caribbean, most Jost Van Dyke species of fish and invertebrates of commercial value have been declining, due to habitat loss, pollution and continuous exploitation.</p>	<ol style="list-style-type: none"> 1. Marine fishery reserves are a useful management tool to aid in the sustainable development of the JVD fishery and associated marine habitats. A marine fisheries protected area was established at Green Cay/Sandy Spit and is managed by the C&FD. The community of JVD, particularly the fishers within the community, need to understand C&FD's options and planning for additional sites in the area. Such efforts will be most successful when there is a shared consensus between local stakeholders and C&FD about the limits of resource exploitation and the value of resource conservation. 2. The concept of "user management" or "co-management" can be employed to mobilise local support for fishery protected areas under the policies established in the Fisheries Act (see Chapter 2). Involving stakeholders in decisions about the reserves is particularly important in areas where there is multiple use of the resource, for example, where commercial fishing co-exists with marine recreational activities within a marine protected area. All resource users, as well as the Government, have an interest in achieving successful management of the fishery. 3. The JVD community of fishers should assess the use of fish traps, seines, lines, and other methods for harvesting fish in order to better understand the impact of current practices on the resource. The more information and knowledge available concerning traditional fishing equipment, methods and patterns, the better prepared the community will be to consider optional means to regulate or modify techniques and equipment as necessary. 4. A targeted fisheries-data-collection programme might be considered specifically for JVD. The primary purpose would not be to obtain precise figures for total landings, for example, but rather to provide a means for recognising major <i>trends</i> to guide future resource management decisions. C&FD should be consulted so that JVD data is integrated with the Department's larger fish data collection system. 5. All marine turtles are considered endangered by the World Conservation Union (IUCN). The JVD Preservation Society, in cooperation with the C&FD, could promote educational opportunities to increase awareness about BVI legislation regarding sea turtles and the importance of protecting turtle populations, including nesting beaches. The emphasis of local efforts should be on education and monitoring, coordinating JVD efforts with the Territory's wildlife protection agency. Anecdotal evidence about past turtle nesting populations might be collected as part of a more comprehensive oral history programme. <div data-bbox="592 1325 919 1591" data-label="Image"> <p>Photo 33. Turtle hatchling at Sandy Cay, September 2004.</p> </div>

MARINE/COASTAL ISSUES	ACTION OPTIONS AND OTHER RECOMMENDATIONS
<p>MARINE/COASTAL ISSUE TWO</p> <p>Since JVD is steep and small, all development on the island should be considered coastal development. Any disturbance on land is also likely to impact nearshore marine habitats.</p>	<ol style="list-style-type: none"> 1. The Environmental Profile team was unable to identify evidence of significant land use planning—currently or in the past—for Jost Van Dyke. Some preliminary planning was carried out in 2002 by the T&CPD for White Bay and Great Harbour, but generally little long-term land use planning appears to have occurred since Town and Country Planner Ivor Jackson visited JVD in 1978 and solicited feedback from the community regarding its “physical planning needs” (Jackson, 1978). If the community wishes to move forward in developing and adopting an island-wide land use plan that expresses its hopes and expectations within the framework of sustainable natural resource use, then it will have to assume a more aggressive position in making its priorities known to Government. 2. Environment Impact Assessments are now required for development activities in the BVI (under the Physical Planning Act, 2004). The community and organisations within the community have an opportunity to participate in this process by reviewing development proposals, participating in decision-making about development activities, and generally assisting the process as informed advocates for local stakeholders. 3. The community, perhaps through a local community-based organisation, should consider the extent to which it could assume a modified “watchdog” role in monitoring the impacts of land-based development on the health and sustainability of marine and coastal environments. <p>For example, community oversight of the following types of activities, coupled with the collection and assemblage of site-specific data, will assist Jost Van Dykians in alerting appropriate public sector agencies to environmental concerns on the island, particularly if this can be accomplished in a spirit of mutually shared problem solving:</p> <ul style="list-style-type: none"> – Monitoring of ghuts and important drainage areas to minimise sediment transport to the marine environment. – Monitoring of road cuts to ensure runoff is directed and dissipated so as to reduce sediment flow into the sea. – Monitoring of salt ponds to ensure protection of their natural functions, particularly by eliminating fill operations and the use of the ponds for waste disposal. – Monitoring of sewage and waste disposal sites to ensure they do not contaminate nearshore waters.

MARINE/COASTAL ISSUES	ACTION OPTIONS AND OTHER RECOMMENDATIONS
<p>MARINE/COASTAL ISSUE THREE</p> <p>Development along the coast of JVD, especially for tourism infrastructure and activities, has degraded the island's water quality. Evidence of domestic sewage discharge and other forms of pollution is evident in the island's population and tourism centres at Great Harbour and Little Harbour.</p>	<ol style="list-style-type: none"> 1. The BVI lacks officially approved water quality standards in law to prevent, abate and control pollution in nearshore waters. Standards are utilised by the C&FD, but these are not formally approved regulations and carry the risk of being employed on an <i>ad hoc</i> basis. Until the BVI Government puts the force of law behind monitoring and regulating coastal water quality, enforcement of pollution control standards will remain inadequate and marine waters will remain at risk. 2. In cooperation with the C&FD, the JVDPS might explore a citizens-based, water quality monitoring programme for JVD, in an effort to acquire targeted, longer-term, and reliable information on the island's coastal and marine environments. Documentation on trends, supported by a continuous data stream, is essential to the formulation of a rational Government response to changes in coastal water quality. 3. All development projects on the island should be required to employ standard erosion control measures. Community organisations elsewhere, e.g., the Fish Bay Owners Association in St. John, USVI, have been effective in educating property owners about erosion and in devising innovative best management practices to control erosion and runoff on steep residential hillsides.
<p>MARINE/COASTAL ISSUE FOUR</p> <p>A small insular community like JVD is uniquely at risk from the combined effects of rapid development, unsustainable use of natural resources, and new patterns of cultural assimilation. The cohesion that was once characteristic of the community may be altered by new externally driven forces, resulting in, among other things, diminishing respect for the environment and loss of traditional values.</p>	<ol style="list-style-type: none"> 1. Jost Van Dykians should take steps to preserve the island's historical heritage and cultural traditions by protecting surviving historical artefacts and recording the oral recollections of senior members of the community (see also Chapters 5 and 6). 2. Efforts to promote awareness about the community's shared past should be encouraged and expanded. JVD's maritime past is particularly unique to this community, and efforts should be supported to include this piece of the island's history in educational programmes and to showcase maritime traditions for tourists as an added "island experience".

MARINE/COASTAL ISSUES	ACTION OPTIONS AND OTHER RECOMMENDATIONS
<p>MARINE/COASTAL ISSUE FIVE</p> <p>Although tourism has fueled the economic growth of JVD, it is also responsible for most of the marine environmental degradation we see today. Generally, tourists require more resources and produce more waste than resident populations.</p>	<ol style="list-style-type: none"> 1. The community should work with the NPT to ensure the installation of additional moorings for visiting yachts, particularly in the waters surrounding the new national park at Sandy Cay. 2. The community and the JVD Preservation Society need to work with Government, and in particular with the NPT, to promote educational activities and materials, as well as marine-focused user guidelines and regulations, that highlight some of the following: <ul style="list-style-type: none"> – The use of vessel holding tanks in crowded anchorages and sensitive marine habitats. – The provision of an adequate number of appropriate onshore waste disposal facilities that are convenient for boaters. – The creation of underwater snorkel trails as an amenity for visitors and residents alike and to direct swimmers away from sensitive habitats. – The development of educational materials, specifically targeting JVD and its satellite isles and cays and providing guidance to boaters on using and protecting the environment when anchoring and snorkeling. – Providing guidance to beach users about appropriate activities that will not interfere with sea turtle nesting and information about where to report turtle sightings—whether turtle nests, eggs, hatchlings, or nesting females. 3. The current collaboration between the JVDPS and the NPT for caretaking services at Sandy Cay could perhaps be broadened to include the larger JVD community in other activities that help to sustain and protect the park at Sandy Cay.

4. JOST VAN DYKE'S HISTORICAL HERITAGE

This chapter is based on preliminary field work and research carried out on Jost Van Dyke and Little Jost Van Dyke in August and October of 2008 by HLSCC historian and Senior Lecturer, Michael D. Kent. In October, Kent was assisted by Sendrick Chinnery, an island resident and a former Virgin Islands history student of Mr. Kent. Unless otherwise noted, the findings presented in this chapter are based on Mr. Kent's archival and field research and analysis.

In assessing the historical heritage of Jost Van Dyke and Little Jost Van Dyke, particularly the islands' surviving historic sites and ruins, it must be remembered that throughout the plantation period—which in the BVI lasted roughly between 1710 and 1840—both islands were considered relatively barren and were settled and farmed accordingly. However, a recent physical inspection of historic sites, carried out as part of the

Environmental Profile project, revealed that contrary to what might be expected, there are in fact a number of historic sites surviving on both islands that are relatively unique.

The sites also readily lend themselves to display within the framework of the Territory's modern tourism product. Their accessibility and condition could easily be improved upon and the sites marketed as a heritage tourism package, providing a new niche to attract resident tourists on JVD as well as overnight guests from Tortola and day visitors embarking from cruise ships calling in the Territory.

IMPORTANT SITES

The islands of JVD and LJVD include a number of historical sites that represent a variety of original uses including agricultural, residential, military, industrial, and religious. Their survival today reminds us of an earlier observation by BVI Commissioner N.G. Cookman in 1897 that “no new houses [are] being erected [on Jost Van Dyke], and those now on the island [are] falling into decay”. There is a surprising lack of vernacular architecture on both islands in the form of the small wooden huts and cottages which housed residents and which are found in abundance on other nearby islands such as Tortola.

The nine primary sites on Jost Van Dyke and Little Jost Van Dyke are depicted on **Figure 8** and **Photo 34** as follows:

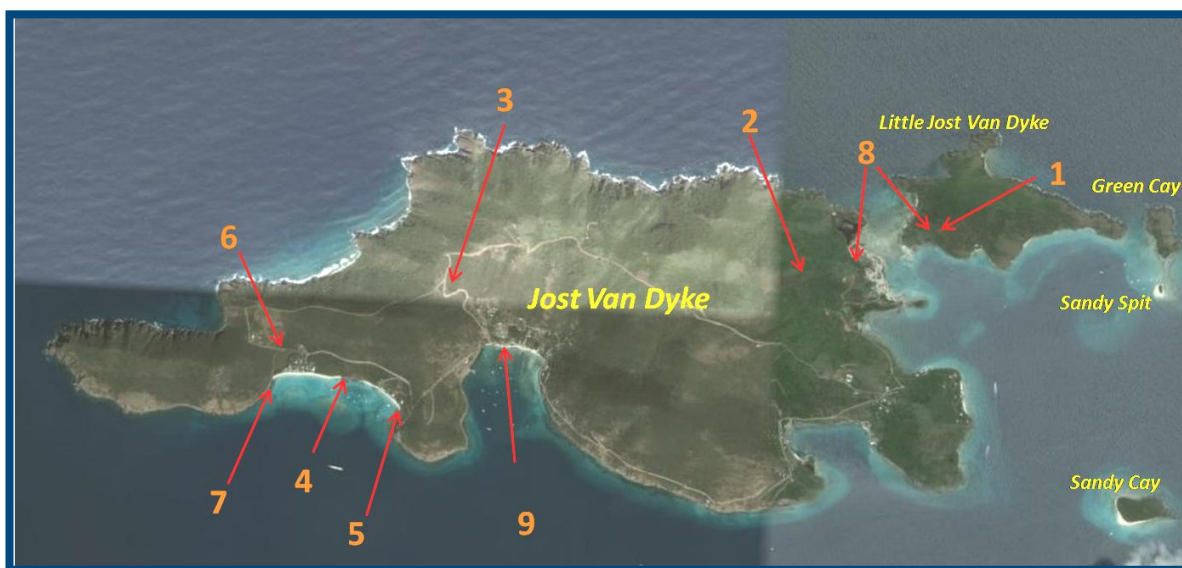


Figure 8. Location of historic sites, Jost Van Dyke and Little Jost Van Dyke; for identification of site numbers, see text on the next page (map source: Google Earth, 2008).

1. **LJVD:** *The Lettsom Settlement* (residential and agricultural use).
2. **JVD:** *Brown Ghut Ruins* (residential and agricultural use).
3. **JVD:** *Mill Round Sugar Mill and Cistern* (industrial and agricultural use).
4. **JVD:** *White Bay Fort* (military use).
5. **JVD:** *Turtle Crawl at White Bay* (enclosure for sea life).
6. **JVD:** *Foundation of a residence or storage facility, above White Bay* (residential or agricultural use).
7. **JVD:** *Standing wall at White Bay* (unknown use).
8. **JVD:** *Cape Wright* and **LJVD:** *Lettsom Settlement* (prehistoric sites).
9. **JVD:** *Methodist chapel at Great Harbour* (religious).

1. Lettsom Settlement

The Lettsom settlement is located on Little Jost Van Dyke and was the birthplace and early childhood home of Dr. John Coakley Lettsom (1744-1815), founder of the London Medical Society (see **Box 8**). To construct such a substantial residence anywhere in the BVI would have been unusual, making it all the more unique to find this example on one of the smallest of the Virgin Islands.

The residence itself is rectangular in shape and sits upon a larger rectangular earth platform which has been retained at the front with a wall reaching approximately six feet in height; it is punctuated by five steps in the middle, creating an entrance feature.

The main residence was divided into two chambers with an entrance opening to the north and an entrance opening above the steps on the west side of the structure. There is also an entrance opening on the east side, which was probably used primarily by domestic slaves to access the

stone oven to the rear of the residence.

Fortunately, a drawing executed by William Thornton (see **Box 8**) in the late eighteenth century shows how the building looked intact, providing documentary evidence rarely found for the BVI (Abraham, 1933).

To the rear of the residence on the west side is found what is generally referred to as a Dutch oven in which most of the food would have been cooked. This has almost entirely collapsed, but a small oval portion remains to identify its original use. Ovens like this may still be seen

Box 8. BORN IN THE BVI

The island of Little Jost Van Dyke is associated with a prominent 18th Century Quaker, Dr. John Coakley LETTSOM (1744-1815), whose fellow physician and Quaker, Dr. William THORNTON (1759-1828), was born in neighbouring Tortola.

Lettsom was born on the family plantation on Little Jost Van Dyke in 1744 but sent to England as a young boy to be educated in the field of medicine. He returned to the Virgin Islands in 1767, following the death of his father. While settling his father's affairs, he freed his slaves before returning to England in 1768, never to see the islands again. In 1773, at the age of 28, Lettsom founded the Medical Society of London; he also inaugurated a system of dispensaries that enabled poor people to be treated as outpatients and was deeply involved in a campaign against quackery and in support of prison reform and improving the medical care of prisoners. He was also author of a guidebook for travelers entitled *Naturalist's and Traveller's Companion*, which included sections on methods for collecting butterflies, moths and beetles, for preserving birds and animals, and for bringing home seeds and plants (Durham, 1972).

Although some sources have identified Jost Van Dyke as the birth place of William Thornton in 1759, the editor of Dr. Thornton's papers (Harris, 1995) confirms that he was born in Tortola. Like Lettsom, he was sent as a boy to England to be educated among Quakers. He later studied medicine in Scotland, receiving a medical degree in 1784 (it was while he was in Scotland that Thornton and Dr. Lettsom became friends). In 1787 he immigrated to the United States, eventually becoming a citizen. At age 31, he married and returned to the Virgin Islands to live at the family plantation, called Pleasant Valley, in Tortola. His correspondence with Lettsom indicates that Thornton seriously considered returning the slaves he inherited from his father to Africa. Eventually he was enticed back to the United States when the design he had submitted for a capital building was selected, and President George Washington appointed him Commissioner of the new federal city in Washington in 1794. He was the first head of the U.S. Patent Office (appointed in 1802 until his death) and was the author of books on such diverse subjects as the origin of steamboats, the education of the deaf, the abolition of slavery, and a plan for uniting North and South America via a canal through Panama.

throughout the Territory and in some cases are still regularly used.

A substantial number of ceramic fragments have been recovered from this area suggesting the possibility of a rubbish midden (refuse heap) in the immediate locale. Evidence of burial mounds can also be seen to the rear of the residence, which corroborates Thornton's identification (Abraham, 1933) of the burial spot of Lettsom's parents as being at the rear of their former home.

To the west of the main structure are the remains of dry stone terracing, which runs in a series parallel to the shoreline all the way to the sea. It was in this area that the cotton plantation would have been located, the staple crop grown on LJVD.

The shoreline has been divided between beach and fertile land by a large dry stone wall that runs the length of the plantation. This would have been constructed to retain precious soil behind the wall during heavy rains and to prevent soil from running into the sea.

Probably the most curious feature of this entire ruined ensemble is a water catchment platform on the northwest side of the shoreline. A variety of water catchment methods have been observed throughout the BVI but none replicate this style, making the catchment at the Lettsom Settlement unique in the Territory. A large boulder, thrown to the surface during the volcanic creation of the island, has slowly eroded in its centre to

create a natural basin. In areas where this depression is incomplete, low walls have been erected to contain the trapped fresh rain water. Potentially, this feature could have held around 100 gallons of water, making it a vital addition to the plantation landscape.

The Lettsom settlement on LJVD is already being closely studied by John Chenoweth from the University of California at Berkeley, who in his first season (2008) collected and catalogued a variety of cultural material (see **Box 9**). These artefacts are currently being stored at the H. Lavity Stoutt Community College in Tortola until a proper facility is available on JVD or LJVD.

2. Brown Ghut Ruins

These extensive ruins are the most remote on JVD and can only be reached on foot after a considerable walk through the bush on the east end of the island. This, however, should not be detrimental to their display because the trail leading to the site appears to follow the original plantation era approach and presents a variety of interesting plants along the way.

The trail is accessible after leaving the main road directly opposite the large black water tank at the east end of JVD. It gradually declines until it reaches a ghut. Along this clear path is evidence of dry stone walls and plant life. After reaching the ghut, the trail begins winding towards a knoll on the landscape, upon which a

Box 9.

HISTORICAL ARTEFACTS ON LJVD

Students participating in an archaeology project during the summer of 2008 discovered over 1,300 pieces of artefacts on the island of Little Jost Van Dyke, mostly broken pottery and glass, dating from 1762 for ceramic production and from 1735 for pipe stem measurements. In a report to the BVI Department of Culture, team leader John Chenoweth (Ph.D. candidate from the University of California at Berkeley) stated the project's goal was to tell the story of the site and of the people who lived and worked there during the eighteenth and nineteenth centuries. The team returned to Little JVD in 2009; they hope to identify the area where the island's enslaved Africans lived.

former settlement might have been located. Closer inspection of the topography reveals areas where the landscape has deliberately been flattened to accommodate the site, which initially appears to be approximately 0.5 acres in size.

The foundations of large standing walls have been heavily corrupted by tree roots, leading to an almost complete collapse of the remaining walls. An indeterminable series of aggregate-bound retaining walls surround the area. Their extent will only be revealed once the site has been cleared.

Many of the corners for these walls have been damaged by the removal of red bricks for later use, quite likely in locally built Dutch ovens. Curiously, a Dutch oven, constructed upon a large boulder, remains at the site. This is the only recorded example of a Dutch oven built

on a boulder in the Territory. The obvious insulating properties of the boulder undoubtedly meant the oven would have stayed hotter longer, making it not only considerably more practical but also economic in that less charcoal would have been required for burning.

Although fragments of creamware ceramic shards were found on the approach trail to the site, surprisingly few were visible amongst the ruins, probably as a result of the dense leaf coverage within the confines of the walls. Only an organised clearance and a survey of the site will reveal the original use of this area.

The presence of ceramic shards and a Dutch oven suggest a residential occupation, but the site is too large for just a house. Interestingly, the site looks directly down onto LJVD, and, during contemporary times, the Lettsom settlement would have been visible. In an era when communications were limited, maintaining visual contact with the neighbouring plantation was vital, especially during uprisings or potential invasions.

3. Mill Round Sugar Mill and Cistern

This ruin is the foremost remaining historic site from the plantation era on JVD, an assessment based primarily on two factors. Firstly, it is easily accessible, located above Great Harbour only a few feet away from an established road; secondly, it is the only example of a sugar works (*i.e.*, sugar production

industrial site) located to date on JVD. A further unique feature of the site is a catchment platform and oval cistern. Only one other example remains in the Territory.

The site is still easily located today and is even marked on maps as “Mill Round”. Almost immediately upon leaving the road on the north side, ruins are encountered contiguous to a small ghut.

The first structure on the north-east side is an angled platform used to catch rainwater that runs into an oval, mortar-rendered cistern. Familiar in other Caribbean islands such as St. Kitts and Antigua, this method of collecting rainfall was considered efficient enough to be used well into modern times on Tortola. Only recently, during

construction of the Territory's new hospital building, was the government catchment platform in Road Town demolished; the catchment was a feature that had long dominated the Road Harbour landscape.

A far larger and impressive example than that on JVD may be found at Fort Purcell on Tortola; however, this was the largest military site ever constructed in the BVI and once housed approximately 1,500 soldiers. However, to find a civil example in a remote location amongst the ruins of a sugar mill, as seen here in Jost Van Dyke, is quite unusual in the BVI.

The mill-round platform (see **Box 10**) is still apparent, and the central foundation within which the roller cradle would have been fixed, is visible. The boiler

Box 10. SUGAR PRODUCTION IN THE BRITISH VIRGIN ISLANDS

Sugar production in the Virgin Islands dictated that every plantation in the colony have its own processing plant, consisting of two primary structures: (1) the **MILL ROUND** (or animal round) and (2) the **BOILING HOUSE**.

The objective was to extract juice from the cane and then reduce it to a solid.

Cut cane would be brought to the mill round, which was a circular earthen platform with a wooden cradle in the middle supporting three heavy iron rollers. A large cross beam would be attached to the cradle extending to the edges of the circular platform. Attached to either end of the beam would be a dray animal walking in a circle and thus turning the beam attached to the central roller in the cradle. This roller was clogged to the other two rollers, and when the central roller turned, so would the other two on either side. The cut cane was then passed in between these rollers and crushed, making the juice flow out into a holding cistern at the bottom of the cradle.

The juice was then reduced to a solid in the boiling house, a structure containing four heavy cauldrons in which the juice was slowly reduced. The iron cauldrons would be secured in a masonry surround known as the “copper battery”, underneath which fires would be lit enabling evaporation of the liquid constituent in the juice.

A bi-product of sugar production was rum, which provided an alternative income and trading commodity for many planters. A copper still, where the rum was brewed, would be placed in a masonry surround adjacent to the sugar works. Although many of the stills in the BVI have been removed, the telltale masonry surround (Historic Site 3) provides evidence that rum was produced in combination with sugar.

house beneath is largely collapsed, but evidence of the copper battery is still discernable inside, whilst outside the stoking orifice for one of the furnaces remains in a semi-collapsed state.

Adjacent to the boiler house is a structure that appears to be the base of a Dutch oven. This is not a residential site, however, making it more likely that this small foundation is in fact the base of a rum still. Rum, extracted from the sugar crop, provided another revenue source for JVD, one which found a ready market in the United States and Europe. The remains of the foundation of rum stills, located next to sugar works, may be found throughout Tortola.

The area surrounding the site is littered with ceramics and glass, which could provide a dating source to define a relatively accurate cycle of activity at this site. Evidence of blue Pearlware was observed, which suggests a late-eighteenth-to-early-nineteenth-century occupation, typical for the BVI. Subsequent to this period, sugar became unprofitable, and statistics for 1815 reported that none was produced on JVD. Consequently, this sugar works was operational prior to this date, probably being abandoned in the early nineteenth century.

4. White Bay Fort

The eighteenth century saw almost constant warfare in the West Indies as various European

powers attempted to control the lucrative sugar islands. As a consequence, the British West Indies was heavily fortified, including Tortola, which was surrounded by approximately 25 emplacements. The smaller satellite islands like JVD also mounted cannons on small batteries guarding the primary bays.

On JVD, White Bay was fortified. Evidence of this can be found in the papers of the Road Town Council in September of 1779, where it was "*Resolved that whatever cannon or other war-like materials provided by John Skelton Esq. for the use of Joes [sic] Van Dyke be reimbursed by the public*" (Road Town Council Chambers CO 316/1 p.374 RHS). A document from 1801 (National Archives, 1801) records the presence of a fort at White Bay, which guarded the entrance through a coral reef into the bay.

The remains of the White Bay Fort are found today on the small rocky outcrop that divides the beach in two. A footpath across the outcrop runs close to the only surviving standing ruins. These ruins represent the remains of a small residence, most likely the guardhouse. More low foundations can be seen to the rear of this building including what was once a small enclosed structure, possibly the former powder magazine.

A little further to the east is an escarped platform, the remains of a flat packed-earth battery. This type of simple battery, cheap to construct, protected

the length of Tortola's north shoreline. Due to the accessibility of the site, few artefacts remain visible, although ceramic fragments and the base of an eighteenth-century beer bottle, common to military sites, were observed.

5. Turtle Crawl (Kraal) at White Bay

This interesting structure allowed fisherman to keep their catch fresh and available for consumption within a controlled environment. Essentially, the structure is a semi-circular wall whose top rises above the surface of the water and whose edges conform to the shoreline shape. Once caught, fish and turtles could be stored within their natural habitat, albeit trapped or corralled—hence the derivation "crawl".

A number of these structures survive in the BVI on Virgin Gorda, Tortola, Peter Island and JVD. Certainly the most impressive is found on Tortola directly opposite Beef Island at the point where a small bridge joins Tortola and Beef Island. A modern house was built in the vicinity and is called Turtle Crawl. Unfortunately, the owner knocked a hole in the crawl wall that enabled him to shelter his boats within the crawl confines, essentially creating an enclosed marina. This type of damage can also be observed at the Pockwood Pond Crawl on the west end of Tortola.

The crawl at White Bay has already deteriorated, and the top does not rise above the

surface anymore. This may be because the wall has been damaged by tidal surge since abandonment or because the water level in the immediate area has risen enough to cover it. Certainly, the edges of the wall do not conform to the beach, suggesting that the shoreline profile has changed since construction.

The crawl at White Bay is very visible as a submerged feature from the shoreline (**Photo 34, Site 5**) and can in fact be distinguished in satellite photography. Although an underwater study of the site was not undertaken during the Profile Project, the fact that the seabed surrounding the wall is composed almost entirely of sand suggests the wall has provided shelter for fish and other sea life and has created an environment especially conducive to snorkeling.

6. Residence Foundation

Perched on a peak towards the west end of Jost Van Dyke above White Bay are the low rectangular foundation remains of a structure, which, most likely, was once used as a residence or storage facility for a plantation-era cotton farmer. The walls only reach on average height of approximately 15 inches and were constructed to encase a wooden building. The sheered, angular, lime-mortar rendering that caps the walls confirms that they were never any taller.

A doorway on the east wall of the structure points to the method of construction. The

two post holes either side of the entrance would have each encased two thick wooden posts. Similar posts would have been placed at the four corners of the structure providing the framework to which smaller batons would have been fixed and then covered in either wooden boards or shingles. The whole would then have been roofed with thatch, probably from the Tyre Tree that can be found in abundance on nearby Great Thatch Island and from which the name of the island is derived.

Curiously, no other foundation presence was observed in the immediate vicinity. However, the tall guinea grass that carpets the area may be obscuring other archaeological features.

7. Standing Wall, White Bay

This unusual feature sits precariously on a steep decline and is similar in appearance to a buttress support. The angular, thick andesite and lime mortar fabrication is consistent with a structure retaining another building to the rear, although nothing remains behind apart from low, mortar-bound foundation walls.

The steep nature of the immediate topography and the architecture of the remaining wall appear to be contemporary to each other, leading the observer to question why anybody would want to expend effort and money to build within such a prohibitive environment. The lack of further standing evidence presents a quandary,

which will only be solved by a concerted effort to clear and document the site. Like much of the island, there is a thick layer of leaf detritus covering the confines of the surviving structure, probably concealing further clues to its history.

A large salt pond located below the site provides one indication of its possible use in the past. Due to its preservative properties, salt was an extremely valuable commodity, which, once harvested, could be exchanged for other goods. Although there is no immediate evidence to link the thick wall and the salt pond, the brackish nature of the surrounding soil would probably negate any agricultural activity in the area, making this hypothesis worth pursuing.

8. Prehistoric Sites

Consecutive years of excavation on Jost Van Dyke and Little JVD by Dr. Brian Bates of Longwood University, Virginia (USA) have revealed two fertile prehistoric archaeological sites, the first at Cape Wright on JVD and the second at the Lettsom Settlement on LJVD. A summary of his work is provided by Dr. Bates in **Box 11**.

9. Methodist Chapel, Great Harbour

The arrival of John Hammet on Tortola in 1789 triggered a series of events that still have a profound influence on the Territory today. Hammet was the first Methodist missionary to be dispatched to the BVI from

England, and within one year he had amassed a congregation of 900 followers. His success encouraged further expansion of the church and led to chapels being built on most of the occupied BVI.

The example surviving on JVD is probably the most often illustrated Methodist chapel anywhere in the BVI (**Photo 34, Site 9**). A number of paintings, postcards and calendars have featured the chapel, whose position close to the beach and shoreline presents an idealistic image of Caribbean community religion.

A closer inspection of the yellow-washed foundations reveals that they pre-date the modern chapel, having probably been constructed in the mid-nineteenth century. The adjoining cistern and bell tower compliment the religious architecture of a building that is similar to many other chapels on Tortola constructed after the 1923 hurricane. The building is still in regular use and is a focal point for the modern community on JVD.

DOCUMENTARY RESEARCH

Archives, located in Europe and the Caribbean, are possible sources for additional information to relate the history of Jost Van Dyke and Little Jost Van Dyke, which to date remains mostly an untold story.

The National Archives at Kew in the United Kingdom (www.nationalarchives.gov.uk) retains a wealth of information chronicling BVI history and undoubtedly has many references to JVD and LJVD. Another archive worth studying is the Dutch records office (www.en.nationaalarchief.nl/default.asp), which contains information about the seventeenth century Dutch Republic occupation of the BVI.

We know that settlers who migrated to Tortola in the mid-seventeenth century were dispatched from the Dutch Caribbean island of St. Eustatius, where records may reveal more about who these people were. Additionally, a vibrant historical group on the island, the St. Eustatius Historical Foundation (www.steustatiushistory.org), maintains close ties with academic institutions in Holland.

There is also considerable information available detailing the life of John Coakley Lettsom of LJVD. James Johnston Abraham's book, *Lettsom: His Life, Times, Friends and Descendants*, published in 1933, occasionally comes onto the market and is the most detailed biography of this famous surgeon's life. More rarely, copies of Lettsom's *Life of Fothergill*, published in the late eighteenth century (Lettsom, 1783), also becomes available.

Box 11. PREHISTORIC SITES

In 1998, a team of archaeologists from Longwood University led by Brian Bates embarked on a survey to identify prehistoric sites on JVD and LJVD. That effort resulted in the identification of two ephemeral prehistoric sites—one at White Bay and one at Little Harbour on Jost Van Dyke.

Two more significant sites were also identified. The first is the scatter of surface finds at the Lettsom Settlement on Little JVD. The second is the more significant prehistoric site at Cape Wright on the east end of Jost Van Dyke overlooking Little Jost. The research since 1998 formed a major component of a doctoral dissertation on the prehistoric settlement of the Virgin Island Group (Bates, 2001).

Since 1998, Dr. Bates and his teams conducted further investigations on JVD in 1999, 2004, 2005, and 2007, with yet another season planned for 2009. The results of this work are preliminary at this time.

What is known is that Cape Wright served as the largest settlement on the island and, based on radiocarbon dating as well as ceramic styles found at the site, we know it was occupied from at least 600 A.D. until sometime just after 1300 A.D. The archaeological deposit at Cape Wright is deep—approaching one metre in places—and has good stratigraphic integrity*. Bates has concluded that the site has great potential to yield detailed information about prehistoric life not only on Jost Van Dyke, but in the British Virgin Islands as a whole.

With the exception of some late-sixteenth-to-late-seventeenth-century historic activity at the site, which is also being examined by the Bates team, the prehistoric component at Cape Wright has been virtually undisturbed over the centuries, thus making its potential to yield information on the prehistoric past unparalleled in the BVI.

* "Stratigraphic integrity" refers to the surface layers which have accumulated over time but have not been disturbed by subsequent human intervention.

Photo 34. Historic sites of Jost Van Dyke and Little JVD.



SITE 1
LETT SOM SETTLEMENT, LITTLE JOST VAN DYKE



SITE 2
Brown Ghuf Ruins

SITE 3
PEARLWARE SHARD, MILL ROUND
SUGAR MILL



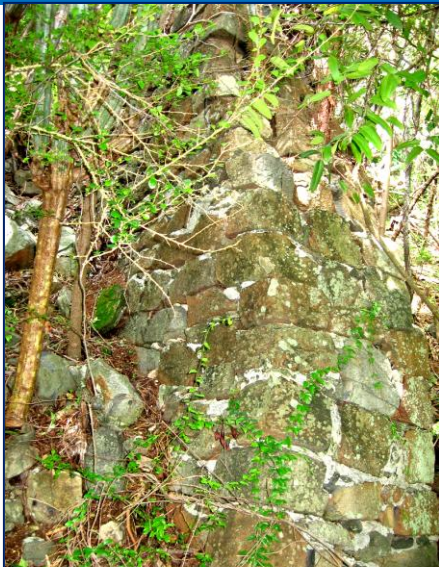
SITE 4
WHITE BAY FORT



SITE 5
TURTLE
CRAWL



SITE 6
RESIDENCE FOUNDATION ABOVE WHITE BAY



SITE 7
STANDING WALL AT WHITE BAY

SITE 9
METHODIST CHURCH AT GREAT HARBOUR



HISTORICAL HERITAGE ISSUES	ACTION OPTIONS AND OTHER RECOMMENDATIONS
<p>HISTORICAL HERITAGE ISSUE ONE</p> <p>The surviving historic sites described in this chapter are mostly in a state of advanced ruin and covered with vegetation and root structures.</p>	<ol style="list-style-type: none"> 1. Prior to any public display of surviving resources, and even before site clearance and survey tasks are undertaken, permission will need to be obtained from private landowners for those sites not located on public lands, following which a thorough surface clearance needs to take place at each site, including a concurrent and supervised collection of remaining artefacts. 2. This could in fact be turned into a community event and an educational experience for the children of JVD. A school project could be initiated, and once instructed on exactly what to look for, the children could under adult supervision help clear sites like the Mill Round and collect remaining artefacts for future display. This will serve to: (a) instruct the children on their surviving historical heritage and (b) clear the sites for subsequent documentation, interpretation, and public presentation.
<p>HISTORICAL HERITAGE ISSUE TWO</p> <p>In the past, a lack of:</p> <ol style="list-style-type: none"> (1) <i>sufficient community interest,</i> (2) <i>a comprehensive, preservation strategy for protecting surviving sites, and</i> (3) <i>funding for site maintenance,</i> <p>have all contributed to the deterioration and abandonment of historic sites on JVD and LJVD.</p>	<ol style="list-style-type: none"> 1. The Jost Van Dykes (BVI) Preservation Society might consider establishing a JVD Historic Sites Committee to focus on stimulating community interest in the history of JVD and LJVD and developing a "Jost Van Dyke Heritage Protection Plan" for the conservation and enhancement of surviving historic sites. 2. The JVD community, in collaboration with the JVDPS, should seek assistance from and cooperation with like-minded organisations in the Territory, such as the National Parks Trust and the BVI Department of Culture, and from nearby islands, such as the St. John Historical Society on the neighbouring island of St. John in the USVI. For example, the St. John Society's website at www.stjohnhistoricalsociety.org is one of the most informative and image-rich sites of any historical society in the Caribbean region.
<p>HISTORICAL HERITAGE ISSUE THREE</p> <p>The historic past of JVD and LJVD remains relatively obscure, and additional research on the islands' history needs to be undertaken in order for islanders to understand more fully their ancestral roots.</p>	<ol style="list-style-type: none"> 1. The JVD Society might pursue the establishment of a relationship with the St. Eustafius Historical Foundation. As stated in this chapter, information may be available from the Dutch island that better explains the Dutch occupation of Jost Van Dyke and the origins of the island's name. 2. The JVDPS could initiate a collections policy that focuses on historical research as part of the further development of its Environmental Information Centre. The Society might purchase some of the volumes mentioned in this chapter for inclusion in its collection, along with other documentation that could be secured from international archives. In this effort, the Society would want to consult with the Archives Unit in the Deputy Governor's Office and the Department of Culture in the Ministry of Education and Culture.

HISTORICAL HERITAGE ISSUES	ACTION OPTIONS AND OTHER RECOMMENDATIONS
<p>HISTORICAL HERITAGE ISSUE FOUR</p> <p>There is not an interpretation centre or museum or similar facility on Jost Van Dyke or Little JVD to display and explain the cultural and historical artefacts of the islands' past.</p>	<ol style="list-style-type: none"> 1. A building apparently abandoned in Great Harbour might provide one possible venue for creating an historical and cultural interpretation centre for Jost Van Dyke; this poured concrete structure lies contiguous to the Government Dock and Customs House. If permission could be obtained to rehabilitate the structure, it would provide a convenient location for a small museum and cultural centre, inside of which artefacts from the various historical sites could be catalogued, stored and displayed. The site could also serve as a location from which a variety of heritage tours around the island could commence. 2. A building on the northeast shore of Little JVD, once the location of a bar, might also, after rehabilitation, serve as an interpretation centre for the Lettsom Settlement and the prehistoric sites of Cape Wright (JVD) and LJVD. This building is currently abandoned but would make an ideal museum within which the life of Lettsom could be related in one half, whilst the prehistoric occupation could be translated in the other. The artefacts from the Lettsom Settlement currently stored at HLSCC could also be on display. The Medical Society of London (based in Lettsom House, Chandos Street, London) was founded by Lettsom in 1773; it has in the past shown an interest in developing the site at LJVD. The Society might be prepared to provide funding and/or relevant documentation or other support in order to achieve this objective. 3. The development of interpretation facilities for JVD and Little JVD should be pursued in cooperative with BVI Government agencies such as the NPT (which has designated the Lettsom Settlement as a future historic site under the National Parks Act), the Department of Culture, the Tourist Board, and the H. Lavity Stoutt Community College.
<p>HISTORICAL HERITAGE ISSUE FIVE</p> <p>The JVD tourism product has focused largely on yachting, with little being done to develop or display the island's historic sites as a tourism niche. The success of heritage tourism sites in St. Kitts (Brimstone Hill Fortress National Park), St. Croix (Whim Estate), and Antigua (Nelson's Dockyard) demonstrates that there is an interest in Caribbean history by the region's tourists.</p>	<ol style="list-style-type: none"> 1. The following is an overview of four potential heritage tours that could be pursued for Jost Van Dyke. <ul style="list-style-type: none"> a. Brown Ghut Tour <p>Beginning at the Ridge Road opposite the large black water tank towards the east of JVD, the route for this tour drops down into the bush, picking up the original plantation trail leading towards the ruins. Dry field stone retaining walls are visible along the trail, which also has a wealth of native plants, some of which were used for medicinal purposes by former inhabitants. The trail crosses a ghut and then leads down in towards the ruins complex at a distance from the road of approximately one-half mile. After an explanation of the site by a tour guide, the tour could either retrace back to the ridge road or, for the more adventurous, follow the ghut down to the coast where it ends close to Foxy's Taboo Restaurant.</p> <p>An explanation of plant life, wildlife and historical features would make this tour fascinating for tourists who are interested in hiking, wildlife and culture.</p>

HISTORICAL HERITAGE ISSUES	ACTION OPTIONS AND OTHER RECOMMENDATIONS
	<p>b. Lettsom Settlement, LJVD</p> <p>Leaving Great Harbour, guests would be transported by safari bus to the dock near Foxy's Taboo Restaurant, where they would catch a ferry for the short trip to LJVD. Following an established trail to the ruins, guests could then be shown the Lettsom Settlement and given an explanation of the features remaining and of Lettsom's life. The tour would then lead over the hill to the cotton plantation, including the terracing that is still clearly visible. Were the building at the site to be rehabilitated, guests could then see a display of Lettsom's life and an explanation of the prehistoric sites on LJVD and Cape Wright opposite on JVD.</p> <p>The Lettsom Settlement artefacts that are currently being stored at the H. Lavity Stoutt Community College might be displayed. The interesting life and extensive achievements of John Coakley Lettsom add a further provenance to the site, which could be exploited to create a significant tourist destination at a site that is rarely visited by most yacht-charter guests.</p> <p>c. Mill Round Sugar Works Tour</p> <p>This tour would be ideal for older visitors or the less adventurous who are unable to walk far. The ruins are a short distance from the Ridge Road above Great Harbour and easily accessible to a variety of guests. Once the site has been cleared and documented, a circular masonry platform could be constructed, which would provide an overall panorama of the former sugar works and cistern. Weather-proof interpretation boards explaining and illustrating how sugar was produced on the island could surround this platform, providing guests with a visual reference to the ruins. There is a prodigious amount of cultural material remaining at the site, primarily represented by Wedgewood ceramics. Some of these shards could be incorporated into the boards, providing a history of eighteenth-century English pottery. This tour could then return to Great Harbour or serve as the first stop of a more extensive tour as described below.</p> <p>d. JVD Historical Sites Tour</p> <p>This tour, the longest of the four suggested tours, would take approximately half a day and would begin in Great Harbour.</p> <p>It would follow the same route as that previously described in Tour C, but would continue along the ridge to the low foundation ruins above White Bay (Historic Site 6 in this chapter). From here the tour would then drop down into White Bay to the standing walls described earlier in this chapter as Historic Site 7.</p>

HISTORICAL HERITAGE ISSUES	ACTION OPTIONS AND OTHER RECOMMENDATIONS
	<p>Alighting from the tour vehicle at the nearest point to the White Bay Fort (Historic Site 4 in this chapter), guests could then be escorted to the gunner's residence ruins and platform, where an explanation of the military history of the BVI would be provided. From here, guests could be taken to see the Turtle Crawl (Historic Site 5 in this chapter) at the east end of the bay before returning to the point of origin.</p> <p>Each of the described tours could provide an interesting element previously unavailable within the BVI tourism product. The JVD tours could therefore be advertised throughout the BVI, attracting guests to JVD and LJVD who may not have visited the islands otherwise. If local businesses are able to work with tour organisers, discounts on ferry trips, meals and other refreshments could be offered to enhance the available package. If the Jost Van Dykes (BVI) Preservation Society is able to organise and manage such tours, gross revenues from the expeditions could be reinvested in Society programmes, including site maintenance and management.</p>

5. JOST VAN DYKE'S CULTURAL HERITAGE

This chapter of the *Profile* was prepared by Susan Zaluski, Projects Manager of the JVDPS, assisted by Rosemary Delaney-Smith, OTEP Project Coordinator for the Society; it is based in large measure on interviews of JVD residents conducted by Ms. Zaluski and Ms. Delaney-Smith in 2008 and 2009.

While historic sites offer a physical link to the past, Jost Van Dyke's rich history is not limited to tangible artefacts or ruined structures. Cultural traditions, often transmitted orally from one generation to the next, emerge as a specific response to the particular environmental, social, political and economic conditions of a specific area (**Box 12**).

In Jost Van Dyke, unique cultural traditions impart important information about the island's history and environment. Many of these traditions have begun to disappear and are quickly fading from modern memory as the fabric of Jost Van Dyke and British Virgin Islands culture changes with the impact of globalisation (particularly expressed through the island's tourism sector) and subsequent economic growth.

Cultural traditions demonstrate the vast diversity of human creativity, and, on Jost Van Dyke, the community's cultural legacy tells the story of a resilient, creative island people, who in the recent past used a limited number of available natural and man-made resources to meet their needs for food, shelter, commerce,

Box 12
CULTURAL HERITAGE

Cultural heritage is not limited to material manifestations, such as monuments and objects that have been preserved over time. This notion also encompasses living expressions and the traditions that countless groups and communities worldwide have inherited from their ancestors and transmit to their descendants, in most cases orally.

—2003 UNESCO Convention on Intangible Cultural Heritage

energy, transportation and even entertainment.

COMPONENTS OF JVD'S CULTURAL HERITAGE

Migrations

Although politically separate from the nearby U.S. Virgin Islands, Jost Van Dyke (and the rest of the BVI, as well) maintains strong ties to the U.S. Territory. Many Jost Van Dykians have spent a good portion of their lives crossing between the two separate territories for a variety of social, religious, familial and economic reasons.

With ancestries of European and African origins, the population of Jost Van Dyke is still undergoing "creolization" through migrations and interactions with other Caribbean islands. According to the Government's

DPU, approximately one-third of the island's resident population is of non-BVI origin, while an informal survey of the island's primary school found that half of these young residents were quickly able to identify their ancestry as other locales—namely, other Caribbean Islands. Undoubtedly, this has an impact on the island's culture, making modern Jost Van Dyke a mini-melting pot of the larger Caribbean culture.

Music of JVD and the BVI

Within both the Caribbean region and the BVI Territory, music has been an important mechanism for transmitting oral history and is a significant cultural expression in itself.

The traditional music of the British Virgin Islands, known as "Fungi," is named for a corn-meal-based local food dish that melds different ingredients (including okra, sweet peppers and onions) into the harmony of a distinct dish. Similarly, Fungi music serves up European, African and local, hand-made instruments into a single helping of music with a distinctive melody and rhythm. Instruments may include the banjo, ukulele, guitar, washtub bass, triangle, washboard, saxophone or calabash.

Some of Jost Van Dyke's residents can remember a time in the not-so-distant past when the metal containers of cooking

oil were recycled into guitars, and drum sets were fashioned out of old butter pans (complete with cymbals created out of the lids of butter pans); a particular type of sardine tin (no longer imported to the island) made excellent ukuleles.

In a typical Caribbean tradition (seen in various forms of Calypso and folk music), BVI songs often provide social commentary, report on historic events, and cover island folklore/legends. Song topics range from stories about smuggling rum to pontificating about politicians and “who is to blame” for a variety of social ills.

Popular Fungi musicians in the Territory include the Tortola-based Lashing Dogs, who still play regularly at musical festivals and special events and whose songs cover the Territory's folk history. Well-known Fungi musician and educator-turned-politician, Elmore Stout spent many years of his career in education on Jost Van Dyke at the island's Primary School. Some of his songs relate valuable information about the island's history and folklore, and his music should be considered a cultural resource for the Jost Van Dyke community.

Although his music is more geared toward entertaining an external tourist audience, local entertainer Philiciano “Foxy” Callwood performs songs which sometimes focus on environmental themes, cautioning the island and Territory against exploitation of their natural re-

sources and the risk of turning their own backyard into a “garbage dump” for the sake of short-term economic gains.

Finally, Ruben Chinnery is perhaps the most prolific singer-songwriter on Jost Van Dyke, writing songs filled with valuable local history and social commentary. In his music, Chinnery takes note of the changing JVD society, in one song focusing on young men who no longer hunt goats, while in another relating the story of Guyanese immigrants in Jost Van Dyke, thereby placing JVD in a wider Caribbean socio-economic context.

Music lyrics may be Jost Van Dyke's (and the Territory's) best record of folk history. Music is also a fluid art form and changes continually with different cultural influences, further relating information about interactions with other societies. Modern music on Jost Van Dyke may reflect the wave of migration from other parts of the Caribbean, as well as influences from the nearby United States, and contains elements of Reggae, Soca, and American Hip Hop.

Festivals, Holidays and Celebrations

As a satellite community of both Tortola (politically) and St. Thomas (socially/historically), residents of Jost Van Dyke often share in the cultural traditions of nearby islands, including Emancipation festivals. Jost Van Dyke

Box 13 REDUCE, RE-USE, RECYCLE: A JVD CULTURAL TRADITION?

While modern communities across the globe are lamenting the development of a “throw-away” culture, this extensive use of disposable, non-renewable materials is particularly problematic for small island communities. Imported items were once treated sparingly and resources were continually reused and recycled, reducing the overall waste stream. Sadly, today's excessive packaging often has a one-way ticket to Jost Van Dyke's landfill. In explorations of Jost Van Dyke's cultural traditions, the theme of recycling products continually emerges.

In past decades, food containers received a second life as musical instruments, while old tires might be turned into shoes or “hooples”, a game for children. Flour and crocus bags were made into clothing or bags for schoolchildren and used to haul charcoal. In many cases, residents would also take bricks from old buildings (today's heritage sites!), recycling these for use in modern buildings.

“As we used to say, ‘Eat the flour, wear the bag’,” remembers Mr. Frank Chinnery, JVD resident (born 1922).

residents may participate as casual observers, but some also participate directly as performers in carnival parades, singing, dancing or playing music.

As an outgrowth of Foxy's Wooden Boat Regata, Jost Van Dyke hosted its own Carnival in September each year from the mid-1980s until the mid-1990s (**Photo 35**), complete with food stalls, floats, music, dance and “Mocko Jumbies” (stilt walkers).



Photo 35.
Carnival parade through Great Harbour in the early 1990s.

This event no longer takes place; however, island residents occasionally express an interest in reviving it.

An edition of the JVDPS' *JVD GREEN Newsletter* (December 2008/January 2009) highlighted a Christmas-time tradition that is familiar in the larger BVI culture and is shared by Jost Van Dykians too. It is the custom of preparing a sweet alcoholic liqueur from the fruit of the guavaberry tree, common to the island. JVD resident, Mrs. Sheila Schullerbrandt, reported that her family traditionally spread Christmas cheer with the sharing of treats like guavaberry liqueur, ham, black cake, wine, tarts, dumb bread and cane rum.

At Christmas time, many residents also participate in traditional religious caroling, spreading holiday cheer from home to home on Christmas Eve day. Later in the evening, the celebration turns toward more raucous "serenading," when singers' spirits are kept high (sometimes in the late

hours of the night) by eating and drinking traditional holiday food and drinks like black cake and guavaberry liqueur.

Many natural items have been used for holiday decorations at Christmas. Shiny fish scales were sometimes used to decorate Christmas Trees, while many residents also report cutting down and painting the tall stalks of Century Plants for use as Christmas trees, a tradition once also popular in neighbouring St. Thomas and St. John.

Many BVI and Commonwealth holidays are celebrated as public holidays on the island. Traditional games and activities are often associated with Commonwealth Day and may involve activities at the Primary School. Each autumn, the Methodist Church becomes the focal point of the Harvest Festival. The island also comes alive every December 31 with an island-wide New Year's Eve party that draws masses of visitors and locals to celebrate.

Games

Many Jost Van Dykians fondly associate a number of games with the island. Games like "scotch-scotch" (similar to hopscotch) once involved throwing shards of pottery found near the ruins of old plantation-era buildings. Other games included "bat and ball", hooples and marbles, which might be played with imported marbles although seeds of plants were also used. Other residents remember making toys out of natural or recycled

Box 14 A MEMORY FROM 1960 ...

While on the island of Jost Van Dyke, I went back and forth to St. Thomas for work. At that time one was given 29 days in the U.S. and so I worked as a maid. After the 29 days were up, I came back home, then I would go to St. Thomas again. At that time I received \$28 per month. A good monthly payment ranged from \$10 and above back then. A bag of flour or sugar was sold at 2-3 cents back then. A strap of fish was 5 cents. The ferryboats I traveled on to get to St. Thomas I remember were the *Joan of Arch* and the *Neptune*. At that time they only charged \$7 a trip."

A memory from Mrs. Roseline
(Mrs. Rose Turnbull, 1928-2009)

products, such as creating dolls out of old mango seeds or toy boats mentioned later in this chapter. Many of the games were multi-generational, and children would play alongside adults. Cricket (common throughout Commonwealth Caribbean countries) is also a popular sport today.

Building Materials

From the Emancipation era forward, the traditional form of architecture on Jost Van Dyke has been described as "wattle and daub," which serves as a metaphor of island life—a latticework of materials taken from the land and bound together by resources from the sea. In a wattle and daub building, the "wattle" is built from sticks and branches from a variety of local trees (including



Photo 36.
JVD men harvesting thatch palms
in the mid-1970s.

but not limited to mangroves and ironwood). The “daub” consists of a mortar mixture created by building a fire and heating crushed coral, which is then mixed together with sand and lime and clapped on the wattle walls. Roofs were made of grass and Thatch Palms (Tyre



Photo 37.
Example of wattle and daub house on
JVD. In the top right hand corner of the
house, the exposed wattle is visible.

Palms) and were sewn together (Photo 36).

As modern building materials became available, this type of building construction has mostly disappeared from the island, with only a few examples surviving (Photo 37). Heavy timbers from the island were also used for building supports, with some remaining examples on the island today. For example, torchwood posts still serve as building supports at Foxy’s Bar and Restaurant in Great Harbour.

The palm-weaving skills employed in roof thatching also were used to create other cultural artefacts. Palm fronds for example have been used historically on Jost Van Dyke and throughout the Territory to weave mats, baskets and hats. The Tyre Palm is also sometimes referred to as the “broom palm,” as it was used to make brooms throughout the Virgin Islands.

Agriculture and Land Tenure

While much of the available food in the Territory today is imported, islanders once had to be more self-sufficient. Most families grew provisions such as banana, potato, tanya, cassava, avocado, sweet yams, pigeon peas and more. Most yards had several fruit trees; and breadfruit, lime, mango, guava, soursop, sugar apple, coconut and tamarind were common.

People in the community worked collectively in small groups, taking turns to cultivate or terrace each other’s land. Women would support the work by preparing food for the men.

A closer inspection of the terrain of Jost Van Dyke reveals a footprint of human history on the land. Coconut palm-fringed beaches, tamarind trees and land terracing are but a few of the many markers of how humans have irrevocably changed the landscape of Jost Van Dyke. Walks through the bush will reveal deliberate rows of Date Fence (*Bromeliad penguin*), a plant that could be used to mark one’s property and which was virtually impenetrable to man and cattle.

The resources of neighbouring cays were also widely used, and some JVD residents report visiting nearby Great Tobago to hunt goats or capture birds. As a bird rookery, Great Tobago was an easy spot to catch young Magnificent Frigatebirds (called Man o’ War locally) or juvenile Brown Pelicans, which were too fat to fly and had

been fed a consistent diet of small fish by their nesting mothers. Game birds were also a useful source of protein, and young boys would fashion Killiwangs (see **Photo 38**), small pyramid-shaped traps made of woven branches to catch doves, pigeons and other ground birds.

Prior to the advent of tourism, livestock agriculture was a major income-generating activity for the island. In addition to numerous goats found on the island, there were several hundred cattle on JVD, which would be delivered to market in nearby St. Thomas via locally-constructed island sloops. Island residents also remember a time when types of grazing grasses would be entered into annual Farmer's Week agricultural competitions. Many families also kept chicken and pigs.

For many of Jost Van Dyke's older residents, chores surrounding livestock tenure were a definitive part of the JVD experience. When questioned about their childhood chores, many islanders will quickly describe a familiar island scene:

Like every other child then, I had morning duties before going to school. My father had cows of his own. And so when I was a little older, on some mornings I had to get up and out of bed to help bring these cows from up on the hill, down to the bottom of the hill where there was a well. There they drank water. We then took them back into their pasture and then



Photo 38.
Wayson Hatchett demonstrates a killiwang made by his father, Baba Hatchett.

we'd go home and get ready for school. Also, sometimes when much rain was not falling and the drums we had were not full, I had to help my brothers and sisters fetch water from the same well that was at the bottom of the hill (Ms. Estella Chinnery, JVD resident born 1928, as told to then HLSCC student and JVD resident, teacher Jessica Callwood).

Charcoal Making

Charcoal making was a practice started during the plantation era, when strong fires were vital for sugar and rum production; it emerged as a primary industry for the BVI in the post-Emancipation years. Between the 1920s and 1960s, 20,000 tons of charcoal were exported from the BVI to the USVI annually (Penn-Moll, 1998).

Charcoal is a shiny black residue made of pure carbon, and is created by burning wood in an environment with limited oxygen, so that the remaining

"coals" could be used to burn at high temperatures.

On Jost Van Dyke, people would work collectively to build charcoal pits, a practice that occasionally continues to this day. First, a piece of land was cleared and a pit dug. Cleared green wood (typically tamarind, acacia and amarette) was set to cure for several days. Adult men generally cut the wood, but women and children from the community would help carry wood to the coal pit.

Wood would either be stacked neatly into rows or into a pyramid-shaped pile. Bush clippings, banana leaves, palm fronds, guinea grass and other branches would be stuffed between all empty spaces in the wood pile, which is then covered with dirt, with a small opening left at the bottom of the pile. The pile would be set on fire with hot coals. Eventually the small opening would be covered, and the men would tend to the pile and patch up new holes that emerged as the pit smoldered for up to an entire week. One island resident vividly remembers this familiar island scene, "The ladies coming out in head ties to pick the coal, their faces black and dirty."

Charcoal pits were also a social gathering place. Women might use the heat of the coal pit to cook breads or roast breadfruit, while men might play dominos around the pit.

In the early 1940s, Jost Van Dyke residents sold charcoal in Charlotte Amalie (St. Thomas)

for approximately eight to ten cents per bucket. As of 2006, the price per bucket was about \$10.00.

Local Drink and Food

In addition to the popular Christmas-time guavaberry liqueur, there are many traditional drinks associated with Jost Van Dyke. For example, "Miss Blyden" was a special drink made from the flower of the Sour Prickle Pear (*Opuntia rubescens*). Another popular drink is Mauby (popular throughout the Caribbean region, although the BVI version involves a fermentation process absent on other islands); it is made by boiling the bark of the Mauby Tree.

Other drinks include the hibiscus drink, lime juice, different bush teas, soursop specials and a juice made by combining the tart fruit of the tamarind tree with sugar. While today's youth may drink UHT Milk that arrives in cardboard containers, youngsters once drank freshly separated cow's milk.

A variety of local foods that are specific to either the Caribbean or the Virgin Islands are also associated with Jost Van Dyke and include, but are not limited to, dumb breads, fruit tarts (guava, coconut, pineapple), Johnny cakes, salt fish dishes, gooseberry stew, pea soup, stewed goat, fungi, dumplings pate (pastry), tulumar and cassava bread. Fish, beef and pork were often corned so that they would keep longer, and it was once a common sight to

see a clothes line or fence full of corned fish. The coal pot was used extensively for cooking and baking.

Food was sometimes seasoned with salt, which might be locally harvested from within the Territory (Salt Island) and even from the pond located in White Bay on Jost Van Dyke.

Herbal Medicine and Plant Use

In the absence of formally educated medical practitioners and medicines, Jost Van Dykians made regular use of herbal medicine and natural healing. Traditionally, the island had known herbal healers who knew a great deal about natural healing. Even today, many older island residents are familiar with local treatments. A collection of local knowledge about "bush plants" could fill a book.

There are numerous examples of herbal medicines used on the island to treat illnesses, including, but not limited to, the following (see interview with Ivan Chinnery, JVD resident, in *JVD GREEN Newsletter*, October 2008):

- Maiden apple vine to treat fevers or to purify blood,
- Cattle tongue as a bush tea to reduce colds and coughs,
- Soursop tree leaves as a mild sedative to help a person sleep, and
- dysentery bush to help stop diarrhea.

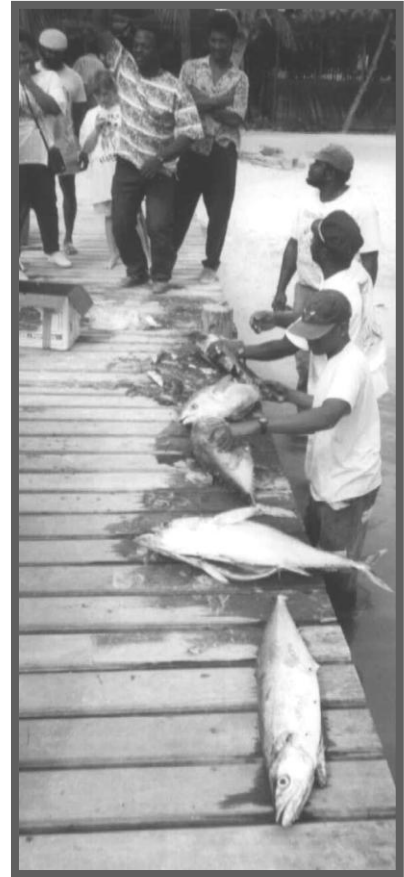


Photo 39.
A common Great Harbour site. Fishing is an important part of daily life on JVD.

Other resources used in herbal healing included shark and trunk oil (from the liver of Leatherback Turtles) as a treatment for asthma and colds.

Still other natural uses for plants abound, including the use of various cacti as hair shampoos or the use of the soft wooly fibers from the Silk Cotton Tree to stuff pillows and mattresses.

Much of the community's knowledge about medicinal herbs and plants has been transmitted orally. As modern medicines are now more readily

accessible to island residents, efforts to record these traditions could help ensure that the community retains this valuable information.

Maritime Resources

Information about Jost Van Dyke's unique relationship with the sea is contained in Chapter Four of this *Environmental Profile*. As noted in the earlier chapter, the island's traditional identity as a fishing and seafaring community is perhaps its most notable cultural identification (**Photo 39**).

Items from the sea have been used extensively in everyday life around the home. Sea sponges were used in the schoolhouse as erasers or to wash dishes, sea fans were used as sieves for sifting flour, sea whips were used to beat eggs and cake batter, and conch were blown throughout the Territory to announce the arrival of fresh catch.

Often from a young age, islanders helped provide food for their families—collecting whelk or conch, line fishing around rocks, or carrying a torch at night to find lobsters in the shallow waters. In small, locally constructed wooden vessels, islanders often rowed or sailed to rich fishing grounds or nearby islands to sell their fish or other goods in markets or barter them for other goods. Islanders also used small boats to row to jobs on nearby islands. Similarly, if a community member was ill, transport via rowing or sailing

was the only way to reach medical services.

Commercial rope was not available for fishing, and men would twist strands of whist as rope for their fish pots, which were also constructed of local, natural materials. Different types of cacti, soldier crabs and even broken lobster (which were less desirable than Hind, Grouper, Oldwife and other types of reef fish) were all used as bait for the pots. Fishermen often weaved their own seine or turtle nets. Today these skills are still used by older residents and are also used on land to capture free-roaming goats.

While Jost Van Dyke was not a boat-building center, many island residents worked with available resources to repair small craft. For play and recreation, many children raised on the island made various types of toy boats (from natural materials like coconuts), model boats (**Photo 40**) (which were part of races that pre-date the modern Wooden Boat Regatta in Great Harbour), and rafts (which were taken out to reefs for fishing). One Islander remembers building small rafts

and stripping the stalks from Century Plants to use the buoyant material of the stalks to help float the rafts.

Until recently, many islanders remember making “bateaux”, small canoe-style boats that were built using galvanized roofing materials (**Photo 41**). Bateaux were patched with tar, which was collected from around rocks. This same tar was also used in home repairs. Many local residents report that they believed the tar constituted remnants of oil spills in the area.



Photo 41.

Bateaux building was popular on JVD during the second half of the twentieth century, seen here during a Carnival race in the late 1980s.

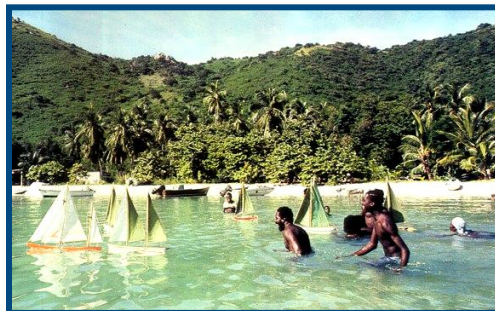


Photo 40.

Model boat races in Great Harbour during the mid-1970s.

VANISHING HISTORY

There is little written documentation within the JVD community of customs and rituals, and efforts to record these traditions through transcribed oral histories, voice recording and videography could help ensure that these unique facets of Jost Van Dyke life do not vanish without trace.

In terms of the environment, records of cultural traditions and firsthand accounts of the past through oral history can also be useful for conservation efforts. Such documentation helps to relate additional information about shifting environmental baselines and anecdotal evidence about the depletion of natural resources.

Box 15

MORE COMMUNITY VOICES

Firsthand accounts from Jost Van Dyke residents (such as the snippets below) formed the basis of this *Environmental Profile* chapter, which could, in turn, serve as the modest beginnings of a larger oral history project for Jost Van Dyke.

"It was such a sight to see: all those whelks on the rocks! Now they're all gone...."

"I lived with her in a thatch house.... There were no hurricane shelters. And so if one was about to approach us, we had nowhere else to go. Yet there were a lot less hurricanes while I was young."

"Thank You for the Word so sweet, Thank You for the food we eat, Thank You for the birds that sing, Thank You Lord for everything. Amen"

[This prayer was recited daily by the island's oldest living residents during schooling and is still recited today at the Primary School. Religion has been at the centre of community life on Jost Van Dyke and is a vital part of the island's cultural traditions and the residents' sense of community.]

CULTURAL HERITAGE ISSUES	ACTION OPTIONS AND OTHER RECOMMENDATIONS
<p>CULTURAL HERITAGE ISSUE ONE</p> <p>There is little available written documentation of customs and rituals of the Jost Van Dyke community.</p>	<ol style="list-style-type: none"> 1. An oral history project could be initiated by the Jost Van Dykes Preservation Society, possibly in collaboration with the BVI Department of Culture, the National Archives, the H. Lavity Stoutt Community and other like-minded partners. Island residents could be encouraged to collect stories and to help preserve old photographs and other cultural artefacts of the island. Until there is an available museum or interpretive centre on Jost Van Dyke to house a collection, island residents might consider lending artefacts for display at the Sugar Works Museum in Road Town. 2. The JVDPS, along with interested members of the community, could explore the use of multi-media presentations such as photo exhibits to help relate cultural information to a wider audience. The Society might mount historical photos on its web site similar to the exhibits on the web site of the St. John Historical Society (www.stjohnhistoricalsociety.org). 3. A project similar to establishment of an oral history archive would be an effort to transcribe song lyrics, interview musicians and write about the events that form the background for song lyrics. This initiative could involve primary, secondary or college students, as well as interested adults from the community.
<p>CULTURAL HERITAGE ISSUE TWO</p> <p>To date, JVD tourism, with its emphasis on yachting, has not yet incorporated significant elements of JVD culture into its tourism product (see also Historical Heritage Issue Five, Chapter Five).</p>	<ol style="list-style-type: none"> 1. Tourists to JVD might find many aspects of Jost Van Dyke's intangible cultural heritage to be of interest. In addition to the historical sites highlighted in Chapter Five for possible public display, new cultural demonstration sites could be created. For example, a demonstration site for the Emancipation era in the 1800s could include a home built of traditional Wattle and Daub or other elements that are culturally and historically of the period. Other demonstration projects could focus on fishing or practices of harvesting salt from salt ponds. The Fish House in Great Harbour might be an appropriate location for housing items or a centre for activities related to fishing and boats. 2. Tourists often express interest in local crafts. Musical instruments, weavings or other items might be a good income-generating activity for individuals or groups on the island. In 2008, the BVI Tourist Board launched an initiative to promote "recycled crafts". Craft projects on JVD could be developed that also focus on past traditions and practices of recycling (such as the creation of musical instruments for Fungi music). Such activities would also help to raise awareness about the importance of preserving the island's cultural traditions and practices.

<p>CULTURAL HERITAGE ISSUES</p>	<p>ACTION OPTIONS AND OTHER RECOMMENDATIONS</p>
<p>CULTURAL HERITAGE ISSUE THREE</p> <p>The British Virgin Islands does not currently have a policy directed toward the preservation and management of cultural resources.</p>	<ol style="list-style-type: none"> 1. The development of a “cultural resource management” policy for the Territory would need to be initiated by the Department of Culture, which is already working diligently with limited resources and is interested in the development of cultural resource management plans. Members of the Jost Van Dyke community should be supportive of initiatives that seek to develop and implement a comprehensive, territory-wide policy. However, it is also important that the policy incorporates island-level input and participation and encourages sufficient flexibility to allow for differences among the separate BVI inhabited islands.
<p>CULTURAL HERITAGE ISSUE FOUR</p> <p>As a UK Overseas Territory, stakeholders in JVD and the BVI (whether they are government or non-government) face the ongoing challenge of identifying sufficient funding and other resources to support cultural heritage programmes. As a dependency of the United Kingdom, the Territory—and institutions in the Territory—do not have access to as many donor sources, particularly in a field such as cultural heritage, a sector that is not generally well funded in the first place.</p>	<ol style="list-style-type: none"> 1. Creative solutions will need to be employed to secure funding for cultural heritage projects on Jost Van Dyke. Since natural linkages often exist between historical, cultural and environmental programmes, every effort should be made in a small place like JVD (with a small NGO like the Preservation Society) to strengthen those linkages where possible and to develop proposals, initiatives, and activities that tie resource <i>preservation</i> and resource <i>management</i> issues—in history, in culture, in the environment—into more integrated, inter-connected approaches, particularly when approaching donors. 2. On a programmatic level, environmental education activities by the JVD Preservation Society or other groups should try to use older community members as a resource for integrating environmental issues within a broader social/cultural/historical context.

6. WASTE MANAGEMENT AND POLLUTION CONTROL

Maintaining a pollution-free environment and the attributes that enhance the quality of life for Jost Van Dykians and attract visitors to the island—idyllic landscapes, beautiful white sandy beaches, aqua-blue waters teaming with marine life—has increasingly emerged as an environmental challenge for JVD islanders and their government. Natural resource pollution within any insular system can have severe negative impacts on the health and wellbeing of the people who live within or visit the island and on the natural ecosystems on which the human inhabitants depend.

Pollution issues can be exaggerated on small islands and are compounded by the dependence of an island like Jost Van Dyke on tourism. Dealing with issues of solid waste, domestic sewage and other pollutants on JVD, with its limited resources, has been intensified by the arrival of thousands of visiting yachts each year and the impact of these added waste streams on an already stressed waste disposal system.

For many who live on Jost Van Dyke, issues of waste management and pollution control have become one of their highest priority environmental concerns. For visitors who travel to JVD from more populated areas, their desire is to escape pollution — not to experience the smell of a burning garbage dump or swim in noticeably polluted waters.

POLLUTION SOURCES

Land-based Sources of Marine Pollution

The marine environments bordering Jost Van Dyke and its neighbouring cays are generally in good condition. However, the three primary bays along the south shore of Jost Van Dyke and the East End Harbour are beginning to exhibit variable levels of stress due to factors such as growth in marine-dependent tourism, inadequate disposal of waste, and increased sediment runoff from adjacent roads and hillsides.

The enclosed nature of the three bays on the southern coast at Great Harbour, Little Harbour and White Bay results in generally weak ocean currents that contribute to the retention of pollutants that are discharged directly or indirectly into marine waters. The primary pollution issue at East End Harbour is sediment runoff.

Sources of marine pollution are classified as either (1) point-source or (2) non-point source.

Point-source pollutants are those whose point-of-origin and location can be precisely determined, and therefore effluents can be accurately identified, for example, the discharge of waste water from a waste treatment plant. On JVD, there

are few known point sources of marine pollution. The primary sources are those associated with storm conduits (culverts, drains) that discharge sediments and “grey water” directly into marine waters (see **Photo 42**).



Photo 42.

An example of point-source marine pollution. A culvert at this location discharges a significant quantity of sediment and other pollutants into the marine waters at East End Harbour, Jost Van Dyke, during a period of heavy rains.

Non-point sources of pollution are many and often arise from a variety of activities. Their wastes may be produced imperceptibly and continuously. Some of these activities are ongoing, while others are seasonal. This contributes to the difficulty of identifying and quantifying non-source pollutants. As they are transported to marine waters, these wastes may become associated or combined with other pollutants.

On JVD the primary non-point sources of marine pollution are:

- solid waste disposal sites and their leachates (*i.e.*, the



Photo 43.

White Bay, JVD, is a popular destination for charter boats and a focal point for other recreational activities. More than 20 boats were observed on this July 2008 afternoon (another 51 boats at Great Harbour), even though July is off-season for tourism in the BVI. Evidence of boat discharge is frequently reported by recreational users and White Bay residents.

liquid that drains or “leaches” from a landfill),

- the sub-surface disposal of sewage and other wastes,
- sediment runoff from roads and eroded hillsides, and
- discharges from vessels such as charter yachts visiting the waters of Jost Van Dyke and its neighbouring cays (**Photo 43**).

Solid Waste

Jost Van Dyke's emergence as a key tourist destination in the British Virgin Islands has increased the volume of solid waste generated on the island. The expanding number of waste-producing visitors coupled with a resident population with greater demands for consumer products—all of which need to be imported to

the island and then disposed of on the island—has strained the capacity of the local system to fully establish and enforce environmentally healthy waste disposal standards.

The BVI Solid Waste Department, under the portfolio of the Ministry of Health and Social Development, is the public agency responsible for the collection and disposal of community solid waste throughout the Territory, including JVD.

However, current waste management practices in JVD have resulted in a number of problems that were identified by residents to the Profile team or observed by IRF researchers during field trips to the island. Additionally, the lack of an effective institutional mechanism for regulating and controlling unhealthy practices further impedes the enforcement of standards for the benefit of the public.

The management of solid waste has therefore emerged as another environmental issue for Jost Van Dyke, one with increasing potential for undesirable impacts on citizens, visitors and the natural environment.

Associated solid waste issues include:

- The unsightly littering and indiscriminate dumping of

solid waste in drains, ghuts, coastal areas, and on public and unoccupied private land.

- The proliferation of insect pests and other vermin, including rats, mongooses, and feral cats attracted by the careless disposal of waste.
- The pollution and degradation of local ghuts, salt ponds, and coastal mangroves, which, in turn, has a negative impact on local flora and fauna.
- The potential for the spread and transmission of diseases to humans and animals.
- The negative response of visitors to the display of unsightly garbage and litter.

Currently, JVD disposes of its solid waste at a disposal site (landfill) located at Beasli Hill on the southern shore of the island. The location was formerly a small salt pond nestled between the steep coastal cliff and storm berm, mainly composed of marine rubble.

Visual evidence indicates that this facility is near capacity; its horizontal growth has been maximised, and the “dump” is only growing vertically at present. The pile of garbage and rubbish once hidden behind the storm berm is now becoming visible to those traveling by boat between Little Harbour and Great Harbour. Smoke and haze from small fires at the facility have also drawn the attention of many JVD

residents and even of persons as distant as St. John (USVI). As well, it is only a matter of time before significant numbers of yachters and tourists take notice of this visual eyesore.

The property on which the waste disposal site is currently situated is leased by the BVI Solid Waste Department from a private citizen of JVD and has been in use for over 20 years. Upon the expiration of the current lease in 2010, a new site will be identified.

A site selection process is already underway, and it is important that this process take into account environmental risks and other undesirable impacts as potential sites are assessed. Any future landfill site for JVD should, as a minimum, take into consideration the following locational factors so as to minimise environmental impacts:

- The waste disposal site should be situated in an area away from wetlands, mangroves, salt ponds and coastal areas.
- The site should be located where it will create minimal visual pollution.
- The future landfill should be designed and constructed according to modern sanitary landfill guidelines, particularly as these have been tested and used on small tropical islands.

- Of critical importance, the new waste disposal site should be sited, designed, and utilised so as to minimise water pollution, both by runoff and leachates.

In addition to the official solid waste disposal site at Beasli Hill, many other sites, particularly salt ponds, are frequently used by residents for discarding waste. The Clean Hole Pond in Garner Bay (Little Harbour) is one such example. Here the surface of the pond is littered with bottles and cans and with numerous heaps of trash along the perimeter (see **Photo 44**).



Photo 44.

Piles of trash such as this one abound along the perimeter of Clean Hole Pond. The site should be targeted for a major clean-up as it offers great potential for wildlife and recreational users.

Another example is the White Bay Pond where piles of trash are frequently reported by the local community. Discarded batteries and tires from ATVs have also been found along the edge of the pond (White Bay is the location of the ATV rental

business). Although worn-out tires and discarded lead/acid batteries occur in small quantities, they are considered hazardous waste, and a suitable means of disposal should be considered.

The collection of solid waste from the island's residential community and its transport to the Beasli Hill disposal site is carried out by the Public Works Department through a contract with a local trucking company. At each local community there is at least one dumpster for residents to dispose of their trash to await collection. One of the principals in the trucking firm

that collects solid waste from the island's dumpsters maintains that these sites need to be more "established" with fencing and plantings to discourage random dumping of large items that should be transported to the landfill by individual residents (*pers. comm.*, Sendrick Chinnery, 2009).

Unfortunately, the number of dumpsters is insufficient to meet current needs as these dumpsters are frequently observed at over-flow capacity, especially during the peak tourist season when yachters and other tourists contribute to the level of trash.

An added environmental issue is the location of the dumpsters. All are adjacent to sensitive ecosystems such as salt ponds and coastal mangroves. When dumpsters are over capacity,

the trash tends to be discarded near to or in the salt pond and adjacent mangrove ecosystem (see **Photo 45**). High winds also contribute to dispersing loose trash further afield where it becomes more difficult to retrieve. Improperly maintained sites also attract more pests and vermin, including rats, mongooses, and feral cats.



Photo 45.
Dumpster site adjacent to the White Bay Salt Pond.

Of the neighbouring Profile islands, only Sandy Cay has a solid waste collection system, which was established by the island's former owner 40 years ago. In 1969, Laurance Rockefeller first employed a "caretaker" for Sandy Cay, and that position has always been filled by a resident from Jost Van Dyke. One of the caretaker's primary responsibilities has been to remove by boat any trash left by visitors along the walking trail and on the beaches.

More recently, and continuing after the 2008 transfer of Sandy Cay to the National Parks Trust, the Jost Van Dykes (BVI) Preservation Society has assumed responsibility for supervising the caretaker's work at Sandy Cay under an agreement authorised by the NPT.

During the Profile survey, few derelict (abandoned) vehicles were noted on JVD; however, with a gradual increase in the resident population and overall development, it is likely that their numbers will increase. The visual impact of

derelict vehicles is not in harmony with the pristine island image the Territory seeks to project for its tourism product (see **Photo 46**). Identifying a means to collect abandoned vehicles as well as a disposal site for scrap metal might be considered before the situation becomes more problematic.

Domestic Sewage and Liquid Waste

Because of the island's small population, the BVI Government



Photo 46.
Derelict and abandoned vehicle along the East End Harbour Road.

does not maintain any central sewage or waste-treatment infrastructure on JVD. All wastewater and sewage are disposed of on-site at residences and businesses by means of septic tanks, sump holes or pit privies. The septic tank is probably the most common method of disposal, but no data were identified on the approximate percentage of households and commercial establishments that use this method.

Septic systems often malfunction during heavy rain events, thereby flushing unknown quantities of effluent that eventually reach coastal waters. The increase in effluent and nutrients over time has contributed to eutrophication, which is an over-enrichment of coastal waters that results in changes to natural habitats, most of which are undesirable. An increase in algal blooms has been noted particularly in Great Harbour and Little Harbour (Garner Bay), where algae grow so fast that they smother other plant species that are normally found in these habitats.

Coastal and Marine Water Quality

Water quality in JVD is generally good, but in certain areas it is declining (see also Chapter 4)

Box 16

EFFECTS OF INCREASED SEDIMENTATION

Increased sediment in the marine environments of Jost Van Dyke can adversely impact coral reefs and other marine habitats and species in a variety of ways, including the following:

- Sediments smother corals and seagrass.
- Sediments screen out sunlight needed for benthic flora to grow.
- Sediments scour and damage corals.
- Sediments inhibit the survival of juvenile corals due to the loss of suitable substrates.
- Sediments reduce the amount of prey captured by sight-feeding fish.
- Sediments clog the gills and filters of fish and shellfish.
- Sediments reduce spawning and juvenile fish survival.
- Sediments contribute to the decline of recreational fishing.
- Sediments reduce the availability of clear, clean waters for swimming, snorkeling, and diving and this, in turn, can eventually reduce the island's attractiveness for tourism.

due to an increase in land-based sources of marine pollution such as domestic waste and sediment runoff (Box 16). In addition, the increase in vessel activity in the three main bays on JVD's south shore is a growing source of concern

The expanding number of yachts and mega-yachts in the bays of Jost Van Dyke is increasing existing levels of pollution as boat operators may intentionally or unintentionally discharge their vessel waste into coastal waters. This routine discharge of oil and sewage from visiting charter boats will continue since charter vessels entering BVI waters are not required to have holding tanks for wastes. Chronic turbidity from excess boat traffic (as bottom sediments are stirred by propeller wash) has also degraded the overall health and productivity of the marine ecosystems.

White Bay is well known for its natural features and recreational amenities; yet, within an approximate 12-month period from late 2007 to late 2008, at least three cases of bacterial infection were reported and attributed to swimming on the western side of the bay. Although the source of contamination has yet to be determined, these incidences are indicative of a troubling decline in water quality. Local residents also reported seeing raw sewage in White Bay in the vicinity of anchored boats (*pers. comm.*, Susan Zaluski, JVDPS, 2009), although the source of this waste cannot be definitively identified.

Such incidences are slowly increasing public awareness about the importance of environmental health issues. Building public awareness and concern is an important first step in counteracting further degradation of water quality.

<p style="text-align: center;">POLLUTION CONTROL ISSUES</p>	<p style="text-align: center;">ACTION OPTIONS AND OTHER RECOMMENDATIONS</p>
<p>POLLUTION CONTROL ISSUE ONE</p> <p>The current landfill at Beasli Hill has reached its horizontal and vertical capacity. A new landfill site has yet to be determined. The site selection process and implementation of a management plan for solid waste disposal will be key factors in minimising long-term environmental and visual impacts.</p>	<ol style="list-style-type: none"> 1. Once the new waste disposal site becomes operational, it will be important to secure the Beasli landfill by covering (capping) the entire surface with a layer of earth material where plants could begin to colonise. If the site remains uncovered, it will be vulnerable to hurricanes and tropical storms. 2. The new waste disposal site should be situated away from environmentally sensitive areas such as salt ponds, ghuts, and the coastline. Other key factors to be considered when assessing the suitability of a given site are terrain, hydrogeology, and topography. 3. The impending process of selecting and developing a new solid waste disposal site creates an excellent opportunity for the community of JVD and the BVI Government to put in place a solid waste management plan specifically designed to meet the future needs of the island's population, both resident and visiting, while minimising environmental and visual impacts. The Solid Waste Department could provide guidance and direction, especially in establishing guidelines for operating a modern sanitary landfill in a small-island, tropical environment. 4. The current practice of burning waste in the open should be reviewed when considering future solid waste disposal practices for the island. Burning trash at the landfill gives rise to smoke, odor and ash and is the subject of complaints by residents downwind of the current site (and of any future site if the practice continues). Careful consideration should be given to sites and practices that reduce these complaints and the associated visual and olfactory impacts on island residents. 5. Waste-reduction practices should be explored at every level from collection to disposal, and development of a solid waste management plan for the island provides an opportunity to do so. For example, residents could be encouraged to compost organic waste for individual or community gardens, and demonstration composting sites might be provided. The island's population is small enough so that the replication effect of a few model sites might be beneficial. The Gilbert Agricultural and Rural Development Centre in Antigua collaborated with that country's Solid Waste Management Authority to promote community composting; see www.gardc.org. 6. A JVD-focused solid waste management plan could establish procedures for simple on-site triage at the landfill, for example, specifying various categories of waste disposal: <ul style="list-style-type: none"> – An area designated for scrap metal, derelict vehicles, and household appliances, with the possibility of future removal from the island. – A containment area for toxic waste, such as batteries, tires, paint thinners, waste oil, and the like. – An area for glass bottles and aluminum cans, for possible recycling (glass is currently collected and recycled in Tortola, and JVD businesses might pool resources to cover the cost of shipping glass for recycling to Tortola). – An area designated for combustible material.

POLLUTION CONTROL ISSUES	ACTION OPTIONS AND OTHER RECOMMENDATIONS
<p>POLLUTION CONTROL ISSUE TWO</p> <p>JVD's coastal inshore waters need protection from land-based sources of pollution. Sewage effluents from household, commercial, and tourism sources, combined with sediment runoff, particularly from unpaved roads and steep road cut-slopes, are likely the primary causes of deteriorating coastal water quality.</p>	<ol style="list-style-type: none"> 1. No data are currently available on coastal water quality in the more stressed bays of Jost Van Dyke—White Bay, Great Harbour, Little Harbour, and East End Harbour. In cooperation with the Conservation and Fisheries Department, the community of Jost Van Dyke might want to consider establishing a citizens-based water monitoring programme to inventory and map pollution discharges and to provide coastal water quality baseline data reflecting both normal and worst-case situations, such as flooding conditions following storm events. <p>The quantitative dimensions of pollution in JVD are not sufficiently documented to elevate public consciousness or to encourage anticipatory government action for keeping pollution levels within manageable bounds. It might therefore be appropriate to launch a community monitoring programme to begin to collect data for JVD's coastal bays, an activity that could be considered by the JVDPS as part of its OTEP project implementation.</p> 2. A programme of community education on topics where individual action can make a difference would help increase the population's understanding of pollution issues, for example: septic tank design and use, sludge removal and disposal, and water conservation. The Environmental Health Department within the Ministry of Health and Social Development has available a design for a septic tank that is better at filtering effluent than older models. This Department will be able to provide guidelines and technical expertise to assist the JVD community regarding the use of septic tanks and other environmental health issues. 3. Sediment control measures in the BVI are only irregularly employed and little regulated even for large-scale development projects (although this may be changing as the Physical Planning Act of 2004 is more fully implemented). The JVD community, however, might want to consider unofficial adoption of guidelines and best management practices for erosion and sediment control on the island as some communities in the USVI have done, e.g., the Fish Bay Owners Association at Fish Bay, St. John. A number of reference documents specific and applicable to the Virgin Island are readily available from the USVI and the wider Caribbean: <ul style="list-style-type: none"> – <i>Guidelines for Sediment Control Practices in the Insular Caribbean</i> (Anderson, 1994). – <i>Virgin Islands Environmental Protection Handbook</i> (Wright, 2002). – <i>Sediment and Erosion Control on Construction Sites: Field Guide</i> (University of the Virgin Islands, 2002).

<p>POLLUTION CONTROL ISSUES</p>	<p>ACTION OPTIONS AND OTHER RECOMMENDATIONS</p>
<p>POLLUTION CONTROL ISSUE THREE</p> <p>The increase in charter boat activity in the three most popular JVD bays on the island's southern shore, combined with the poor flushing capacity of the three bays, have contributed to deteriorating water quality.</p>	<ol style="list-style-type: none"> 1. A 1980 study of the pleasure boat industry in the British Virgin Islands (Jackson, 1980), with an emphasis on charter boat operations, the industry's economic contributions and water pollution impacts, is in need of a comprehensive update. The dimensions of yachting tourism in the BVI economy, including its impact on the environment, need to be better understood so that public policy to regulate the industry is based not on anecdotal evidence but verifiable data. The JVD community should encourage efforts to update the Jackson study and would be in a position to assist such an effort, should it occur, by documenting the charter fleet using the waters surrounding Jost Van Dyke. 2. Charter industry-funded efforts in collaboration with the BVI Government—such as the 2008 publication of the <i>BVI Marine Awareness Guide</i> (Gore, 2008)—are very useful in educating visiting boaters about practices that minimise pollution in the marine environment. The community of Jost Van Dyke should remain alert for similar opportunities to sponsor, promote or cooperate in educational activities directed at the transient yachting population, whether it be a signage campaign with “do and don't” reminders, or activities to involve boaters in environmental education programmes during their visits, or posters and brochures stressing healthy environmental practices when sailing in the waters around Jost Van Dyke. The BVI Tourist Board has assigned a staff person to coordinate specifically with the sister islands, including Jost Van Dyke, and therefore might cooperate directly with the JVD community to promote environmentally friendly practices by boating tourists who visit the island. 3. As discussed above (Pollution Issue Two/Action Item 1), development of a marine water quality monitoring protocol for JVD should be considered as a community effort led by the JVD Preservation Society. White Bay, in particular, should be targeted as a priority site as it attracts the highest level of water-related activities. Marine monitoring should follow the generally accepted criteria for water quality measurements in the BVI, which are the informal standards available from the Conservation and Fisheries Department. These are not yet officially established in law but can be used as a guide. The C&FD provides standards and limits for four water classes: Class I—Excellent, Class II—Good, Class III—Adequate and Class IV—Poor.

8. DIRECTIONS FOR THE FUTURE

The island of Jost Van Dyke is the fourth largest of the British Virgin Islands. Limited by a small land mass and equally small population base, the island's development has been overshadowed by the hub of activity centred in Tortola to its southeast. Current settlement patterns have focused on the village that developed at Great Harbour, the island's primary communication and transportation link with the rest of the Territory and beyond.

Until recently, economic activity consisted only of small-scale agriculture, fishing and livestock production. The pursuit of these livelihoods—coupled with the limited availability of flat land, the island's rugged topography and the need for accessibility to transportation and marine outlets—all influenced where the population lived and how the people of Jost Van Dyke utilised the land of their birth and the waters surrounding their island home.

With the advent of tourism, other factors began to influence resource use as a given area's suitability for tourism infrastructure or a particular site's usefulness in enhancing the tourist's experience also affected resource-use decisions, whether the resources were terrestrial- or marine-based.

Even so, much of the island remains undeveloped and is only modestly settled. According to the Development Planning Unit

of the BVI Government, of the total acreage for Jost Van Dyke (including LJVD, SC, GC, and Little and Great Tobago), only 12 percent is categorised as "built up area" and the remaining 88 percent (2,224 acres) is classified as "vacant" parcels. (In the BVI Territory as a whole, 20 percent of all lands are considered "developed", with undeveloped land identified mainly on steep slopes; see www.dpu.gov.vg).

Thus, there are still choices and options for Jost Van Dykians to consider concerning the island's future—about the ongoing consumption of its natural resources, about how its economy should continue to grow and prosper, and about what is critical to protect. With this *Environmental Profile* in hand, Jost Van Dykians now have an improved environmental database to support that decision-making process, including a wide range of environmental policy recommendations and community action options. In this final chapter of the *Profile*, IRF has highlighted some of the choices ahead as the community considers how to support environmental protection and sustainable growth for Jost Van Dyke.

Over three decades ago, in September of 1978, Town and Country Planner, Ivor Jackson, made a visit to Jost Van Dyke to meet with residents about their "planning concerns" for the island. Jackson reported the

following as among islanders' concerns at that time (Jackson, 1978):

- the need for better maintenance of pedestrian roads;
- the need for general improvement of Great Harbour by simple tree planting and other methods of beautification;
- the need to protect the shorelines of Great Harbour by development of a protective strip of land bordering the sea;
- the desire to see that traditional ways of life are protected by being selective with respect to developments that are allowed to occur;
- the desire to have development projects assessed against the needs of the community, e.g., jobs vs. protection of the island's way of life;
- the desire to see development projects planned so as to minimise their impact on the environment, with reference especially to water-dependent developments.

What has changed in the intervening 30 years?

For one thing, today's participants in a similar forum might point to increasing pressures on natural resources, such as:

- increased numbers of tourists using beaches and the coastal environment;
- conflicting uses of marine resources, for example at White Bay;
- continued overgrazing and lack of livestock control;
- overfishing of inshore waters;
- the need to upgrade waste disposal practices.

Increasingly, Jost Van Dykians are compelled to address the central issue that has directed preparation of this *Environmental Profile*, namely:

How can a very small place (with limited resources, a centralised government structure located elsewhere, and a small private sector) adequately deal with the management and protection of its commonly-shared natural resources?

The traditional inventory approach to managing singular resources—whether water or wildlife, forests or fish, rocks or reefs, soils or seagrasses—is simply not adequate anymore, now that there are more people (both residents and tourists) competing for the use of finite resources in this very small place called Jost Van Dyke.

Elsewhere, the old inventory approach to resource management is being replaced by a more holistic perception of hundreds of interconnected “goods” and “services” made available to the community as a whole by what was traditionally referred to as “*Mother Nature*” but now called “*functioning ecosystems*,” which are interconnected, one to the other. Clean and stable beaches are not unrelated to robust and flourishing reefs or to the abundance of fishery stocks, or to best management practices on erosion-prone hillsides. That which we have long taken for granted as useful or as desirable or as “free”, we are now seeing in a new, more informed light—an *ecological light* (E.L. Towle in CCA/IRF, 1993).

Jost Van Dykians, like islanders everywhere, are beginning to understand that there are limits to what can be taken from the natural environment as “free goods and services” and how much we can put back in the way of pollution and other insults.

This balancing act, this reasoned public search for fairness and enhanced awareness of ecosystem needs as well as human needs is what environmental policy, environmental planning, environmental management, and environmental protection are all about (*ibid.*, p. 9).

It is also what Jost Van Dyke’s future is all about.

WHAT IS ALREADY PROTECTED

As indicated in Chapter 1, the Profile islands include several areas already identified by the BVI Government for protected area status. These include:

1. Diamond Cay National Park.

Established as a national park in 1991, this one-half hectare (1.25 acre) protected site is located at the terminus of a small peninsula off Long Bay on the eastern shoreline of Jost Van Dyke.

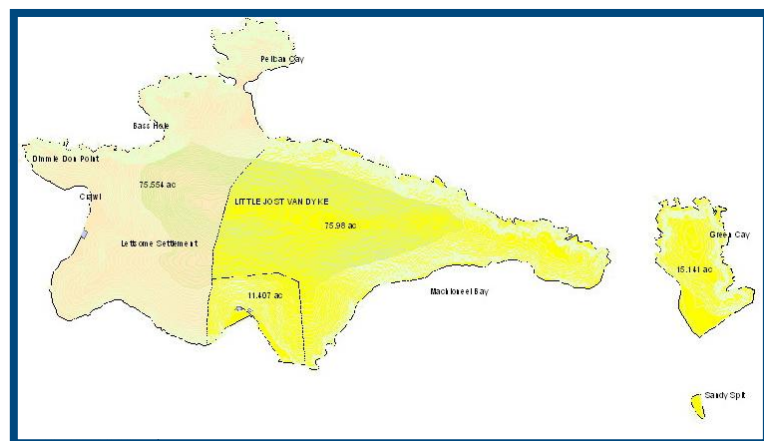


Figure 9.

Crown Land on Little Jost Van Dyke, Green Cay and Sandy Spit. Government-owned areas are highlighted in bright yellow and include the eastern half of LJVD and all of Green Cay and Sandy Spit (source: T&CPD).

2. Green Cay and Sandy Spit Fisheries Protected Area.

Fifteen-and-one-half hectares (38.4 acres) of protected waters to the east of GC and SS were declared under the Fisheries Regulations in 2003.

3. Sandy Cay Habitat Management Area.

The 5.7 hectare (14 acre) national park was authorised by the Minister of Natural Resources and Labour at a ceremony formally transferring the island from private ownership to the National Parks Trust on May 1, 2008.

Additionally, government-held Crown Lands are also included within the Profile study area, specifically (see **Figure 9**):

- slightly more than half (35 hectares/86.5 acres) of Little Jost Van Dyke, and
- all acreage on Green Cay and Sandy Spit.

Finally, the *British Virgin Islands Protected Areas System Plan, 2007-2017* (Gardner, 2007), approved by Government in 2008, identifies additional areas within the boundaries of this study for proposed protected area status. These include the following:

1. Little Jost Van Dyke Proposed Marine Protected Area (MPA).

This proposed MPA (see **Figure 10**) would protect a designated marine environment in the waters between

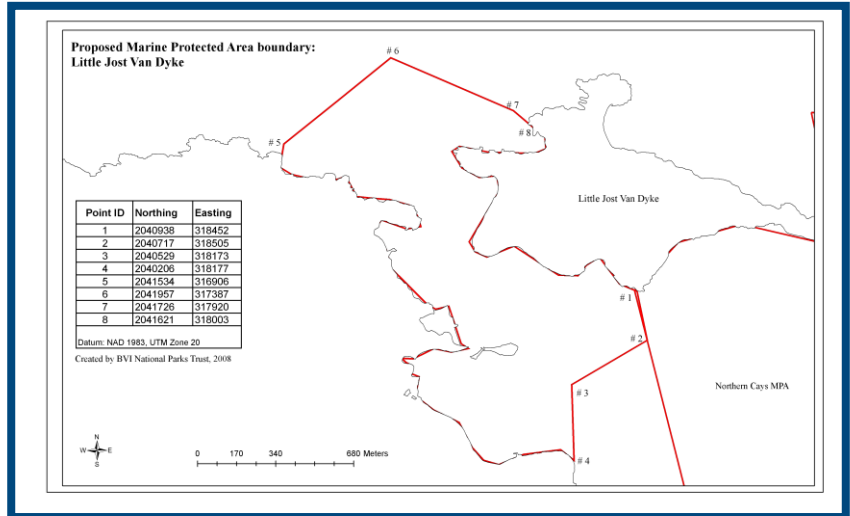


Figure 10. Boundaries for the proposed Little Jost Van Dyke Marine Protected Area (source: National Parks Trust).

Jost Van Dyke and Little Jost Van Dyke, including the currently protected National Park at Diamond Cay and a proposed Protected Landscape/ Seascape at Cape Wright and East End Har-

bour. The latter is proposed under Management Category 15(e) of the National Parks Act (NPA), 2006.

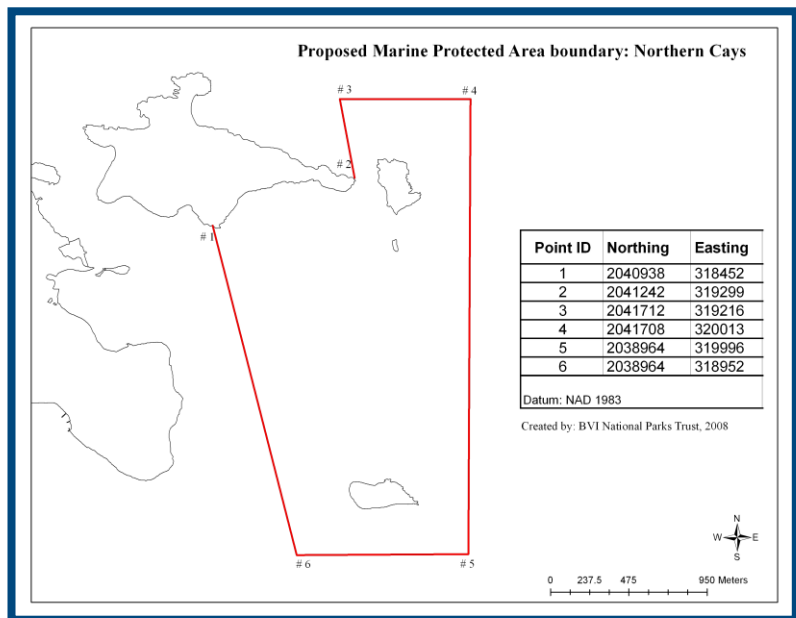


Figure 11. Boundaries for the proposed Northern Cays Marine Protected Area (source: National Parks Trust).

2. Northern Cays Proposed Marine Protected Area (MPA).

This proposed MPA (see **Figure 11**) would include the existing Fisheries Protected Area east of Green Cay and Sandy Spit, the existing Habitat Management Area at Sandy Cay, the designation of Green Cay as a Species Management Area (under Management Category 15(d) of the NPA), and the designation of Sandy Spit as a Natural Monument (under Management Category 15(c) of the NPA).

Green Cay and Sandy Spit are Crown Lands, and the Government could vest these properties in the National Parks Trust with the protected area classifications proposed by the NPT in the *BVI Protected Areas System Plan*, and as also noted in the paragraph above.

Photo 47 provides the geographic positioning of Green Cay, Sandy Spit, and Sandy Cay, the first two proposed as protected sites and the last already designated as a protected site within the BVI's National Parks and Protected Areas System.

3. Lettsom Plantation House, Little Jost Van Dyke, Proposed Historic Site.

The Lettsom Plantation House on Little Jost Van Dyke is designated in the BVI's *Protected Areas System Plan* to be managed as a Historic Site, classified as a Manage-



Photo 47.

Green Cay in the foreground, with Sandy Spit offshore of Green Cay and Sandy Cay in the background, beyond Sandy Spit.

ment Category 15(h) site under the National Parks Act.

4. Thomas George Bay, Jost Van Dyke, Proposed Marine Park.

This proposed MPA, comprising 7.6 hectares (18.7 acres) on the southeast shore of Jost Van Dyke near Little Harbour (Garner Bay), is identified within the *System Plan* as a future marine park under category 15(b) of the National Parks Act.

and reviews. It is likely that with additional field surveys, more species could be added to the list.

However, the *limited* number of species identified in **Table 12** reflects just how much the forest and woodland cover on most of Jost Van Dyke and its satellite islands has declined over the last 50 years—and continues to do so. A positive exception is Sandy Cay, which has no inhabitants, no livestock, no rats and no mongoose. Relative to its size, Sandy Cay offers the most biodiversity of any of the Profile islands.

Table 12 provides a list of plant species of special concern that the field team recorded during its surveys; they are located on **Figure 12**. Many of them have a GPS coordinate, and their position can be displayed on a map. Other plants that were less uncommon or locally common were not documented with GPS coordinates.

CRITICAL SPECIES AND HABITATS

Floral Species of Special Concern

The list of plant species of special concern compiled by the *Profile* research team (**Table 12**) is based on two periods of field investigation in July and October of 2008, complemented by literature searches

Table 12. Plant species of special concern, with locational information.

Habitat Key:				Status Key:			
Be	beach	Ro	rocks	En	endangered	Th	threatened
Cl	cliffs	Wo	woodlands	LC	locally common	Un	uncommon
Fo	forests			R	rare		
Oa	open areas						

Species	Common Names	Habitat	Conservation Status	Location on Figure 12	Photo in Profile
<i>Psychilis macconnelliae</i>	Butterfly Orchid	Fo/Wo/Oa/Be/Ro/Cl	Un/Th		Photo 48
<i>Epidendrum ciliare</i>	Christmas Orchid or Eye-lash Orchid	Fo/Wo/Oa/Ro/Cl	Un/Th		Photo 50
<i>Tillandsia fasciculata</i>	Giant Air Plant	Fo/Ro/Cl	R/Th		
<i>Coccothrinax alta</i>	Tyre Palm or Thatch Palm also Broom Palm	Fo/Wo	R/En	A	Photos 9 & 14
<i>Erythrina eggersii</i>	Coral Tree or Cockspur	Fo/Wo	Extremely rare/En	B	Photo 11
<i>Flueggea acidoton</i>	Simple-leaf Bushweed	Wo	R/En	C	
<i>Opuntia rubescens</i>	Tree Cactus or Prickly Pear Cactus	Be/Wo/Oa/Ro/Wo	R/En	D	Photo 16
<i>Melocactus intortus</i>	Barrel Cactus or Turk's Cap Cactus	Ro/Oa/Cl	LC/Th		Photo 15
<i>Bastardiopsis eggersii</i>	Jost Van Dyke Indian Mallow	Fo/Wo	Unknown	E	Photo 10
<i>Eugenia sessiliflora</i>	No common name available	Fo	Un-R		
<i>Agave missonium</i>	Century Plant or Agave	Fo/Wo/Ro	Un/En	F	
<i>Guaiacum officinale</i>	Lignum Vitae	Wo/Oa/Be	R/En	G	Photos 12 & 13
<i>Malpighia woodburyana</i>	Stinging Bush	Wo	Un	H	Photo 49

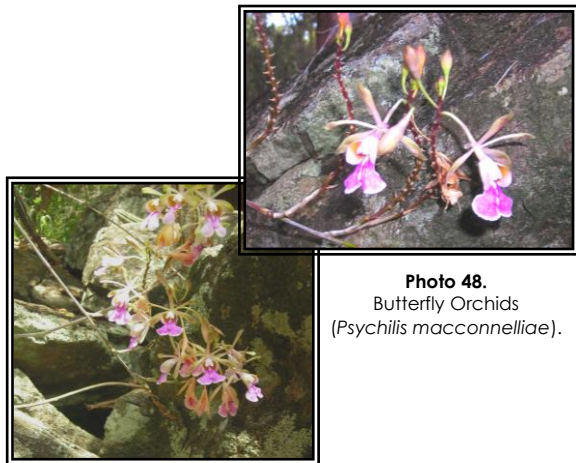


Photo 48.
Butterfly Orchids
(*Psychilis macconnelliae*).

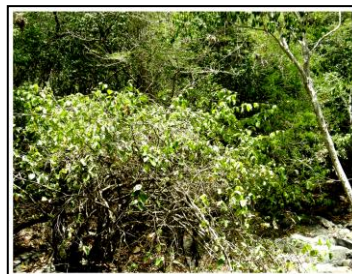


Photo 49.
A few strands of Stinging Bush (*Malpighia woodburyana*) were found along Brown Ghut.



Photo 50.
Christmas Orchid (not in bloom)
(*Epidendrum ciliare*).

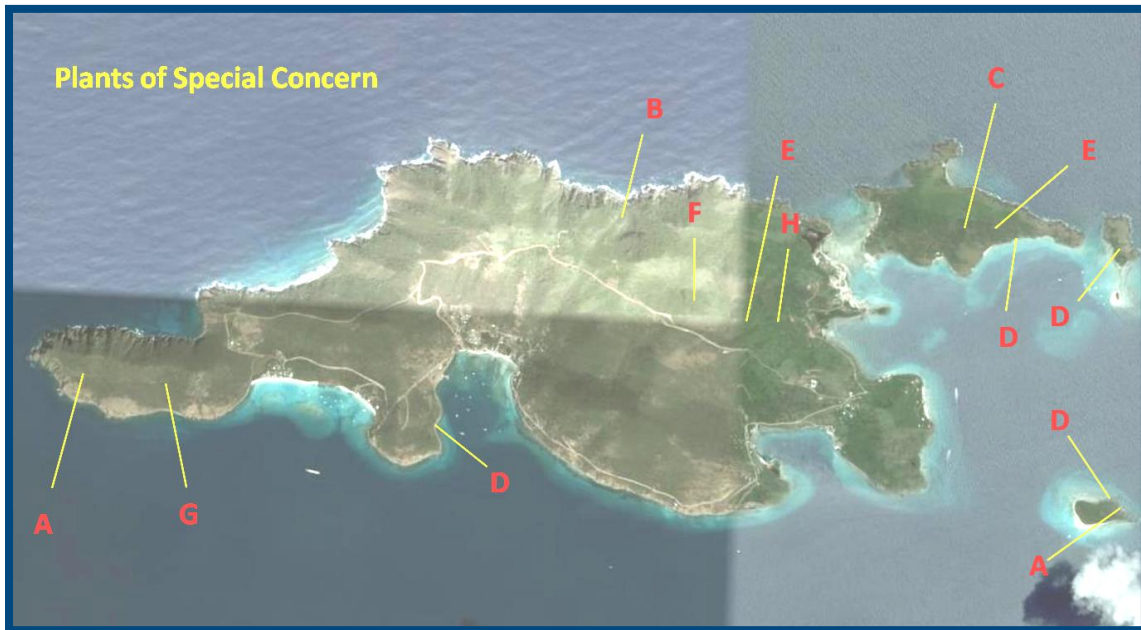


Figure 12.
Location of plants of special concern on Profile Islands; for species identification, see Table 12
(map source: Google Earth, 2008).

Faunal Species of Special Concern

Most of the faunal species of special concern in the *Profile* islands are listed in **Table 13** and located on **Figure 13**.

Many factors have contributed to their unstable and uncertain status, but the primary causes are:

- (1) Deterioration and loss of habitat due to free-roaming goats, land clearing, and, to a lesser extent, human encroachment.
- (2) Decline in species population due to invasive predators such as the mongoose, rats, and feral cats.

Habitats of Special Concern

Many habitat types on JVD and its neighbouring cayes are critical for the survival of the floral and faunal species of special concern that have been identified above. Of particular importance are the following (see also **Figure 13**):

- Salt ponds
- Ghuts
- Fringing mangroves
- Forest and woodland communities
- Coral reefs
- Seagrass beds.

Salt ponds and ghut systems are probably the habitats that

could most immediately be affected by community action through clean-up and restoration efforts. Both support diverse species of flora as well as providing foraging and roosting opportunities for wildlife in general. Ghuts offer a sheltered wildlife corridor, while salt ponds provide sediment control attributes that prevent sediment and pollution from reaching marine habitats.

Maintaining, protecting, and restoring these ecosystems is not only critical for the survival of species of special concern, but also for the overall health of the natural environment, which ultimately will influence the economic well being of the Jost Van Dyke community.

Table 13.
Faunal species of special concern, with locational information.

Habitat Key:		Status Key:	
Be beach	Ro rocks	En endangered	Th threatened
Cl cliffs	Wo woodlands	LC locally common	Un uncommon
Fo forests		R rare	
Oa open areas			

Species	Common Names	Habitat	Conservation Status	Location on Figure 13
<i>Sterna dougallii</i>	Roseate Tern	Be/Oa/Cl	Un/En	1
<i>Phaethon aethereus</i>	Red-billed Tropicbird	Cl	Un/En	2
<i>Pelecanus occidentalis</i>	Brown Pelican	Cl	Un/En	3
<i>Geotrygon mystacea</i>	Bridle Quail Dove	Fo/Wo	Un/En	4
<i>Epicrates monensis granti</i>	Virgin Island Tree Boa	Fo/Wo	Un/En	5
<i>Alsophis portoricensis anegadae</i>	Puerto Rican Racer	Oa/Wo	Un/En	6
<i>Typhlops richardii</i>	Virgin Islands Blindsnake	Oa/Wo	Un/En	
<i>Ameiva exsul</i>	Virgin Islands Ground Lizard	Wo/Fo	Un	
<i>Mabuya sloanei</i>	Mabuya	Oa/Wo	Un/E	
<i>Eretmochelys imbricata</i>	Hawksbill Turtle	Be	En	7
<i>Chelonia mydas</i>	Green Turtle	Be	En	7
<i>Dermochelys coriacea</i>	Leatherback Turtle	Be	En	7
<i>Eleutherodactylus swartzi</i>	Virgin Island Coqui	Wo/Fo	En	
<i>Eleutherodactylus lentus</i>	Mute Frog	Wo/Fo	En	
<i>Brachyphylla cavernarum</i>	Antillean Cave Bat	Fo/Wo/Oa	Un	
<i>Noctilio leporinus</i>	Fishing Bat	Oa/Wo	Un	

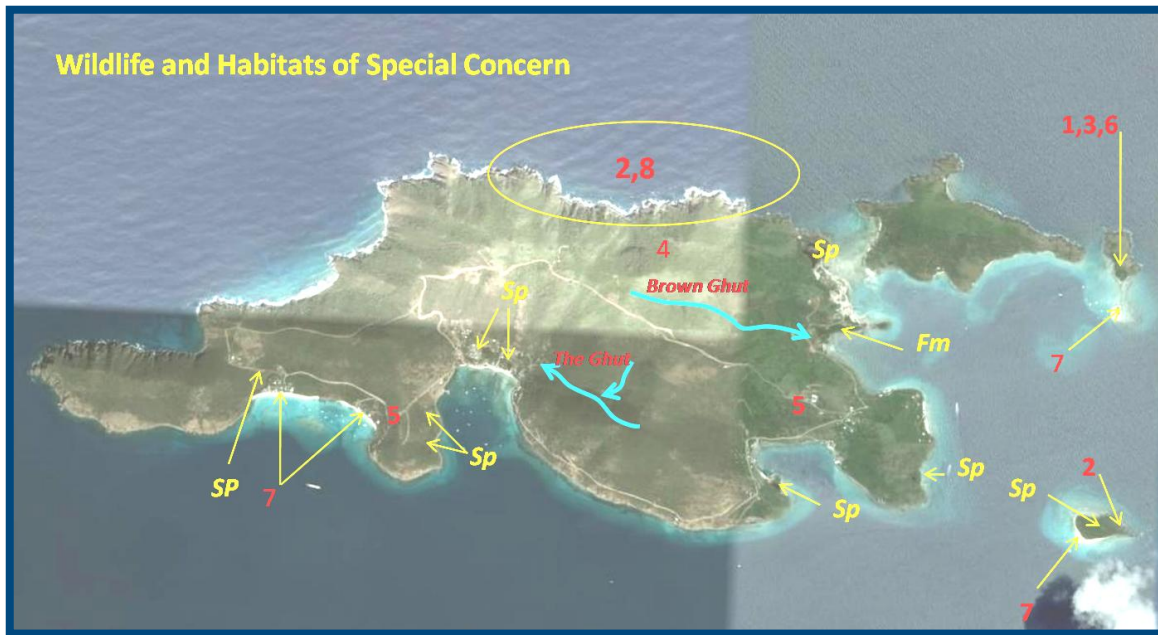


Figure 13. Location of wildlife and habitats of special concern on Profile islands (map source: Google Earth, 2008).

For wildlife species identified by number above, see Table 13.

Habitats are identified above as follows: **Sp**-salt ponds; **blue line**-ghuts; **Fm**-fringing mangroves. Habitats for coral reef systems and seagrass beds are identified in Chapter 4, Figure 5. Forest and woodland habitats have not been mapped for this report.

FUTURE PROTECTION PRIORITIES

As has been noted throughout this *Environmental Profile*, there are several areas on Jost Van Dyke and its satellite islands that require careful resource management and protection in order for ecosystems and ecological services, natural

aesthetics, historical values, and biodiversity to be sustained.

Table 14 provides a summation of information on those areas of historical, scenic, ecological and biodiversity value on the Profile islands which the Profile research team has identified as priorities. The cross-referenced format demonstrates that most

of the areas included have multiple significance, and therefore judicious management and protection of these areas may be important not only to Jost Van Dyke but to the long-term sustainable development of the British Virgin Islands as well.

Table 14.
Areas of Jost Van Dyke and other Profile islands
with multiple parameters of value or significance.

Sites/Habitats/Communities	Parameter of Value or Significance									CONSERVATION STATUS
	BIODIVERSITY	HISTORICAL/ ARCHAEOLOGICAL	SCENIC/ AESTHETIC	MARINE	BEACH	WETLAND	BIRDS	FISHERIES	ECONOMIC	
SATELLITE ISLANDS										
Sandy Cay	Orange	White	Green	Blue	Orange	Green	Red	Dark Blue	Yellow	Protected Area
Sandy Spit	Orange	White	Green	Blue	Orange	White	White	Dark Blue	Yellow	Stable
Green Cay	Orange	White	Green	Blue	Orange	White	Red	Dark Blue	Yellow	Threatened
Little Jost Van Dyke	Orange	Light Blue	Green	Blue	Orange	White	White	Dark Blue	Yellow	Threatened
JOST VAN DYKE										
Northern Slopes	Orange	White	Green	White	White	White	Red	White	White	Threatened
Western Peninsula	Orange	White	Green	White	White	White	White	White	White	Threatened
White Bay	Orange	Light Blue	Green	Blue	Orange	Green	White	White	Yellow	Threatened
Mill Round above Great Harbour	White	Light Blue	White	White	White	White	White	White	Yellow	Threatened
North Side Bay	Orange	White	Green	White	White	White	White	White	White	Stable
East End Harbour to Cape Wright	Orange	Light Blue	Green	Blue	Orange	Green	Red	Dark Blue	Yellow	Threatened
HABITATS										
Mangroves and Salt Ponds	Orange	White	Green	Blue	Orange	Green	Red	Dark Blue	White	Endangered
Ghuts	Orange	White	Green	White	White	White	White	White	White	Threatened
Coral Reefs and Seagrass	Orange	White	Green	Blue	White	White	White	Dark Blue	Yellow	Threatened
VEGETATION COMMUNITIES										
Semi-deciduous forest	Orange	White	Green	White	White	White	White	White	White	Threatened
Gallery Semi-deciduous Forest	Orange	White	Green	White	White	White	White	White	White	Threatened
Drought-deciduous Forest	Orange	White	Green	White	White	White	White	White	White	Threatened
Semi-deciduous Woodland	Orange	White	Green	White	White	White	White	White	White	Threatened
Coastal Hedge	Orange	White	Green	White	White	White	White	White	White	Threatened
Sclerophyllous Evergreen Shrubland	Orange	White	Green	White	White	White	White	White	White	Threatened
Mixed Dry Shrubland	Orange	White	Green	White	White	White	White	White	White	Threatened
Rock Pavement	Orange	White	Green	White	White	White	White	White	White	Threatened

COMMUNITY MANAGEMENT: A JVD APPROACH TO RESOURCE PROTECTION

Jost Van Dyke is a small community of limited capacity and resources; thus, the challenge of addressing many of the environmental issues outlined in this report may seem insurmountable, if not impossible. Nevertheless, the apparent lack of supporting institutional mechanisms for addressing Profile issues does not mean that workable solutions are not available.

Solutions will not necessarily lie in creating new institutions or management structures but in working within the existing community and applying innovative management and conservation strategies that have been tested elsewhere in the insular Caribbean and South Pacific.

Bromley (1986) identified four types of management regimes for natural resources, and these could be informally applied to the Profile islands:

- (1) *Private property* in which resource use rights are exclusive and transferable. Most of Jost Van Dyke is privately held.
- (2) *Government-held property*, or Crown Lands, in which resource use rights are state-held. Half of Little Jost Van Dyke and all of Green Cay and Sandy Spit are Crown Lands; Sandy Cay has been vested in a

government-created statutory body.

- (3) *Open access*, which is characterised as a “free-for-all” regime and might be applied to JVD’s marine resources as there is open-access to their use. In other Caribbean islands, for example St. Lucia, open access is considered largely responsible for excessive exploitation of some natural resources, e.g., traditional encroachment on forested lands.

In Jost Van Dyke, livestock herders have traditionally enjoyed open access to natural resources (e.g., vegetation) although the resources may be found on privately owned land.

- (4) *Communal property*, which includes situations where resource use rights are held by an identifiable group which, through formal and informal procedures, manages the resource. By strict definition, this regime does not exist in JVD, although some aspects of family-owned and family-managed property share its characteristics.

Communal or community management systems have a valuable role to play in resource management but are often overlooked. A community-based resource management regime is really a people-centred regime, the presumption being that the interests of the community can, in certain

situations, transcend those of the individual.

The goal of community management is sustainable management; it represents an explicit community choice to select options that will allow the community to pass on to the future what has been inherited from the past. The community says, in effect, that certain natural resources will not be exhausted by accident or by default (CCA/IRF, 1991).

A first step in the process of developing a community-centred strategy would be for the JVD community to systematically analyse and prioritise those resources that are most at risk and most valued, using this *Environmental Profile* as a baseline of information from which to start. A number of factors would need to be considered, including but not limited to:

- Economic development projections
- Population growth
- Resource distribution
- Governance issues
- Public health issues
- Infrastructure needs
- Technology requirements.

From this assessment and prioritisation, the community could move forward to develop a first-stage strategy to address resource protection issues as a community effort. In this, the community may need to seek the cooperation of the central Government or of other external organisations.

For example, the issue of free-roaming livestock is not only an environmental issue but also an economic issue. While the number of individuals who earn their primary income from livestock raising is decreasing, there are still many on JVD who earn occasional “pick-up” money from goat raising and who would not want to jeopardise this income.

As long as goat farming is an economic necessity for some and a supplemental income source for others, a JVD-devised strategy to address the environmental damage caused by free-grazing goats will need to account for this reality. Therefore, perhaps one approach might be for the community to focus on the role of agriculture on JVD and how the community, working with appropriate agencies of Government, can promote a renewal of small-scale agriculture on the island, *in concert* with steps to limit unfettered access by livestock to the island’s vegetative cover.

Another option to address the same issue might be for the community to join forces with Government to experiment with goat removal from Green Cay. Since Green Cay is Crown Land, and assuming that the support of the JVD community—where most of the goat herders using Green Cay reside—could be obtained, this experiment provides an opportunity to control a limited portion of the greater Jost Van Dyke goat population while addressing the environmental issue at a single site that could be monitored.

The JVD community might establish a monitoring group to survey Green Cay prior to goat removal in order to establish baseline information about the island’s flora and fauna before the experiment begins. The monitoring group would then revisit the Cay periodically to assess changes in the environment, which will be gradual at first but which will over the long-term allow vegetation to recover and fauna to multiply.

Another area for a community approach might be at White Bay where coastal and marine resources are already significantly stressed from heavy use, with many resource uses in conflict with one another. As discussed in the Issue Section of Chapter Three, a community “management zone” could be established for an area like White Bay in which resource uses are assessed and prioritised and consensus is reached for community action.

For example, recent boat groundings in White Bay have attracted the attention of the JVD community and the BVI media (see *BVI Beacon*, March 12, 2009). Vessels aground on reefs at White Bay reportedly churned sand for hours to work themselves free, oil was leaked from distressed boats, and corals were torn in what was described by one observer as “coral soup”.

The White Bay community could establish a monitoring regime for such events, within an informally designated White Bay “management zone,” and use data so derived to work with

Government to establish protective measures such as offshore moorings for the popular White Bay anchorage. Other jurisdictions in the Wider Caribbean have exacted significant fines from vessels causing damage to coral reefs.

Regional organisations and institutions can be a source of support and advocacy on behalf of JVD. Greater cooperation between the British and American Virgin Islands in areas of transboundary environmental concerns could be beneficial to Jost Van Dyke. Seabird conservation, marine pollution, marine hazards, natural disaster mitigation and biodiversity research are areas for BVI/USVI collaboration that should be encouraged by the JVD community and the JVD Preservation Society.

Reaching out to organisations in addition to BVI Government agencies would provide a greater diversity of options, ideas and support for the Jost Van Dyke community. Organisations of particular interest include:

- Organisation of Eastern Caribbean States (OECS), Environmental and Sustainable Development Unit
- Caribbean Natural Resources Institute (CANARI)
- UK Overseas Territories Conservation Forum
- Royal Botanic Gardens Kew
- Society for the Conservation and Study of Caribbean Birds

- University of the West Indies
- University of the Virgin Islands
- Division of Fish and Wildlife, Government of the U.S. Virgin Islands
- Guana Island (BVI) scientific research programme.

Over time, community-based approaches to resource management would give residents of JVD a more complete sense of ownership about their environment and about the positive benefits of community-centred resource management. The early steps of community resource management discussed in this chapter of the *Profile* could eventually lead to broader and more comprehensive efforts at community-based resource conservation, resource oversight, and resource management for Jost Van Dyke.

A CLOSING STATEMENT

In a small island like Jost Van Dyke (or even in the larger Territory of the British Virgin Islands) the trade-offs between the long-term benefits of conservation and resource protection and the immediate, shorter-term benefits of resource exploitation are not always easy to determine. The role of conservation programmes and environmental protection strategies in defining that delicate balance (*i.e.*, between preserving resources for the future while using resources to meet today's demands) have been examined throughout the development of this *Jost Van Dyke Environment Profile*.

It is hoped that the information contained within the *Environmental Profile* will help JVD residents and stakeholders and the Government of the British Virgin Islands to make more informed decisions about the island's future and to more fully assess the impact of their actions (or inactions) on the natural, historical and cultural resources of Jost Van Dyke.

"FUTURES" ISSUES	ACTION OPTIONS AND OTHER RECOMMENDATIONS
<p>ISSUE ONE</p> <p>Effective implementation of programmes to protect JVD's natural heritage will require a more wide-spread concern about objectives that balance community needs and conservation initiatives.</p> <p>For Jost Van Dykians, this means the community must address unpopular and difficult issues, particularly the issue of uncontrolled livestock grazing, which remains the single factor that most contributes to degradation of the natural environment of JVD, Little JVD, and Green Cay.</p> <p>(For additional discussion of this issue, see Chapter 3, including Invasive Species Issue One in that chapter.)</p>	<ol style="list-style-type: none"> 1. Given the social and economic—as well as environmental—dimensions of the grazing issue, it is unlikely that desired behavioral changes will occur if only a political strategy, <i>i.e.</i>, a legislative or public policy-driven initiative, is employed. 2. A shared consensus or mutual understanding of the limits and possibilities of resource exploitation is more likely achievable within a longer-term, public awareness campaign focused on conservation issues, the concept of "community resource management," and broader public involvement in resource management responsibilities and activities. 3. Current community awareness of the "loose livestock" issue is generally focused on the need to protect individual garden plots. There is limited community awareness or concern about the threats posed to Jost Van Dyke's biodiversity by uncontrolled livestock grazing. Educational efforts, both in the primary school and in the wider community, need to link the loss of vegetation and biodiversity due to free-roaming livestock to issues that can be readily observed and understood by the community, for example: <ul style="list-style-type: none"> – Linking the loss of plant cover to the drier and more arid conditions experienced in JVD, Little JVD, and Green Cay. – Linking the damage caused by devegetation and deforestation to easily observable events, such as those that occur during heavy rains when flash floods wash soils down ghuts and along roads. – Linking the loss of natural areas and wildlife species to the community's collective patrimony, which should not be passed on to the next generation in a diminished state. 4. The concepts of community (or user) management of natural resources, as discussed in this chapter (and in Biodiversity Issue Three in Chapter 3), should be explored by the citizens of Jost Van Dyke as one approach to dealing with this controversial issue; it is an approach that is better grounded in the concerns, needs, and aspirations of the people of Jost Van Dyke.
<p>ISSUE TWO</p> <p>Conservation planning for Jost Van Dyke requires that the community begin to more systematically evaluate and assess what natural and historical features, resources, or sites are most at risk and most valued and what features, resources, or sites are less endangered at the present time.</p>	<ol style="list-style-type: none"> 1. This <i>Environmental Profile</i> provides a centralising mechanism for the community to begin to more rigorously and systematically establish its own priorities for resource use and environmental protection. The JVD Preservation Society might take the lead in this, but it must be a community-inclusive process. 2. Such a process need not lead to a highly structured environmental protection "system" for JVD. Indeed, this would likely be the wrong approach for such a small community with well-established but often conflicting resource use priorities that are already reflected within the population.

"FUTURES" ISSUES	ACTION OPTIONS AND OTHER RECOMMENDATIONS
	<ol style="list-style-type: none"> 3. In assessing and establishing priorities for protection, the recommendations outlined in Chapters 5 and 6 should not be overlooked; these chapters focus on the historical and cultural heritage of the island. 4. In assessing its environmental priorities, the JVD community will need to work with units of the BVI Government, especially the National Parks Trust and the Conservation and Fisheries Department, which have legislative responsibility for resource management and protected area oversight (see Chapter 2).
<p>ISSUE THREE</p> <p>A number of floral and faunal species of special concern have been identified in this <i>Environmental Profile</i>. Insufficient attention by the JVD community and the BVI Government to the healthy survival of these resources places them at even greater risk.</p>	<ol style="list-style-type: none"> 1. The mongoose-control programme, formerly carried out in and around the Great Harbour and White Bay communities, should be revived, perhaps under the leadership of volunteers affiliated with the JVD Preservation Society. 2. The Society might also consider sponsorship of additional reptilian, amphibian and invertebrate surveys by inviting scientists from nearby islands, for example, from the Virgin Islands National Park in St. John or the Virgin Islands Division of Fish and Wildlife in St. Thomas, and from the group of scientists working at Guana Island, BVI. Such visits should be coordinated with the BVI Department of Conservation and Fisheries. 3. Consideration might be given to initiating an annual Christmas Bird Count for Jost Van Dyke, coordinating the JVD survey with similar efforts carried out in the BVI. The Cape Wright salt pond area would be a priority site as it includes a variety of habitats in close proximity. 4. Periodic surveys of sea turtle nesting could also be carried out by community volunteers, again under the guidance of the C&FD. There are at least three species of sea turtle known in the area (Hawksbill, Green and Leatherback). The Hawksbill and Green are permanent residents and occur regularly in the waters off JVD and the nearby cays. The Leatherback, a predominantly pelagic species, visits the area from March to July. 5. Working with the NPT and the J.R. O'Neal Botanic Gardens in Road Town, the JVD Preservation Society might initiate a programme to propagate seedlings and cuttings of floral species of special concern. As experience is gained, a nursery could eventually be established on JVD. 6. A number of educational initiatives could be carried out by the JVD Preservation Society to expand the programmes currently conducted by the Society at the local primary school, perhaps extending such efforts to the entire community. A number of themes concerning floral and faunal species of special concern come to mind for educational and community outreach programmes, including but certainly not limited to the following: <ul style="list-style-type: none"> - The island's reptilian fauna, especially snakes, and why island species are not a threat to the community. - The usefulness of bats, highlighting their importance for seed dispersal, pollination, and insect control.

"FUTURES" ISSUES	ACTION OPTIONS AND OTHER RECOMMENDATIONS
	<ul style="list-style-type: none"> - The plant biodiversity of Jost Van Dyke and the surrounding cays, perhaps adopting one of the local endemics as a floral symbol for Jost Van Dyke or creating a community garden to highlight the diversity of the island's flora.
<p>ISSUE FOUR</p> <p>A number of habitats of special concern have been emphasised in this chapter and elsewhere in the <i>Profile</i>. As with species of special concern, efforts to increase community awareness about the importance of these natural areas need to be expanded and enriched.</p>	<ol style="list-style-type: none"> 1. Community clean-up programmes for the island's salt ponds and ghut systems need to be linked to educational efforts to increase awareness about the importance of these habitats and why they must remain in their natural state. 2. Coastal mangrove ecosystems are restricted on Jost Van Dyke and are most extensive along the eastern coast of JVD, primarily south of Diamond Cay. This coastal system offers potential for nature tourism, with the added benefit of being adjacent to a national park at Diamond Cay and a short distance from the Cape Wright Salt Pond. The BVI Tourist Board is pursuing a "Green Globe" certification for the tourism industry in the BVI and has noted that an entire island, like Jost Van Dyke, could be Green Globe certified. 3. Other nature tourism study trips that focus on sites or ecosystems of special concern might be explored by JVD tourism entrepreneurs, perhaps in cooperation with the JVD Preservation Society and the BVI Tourist Board. The Cape Wright Pond, with Bubbly Pool adjacent to it, could be such a site because of its nature appeal, presence of wildlife, and trail access. Such field trips could also be a regular feature of JVDPS activities and could be designed for Society members, the general community, students and visitors alike.

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APPENDIX 1

JOST VAN DYKE ENVIRONMENTAL PROFILE TEAM

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CHAPTER 3. CONSERVING BIODIVERSITY	Kevel Lindsay (<i>IRF</i>), Jean-Pierre Bacle, Judith Towle
CHAPTER 4. JVD AND THE SEA	Clive Petrovic, Judith Towle
CHAPTER 5. HISTORICAL HERITAGE	Michael Kent, Judith Towle
CHAPTER 6. CULTURAL HERITAGE	Susan Zaluski (<i>JVDPS</i>), Rosemary Delaney-Smith (<i>JVDPS</i>)
CHAPTER 7. WASTE MANAGEMENT	Jean-Pierre Bacle, Judith Towle
CHAPTER 8. DIRECTIONS FOR THE FUTURE	Judith Towle, Kevel Lindsay, Jean-Pierre Bacle

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Appendix 2

Preliminary List of Plant Species for Jost Van Dyke, Little Jost Van Dyke, Green Cay, Sandy Cay and Sandy Spit

This list was principally compiled by Kevel C. Lindsay from identifications made during the terrestrial survey phase of the JVD Environmental Profile project and from the *Sandy Cay Ecosystem Resource Characterisation* (IRF, 2001b) with the earlier Sandy Cay plant data compiled by Eleanor Gibney, Dr. Gary Ray and Dr. Barry Devine.

FAMILY	SUBFAMILY	SCIENTIFIC NAME	COMMON NAME	GROWTH FORM	ORIGIN	HABITAT
POLYPODIACEAE		<i>Nephrolepis</i> sp.		H	I ?	Wo/Oa
		<i>Pityrogramma calomelanos</i>	Silverback fern	H	N	Wo/Oa
		<i>Thelypteris</i> sp.		H	N	Wo/Fo
ACANTHACEAE		<i>Blechum pyramidatum</i>		H	N	Oa
		<i>Oplonia microphylla</i>		S	N	Fa/Wo
		<i>Ruellia tuberosa</i>	Mini-root	H	N	Oa/We
		<i>Justicia carthaginensis</i>		S	N	Wo/Oa
		<i>J. periplocifolia</i>		S	N	Wo/Oa
		<i>J. sessilis</i>	Rock balsam	H	N	Wo/Oa/We
PLANTAGINACEAE		<i>Bacopa monnieri</i>	Waterhyssop	H	N	We/Oa
SCROPHULARIACEAE		<i>Bontia daphnoides</i>	Wild olive	T	N	We/Be/Oa
AIZOACEAE		<i>Sesuvium portulacastrum</i>	Sea purslane	H	N	Be
		<i>Trianthema portulacastrum</i>		H	N	Be
AMARANTHACEAE		<i>Achyranthes aspera</i>	Devil's Horsewhip, Man-better-man	H	I	We
ANACARDIACEAE		<i>Anacardium occidentale</i>	Cashew	T	I ?	Wo/Oa/Ga
		<i>Comocladia dodonaea</i>	Christmas bush, Christmas tree	T	N	Wo/Oa/Cl
		<i>Mangifera indica</i>	Mango	T	I	Wo/Oa/Ga
APOCYNACEAE		<i>Catharanthus roseus</i>	Periwinkle	H	I/C	Ga
		<i>Cryptostegia grandiflora</i>	Purple allamanda	S	I	Wo/Oa
		<i>Pentalion luteum</i>	Wild allamanda	S	N	Wo
		<i>Plumeria alba</i>	Wild frangipani	T	N	Fo/Wo/Cl
		<i>Rauvolfia viridis</i>	Bitterbush	S	N	Wo/Oa
ANNONACEAE		<i>Annona glabra</i>	Pond apple	T	N	Fo/We†
		<i>A. muricata</i>	Soursap	T	I ?	Oa/Ga
		<i>A. squamosa</i>	Sugar apple	T	N ?	Oa/Ga
LAURACEAE		cf. <i>Licaria parvifolia</i>	PR Cinnamon	T	N	Fo/Wo
		<i>Ocotea coriacea</i>		T	N	Fo/Wo
ASCLEPIADACEAE		<i>Calotropis procera</i>	Giant milkweed	S	I/n	Be
		<i>Cynanchum cheesmanii</i>		V	N	Wo/Oa

FAMILY	SUBFAMILY	SCIENTIFIC NAME	COMMON NAME	GROWTH FORM	ORIGIN	HABITAT
		<i>Metastelma grisbachianum</i>		V	N	Wo/Oa
ASTERACEAE		<i>Adenostemma verbesina</i>		H	N	Oa/We
		<i>Emilia fosbergii</i>		H	N	We
		<i>Chromolaena sinuata</i>		S	N	Wo
		<i>Conyza</i> sp.		H	N	Oa/Be
		<i>Cyanthillium cinereum</i>		H	N	?
		<i>Erigeron cuneifolius</i>		H	N	Oa
		<i>Launaea intybacea</i>	Wild lettuce	H	N	Oa
		<i>Lepidaploa cineria</i>	Inflammation bush	H	N	Wo/Oa
		<i>L. glabra</i>		S	N	Wo/Oa
		<i>Piptocoma antillana</i>	Antilles velvet shrub	S	N	Wo/Oa
		<i>Pluchea carolinensis</i>	Cure-for-all, Cattle tongue	S	N	Oa/We
		<i>Synedrella nodiflora</i>	Fatten barrow, node weed	H	N	Oa
		<i>Tridax procumbens</i>		H	N	Oa/We
		<i>Vernonia cinerea</i>		H	I ?	Oa
		<i>Wedelia fruticosa</i>		S	N	Wo/Oa
BATACEAE		<i>Batis maritima</i>	Salt plant, saltwort	S	N	Be
ULMACEAE		<i>Celtis iguanaea</i>	Cockspur, Iguana hackberry	V	N	Fo/Wo
BIGNONIACEAE		<i>Crescentia cujete</i>	Calabash, Gourd tree	T	N	Fo/Wo/Oa/Ga
		<i>Macfadyena unguis-cati</i>	Cat's-claw	V	N	Fo/Wo
		<i>Tabebuia heterophylla</i>	White cedar	T	N	Fo/Wo
BORAGINACEAE		<i>Argusia gnaphalodes</i>	Bay lavender, crab bush	S	N	Be
		<i>Bouyeria succulenta</i>	Pigeonberry, chink	T	N	Fo/Wo/Oa
		<i>Cordia alliodora</i>	Cype	T	N	Fo/Wo
		<i>C. collococca</i>	Manjack	T	N	Fo/Wo
		<i>C. polycephala</i>		S	N	Fo/Wo/Oa
		<i>C. rickseckeri</i>	Dog almond	T	N	Fo/Wo/Be/Oa/Ga
		<i>C. sulcata</i>		T	N	Fo/Wo
		<i>Heliotropium angiospermum</i>	Eyebright	H	N	We
		<i>H. curassavicum</i>	Seaside heliotrope	H	N	Be
		<i>Tournefortia</i> cf. <i>microphylla</i>		S	N	Wo/Oa/Be
AVICENNIACEAE		<i>Avicennia germinans</i>	Black mangrove	T	N	We/Be/Oa
BRASSICAEAE		<i>Cakile lanceolata</i>	Sea rocket	H	N	Be
BURSERACEAE		<i>Bursera simaruba</i>	Turpentine	T	N	Fo/Wo
CACTACEAE		<i>Hylocereus trigonus</i>	Night-blooming cereus	V	N	Wo
		<i>Melocactus infortus</i>	Turk's-cap	S	N	Cl/Fo/Wo/Be
		<i>Opuntia dillenii</i>	Prickly pear	S	N	Fo/Wo/Be/Cl
		<i>O. repens</i>	Suckers	S	N	Fo/Wo/Be/Cl/Oa

FAMILY	SUBFAMILY	SCIENTIFIC NAME	COMMON NAME	GROWTH FORM	ORIGIN	HABITAT
		<i>O. rubescens</i>	Tree opuntia	T	N	Wo/Oa/Be
		<i>Pilosocereus royenii</i>	Pipe organ	T	N	Fo/Wo/Be/Cl/Oa
CANELLACEAE		<i>Canella winterana</i>	Wild cinnamon	T	N	Fo/Wo
CAPPARACEAE		<i>Capparis cynophallophora</i>	Black caper	T	N	Fo/Wo
		<i>C. flexuosa</i>	Limber caper	V	N	Fo/Wo
		<i>C. cf. hastata</i>	Caper	T	N	Fo/Wo
		<i>C. indica</i>	White caper	T	N	Fo/Wo
		<i>Cleome cf. rutidosperma</i>	Consumption wed	H	I	Wo/Oa
		<i>C. viscosa</i>	Sticky cleome	H	N	We
		<i>Morisonia americana</i>	Rat apple	T	N	Fo/Wo
CRASSULACEAE		<i>Bryophyllum pinnatum</i>	Leaf of life	H	I	We/Oa
		<i>Kalanchoe cf. daigremontiana</i>	Leaf of life	H	I	We/Oa
CELASTRACEAE		<i>Cassine xylocarpa</i>	Marble Tree	T	N	Fo/Wo/Be/Oa
		<i>Crossopetalum rhacoma</i>	Maidenberry	S	N	Fo/Wo/Be/Oa
		<i>Maytenus laevigata</i>	Maytenus	T	N	Fo/Wo
		<i>Schaefferia frutescens</i>	Yellow box	S	N	Fo/Wo/Oa
CLUSIACEAE		<i>Clusia rosea</i>	Pitch apple	T	N	Wo/Oa
		<i>Mammea americana</i>	Mammee support, Mammee apple	T	I ?	Wo/Fo/Ga
RHIZOPHORACEAE		<i>Rhizophora mangle</i>	Red mangrove	T	N	We/Be
COMBRETACEAE		<i>Bucida buceras</i>	Gree gree tree, Gri gri	T	N	Fo/Wo/Oa
		<i>Conocarpus erectus</i>	Buttonwood	T	N	Be/Wet
		<i>Laguncularia racemosa</i>	White mangrove	T	N	Wet
		<i>Terminalia catappa</i>	Tropical almond	T	I/C/n	Be/Ga
CONVOLVULACEAE		<i>Cuscuta cf. americana</i>	Yellow dod	V	N	Fo/Wo/Oa
		<i>Evolvulus convolvuloides</i>		H	N	Wo/Oa
		<i>E. mummularius</i>		V	N	Wo/Oa
		<i>Ipomoea pes-caprae</i>	Beach morning glory, bay vine	V	N	Fo/Wo
		<i>I. violacea</i>		V	N	Oa/Be
		<i>Jacquemontia cumanensis</i>		V	N	Wo/Oa
		<i>J. cf. pentanthos</i>	Clashie-malashie	V	N	Wo
ERYTHROXYLACEAE		<i>Erythroxylum brevipes</i>	Brisselet	T	N	Fo/Wo
ZYGOPHYLLACEAE		<i>Guaiacum officinale</i>	Lignum vitae	T	N	Fo/Wo/Oa/Ga
EUPHORBIACEAE		<i>Acalypha cf. chamaedrifolia</i>		H	N	Wo/Oa
		<i>A. poiretii ?</i>		H	I	Fo/Wo
		<i>Adelia ricinella</i>		T	N	Fo/Wo
		<i>Argythamnia candicans</i>		S	N	Wo/Oa

FAMILY	SUBFAMILY	SCIENTIFIC NAME	COMMON NAME	GROWTH FORM	ORIGIN	HABITAT
		<i>A. fasciculata</i>		S	N	Wo/Oa
		<i>A. stahlii</i>		S	N	Wo/Oa
		<i>Chamaesyce hirta</i>	Milk weed	H	N	We
		<i>C. mesembrianthemifolia</i>	Beach euphorbe/beach spurge	H	N	Be
		cf. <i>C. prostrata</i>		H	N	Oa/Be
		cf. <i>C. serpens</i>		H	N	Oa/Be
		<i>Croton astroites</i>	Maran	S	N	Fo/Wo/Oa
		<i>C. betulinus</i>	Pistarckle bush	S	N	Wo/Oa
		<i>C. flavens</i> var. <i>ridgidus</i>	Yellow maran	S	N	Wo/Oa
		<i>C. lobatus</i>	Croton	H	N ?	We
		<i>Euphorbia amarus</i>		H	N	Wo/Oa
		<i>E. heterophylla</i>	Red milkweed	H	N	We
		<i>E. petiolaris</i>	Hill manchineel	S	N	Wo
		<i>Fluggea acidoton</i>	Small leaf bushweed	T	N	Wo
		<i>Gymnanthes lucida</i>	Crabwood	T	N	Fo/Wo
		<i>Hippomane mancinella</i>	Manchineel, Manchioneel	T	N	Wo/Oa/Be
		<i>Jatropha gossypifolia</i>	Wild physicnut	S	N	Fo/Wo
		cf. <i>Margaritaria nobilis</i>	Gounglehout	T	N	Fo/Wo
		<i>Phyllanthus</i> sp.	Seed under leaf	H	I ?	Wo/Oa
		<i>Ricinus communis</i>	Castorbean	S	I/C/n	Oa/We
		<i>Savia sessiflora</i>		T	N	Fo/Wo
		<i>Tragia volubilis</i>	Stinging nettle	V	N	Fo/Wo/Oa
FABACEAE						
	<i>Caesalpinoideae</i>	<i>Caesalpinia bonduc</i>	Gray nicker	S	N	Wo/Oa/Be
		<i>C. ciliata</i>	Brown nicker	S	N	Wo/Oa/Be
		<i>Delonix regia</i>	Flamboyant	T	I/C/n	Oa/Ga
		<i>Parkinsonia aculeata</i>	Horse bean, Jerusalem thorn	T	I/C	Wo
		<i>Senna occidentalis</i>	Stinking weed	S	N ?	Oa/We
		<i>Tamarindus indica</i>	Tamarind	T	I/C/n	Fo/Oa
	<i>Faboideae</i>	<i>Abrus precatorius</i>	Jumbie bead	V	N	Wo/Oa
		<i>Aeschynomene</i> cf. <i>americana</i>		H	N	Oa
		<i>Canavalia rosea</i>	Bay bean	V	N	Be
		<i>Centrosema pubescens</i>	Butterfly pea, wist vine	V	N	Wo/Oa
		<i>C. virginianum</i>	Butterfly pea, wist vine	V	N	Wo/Oa
		<i>Crotalaria lotifolia</i>	Shak-shak	S	N	Wo/Oa
		<i>C. retusa</i>	Shak-shak	H	N	Wo/Oa
		<i>Desmodium</i> sp.	Begger's ticks	H	N	We
		<i>Erythrina eggersii</i>	Cockspur	T	N	Fo/Wo
		<i>Galactia</i> cf. <i>dubia</i>		V	N	Fo/Wo/Oa
		<i>G.</i> cf. <i>egersii</i>		V	N	Wo
		<i>G.</i> cf. <i>striata</i>		V	N	Fo/Wo/Oa
		<i>Indigofera</i> cf. <i>suffruticosa</i>	Indigo	S	N	Wo/Oa/We
		<i>Pictetia aculeata</i>	Fustic	S	N	Wo
		<i>Piscidia carthagenensis</i>	Dogwood, fishpoison	T	N	Fo/Wo
		<i>Poitea florida</i>	Wattapama	T	N	Fo/Wo
		<i>Rhynchosia minima</i>		V	N	Wo
		<i>R. reticulata</i>		V	N	Wo

FAMILY	SUBFAMILY	SCIENTIFIC NAME	COMMON NAME	GROWTH FORM	ORIGIN	HABITAT
		<i>Stylosanthes hamata</i>	Donkey weed	H	I ?	We
		<i>Tephrosia cinerea</i>		V	N	Wo
		<i>Teramnus labialis</i>	Blue wiss	V	N	Wo
	Mimosoideae	<i>Acacia farnesiana</i>		T	I	Fo/Wo/Oa
		<i>A. macracantha</i>	Casha, stink casha	T	I	Wo
		<i>A. muricata</i>	Amarat	T	N	Wo
		<i>A. retusa</i>	Catch-and-keep	V	I	Wo
		<i>A. tortuosa</i>	Casha	T	I	
		<i>Desmanthus virgatus</i>		S	N	Wo
		<i>Leucaena leucocephala</i>	Tan-tan	T	I/N	Wo
		<i>Mimosa ceratonia</i>	Ambret	V	N	Fo/Wo
		<i>Pithecellobium unguis-cati</i>	Bread-and-cheese	S	N	Fo/Wo
FLACOURTACEAE		<i>Samyda dodecandra</i>	Samyda	S	N	Fo/Wo
TURNERACEAE		<i>Turnera diffusa</i>		S	N	Wo/Oa
LORANTHACEAE		<i>Dendropemon caribaeus</i>	Bassinboom	S	N	Fo/Wo
OLACACEAE		<i>Schoepfia schreberi</i>		T	N	Fo/Wo
LYTHRACEAE		<i>Ammania coccinea</i>		H	N	Oa
MALPIGHIACEAE		cf. <i>Bunchosia glandulosa</i>		T	N	Fo/Wo
		<i>Byrsonima spicata</i>	Clam cherry	T	N	Fo/Wo
		<i>Heteropteris purpurea</i>		V	N	Wo
		<i>Malpighia woodburyana</i>	Bulldog	S	N	Wo
		<i>Stigmaphyllon emarginatum</i>	Yellow wiss	V	N	Wo
		<i>Abutilon umbellatum</i>		H	N	We
MALVACEAE		<i>Bastardiopsis eggersii</i>	Jost Van Dyke Indian Mallow	T	N	Fo/Wo
		<i>Ceiba pentandra</i>	Silk cotton	T	N	Fo/Wo/Oa/Ga
		<i>Gossypium hirsutum</i>	Cotton	S	I	Wo/Oa/Ga
		<i>Malvastrum americanum</i>		H	N	Oa
		<i>Pavonia spinifex</i>	Spiny pavonia	S	N	Fo/Wo
		<i>Sida</i> cf. <i>acuta</i>	Wire weed	H	N	Oa
		<i>S. ciliaris</i>		S	N	Oa
		<i>S. cordifolia</i>		H	N	We/Oa
		<i>Sidastrum multiflorum</i>		S	N	Wo/Oa
		<i>Thespesia populnea</i>	Haiti-haiti	T	N	Be
MELIACEAE		<i>Swietenia mahagoni</i>	Westindian mahogany	T	I/C/n	Oa
MULLUGINACEAE		<i>Mollugo nudicaulis</i>		H	N	Oa/We
ULMACEAE		<i>Trema micrantha</i>	Trema	T	N	Fo/Wo
MORACEAE		<i>Ficus citrifolia</i>	Short-leaf fig	T	N	Fo/Wo
		<i>F. cf. trigonata</i>		T	N	Fo/Wo

FAMILY	SUBFAMILY	SCIENTIFIC NAME	COMMON NAME	GROWTH FORM	ORIGIN	HABITAT
URTICACEAE		<i>Pilea cf. sanctae-crucis</i>		H	N	Fo/Wo
		<i>cf. Calypranthes sp.</i>		T	N	Fo/Wo
MELASTOMATACEAE		<i>Henriettea cf. macfadyenii</i>		S	N	Fo/Wo/Oa
		<i>Tetrazygia cf. elaeagnoides</i>		T	N	Fo/Wo
MYRTACEAE		<i>Eugenia axillaris</i>		T	N	Fo/Wo
		<i>E. biflora</i>		T	N	Fo/Wo
		<i>E. confusa</i>		T	N	Fo/Wo
		<i>E. cordata</i>		T	N	Fo/Wo
		<i>E. floribunda</i>		T	N	Fo/Wo
		<i>E. ligustrina</i>		T	N	Fo/Wo
		<i>E. monticola</i>	Rodwood	T	N	Fo/Wo
		<i>E. pseudopsidium</i>	False guava	S	N	Fo/Wo
		<i>E. sessiliflora</i>		S	N	Fo/Wo
		<i>Myrcianthes fragrans</i>		T	N	Fo/Wo
		<i>Psidium guajava</i>	Guava	T	N ?	Wo/Oa/Ga
NYCTAGINACEAE		<i>Boerhavia coccinea</i> ?	Batta batta, kallaloo bush	H	N ?	We
		<i>B. scandens</i> ?		H	N ?	We
		<i>Guapira fragrans</i>	Black mampoo	T	N	Fo/Wo
		<i>Pisonia subcordata</i>	Water mampoo	T	N	Fo/Wo
ONAGRACEAE		<i>Ludwigia octovalis</i>	Wild clove, many seed	H	N	We/Oa
OXALIDACEAE		<i>Oxalis corniculata</i>	Wood sorrel	H	N	We
PAPAVERACEAE		<i>Argemone mexicana</i>	Mexican poppy, yellow thistle	H	N	We
PASSIFLORACEAE		<i>Passiflora suberosa</i>	Indigo berry	V	N	Wo
		<i>P. edulis</i>	Passion fruit	V	C	Wo
CARICAEAE		<i>Carica papaya</i>	Papaya	T	I ?	Fo/Wo/Oa/Ga
PHYTOLACCACEAE		<i>Rivina humilis</i>	Jumbie-pepper	H	N	Wo
ARISTOLOCHACEAE		<i>Aristolochia trilobata</i>		V	N	Fo/Wo
POLYGONACEAE		<i>Coccoloba krugii</i> ?	Hill grape	T	N	Fo/Wo
		<i>C. microstachya</i>		T	N	Fo/Wo
		<i>C. uvifera</i>	Seagrape	T	N	Wo/Be
		<i>C. venosa</i>	Chiggery grape	T	N	Fo/Wo
PORTULACACEAE		<i>Portulaca oleracea</i>	Purslane, jump up an' kiss me	H	N	Oa
		<i>Talinum fruticosum</i>		H	N	Fo/Wo

FAMILY	SUBFAMILY	SCIENTIFIC NAME	COMMON NAME	GROWTH FORM	ORIGIN	HABITAT
RHAMNACEAE		<i>Colubrina arborescens</i>	Mauby, Maubi, Soap bush	T	N	Fo/Wo/Oa
		<i>C. elliptica</i>	Mauby, Maubi, Snake root	T	N	Fo/Wo/Oa
		<i>Gouania lupuloides</i>	Chew stick	V	N	Wo
		<i>Krugiodendron ferreum</i>	Ironwood, ebonyberry	T	N	Fo/Wo
		<i>Reynosia guama</i>		T	N	Fo/Wo
RUBIACEAE		<i>Chiococca</i> sp.	Snowberry	V	N	Fo/Wo
		<i>Erithalis fruticosa</i>		S	N	Wo
		<i>Ernodea littoralis</i>	Cough bush	H	N	Wo
		<i>Exostema caribaeum</i>	Princewood	T	N	Fo/Wo
		<i>Guettarda odorata</i>	Blackberry	T	N	Fo/Wo
		<i>G. scabra</i>	Green heart	T	N	Fo/Wo
		<i>Gonzalagunia hirsuta</i>		S	N	Fo/Wo
		<i>Morinda citrifolia</i>	Noni	S	I	Wo/Oa/Ga
		<i>Psychotria brownei</i>		S	N	Fo/Wo
		<i>P. cf. microdon</i>		S	N	Fo/Wo
		<i>Randia aculeata</i>	Inkberry	S	N	Fo/Wo
		<i>Rondeletia pilosa</i>		S	N	Fo/Wo
		<i>Scolosanthus versicolor</i>		S	N	Wo
		<i>Spermacoce</i> sp.		S	N	We
CUCURBITACEAE		<i>Cayaponia americana</i>	Wild pumpkin	V	N	Wo/Oa
GOODENIACEAE		<i>Scaevola sericea</i>		S	I	Be/Oa
		<i>S. plumieri</i>	Beach berry	S	N	Wo/Be
RUTACEAE		<i>Amyris elemifera</i>	Amyris	T	N	Fo/Wo
		<i>Citrus aurantifolia</i>	Lime	T	I	Wo/Oa
		<i>Zanthoxylum martinicense</i>	White prickle	T	N	Fo/Wo
		<i>Zanthoxylum monophyllum</i>	Yellow prickle	T	N	Fo/Wo
SAPINDACEAE		<i>Melicoccus bejugatus</i>	Genip	T	I	Fo/Wo/Oa/Ga
		<i>Serjania polyphylla</i>	Basket wiss	V	N	Fo/Wo/Oa
SAPOTACEAE		<i>Sideroxylon foetidissimum</i>	Bully, bully mastic	T	N	Fo/Wo
		<i>S. obovatum</i>	West Indian box, boxwood	T	N	Fo/Wo
		<i>S. salicifolium</i>	Sweetwood	T	N	Fo/Wo
OLEACEAE		<i>Chionanthus compacta</i>	Wild olive	T	N	Fo/Wo
SCROPHULARIACEAE		<i>Capraria biflora</i>	Goatweed	S	N	Wo
LAMIACEAE		<i>Hpytis</i> sp.		H	N	Wo/Oa
		<i>Leonotis nepetifolia</i>		H	I	Wo/Oa
		<i>Plectranthus amboinicus</i>	French thyme, Thyme	H	I	Oa/Ga
SOLANACEAE		<i>Brunfelsia americana</i>		S	N	Fo/Wo/Oa
		<i>Datura inoxia</i>	Nightshade	S	N	Oa/We

FAMILY	SUBFAMILY	SCIENTIFIC NAME	COMMON NAME	GROWTH FORM	ORIGIN	HABITAT
		<i>Physalis angulata</i>	Ground cherry	H	N	Oa/We
		<i>Solanum cf. erianthum</i>	Potato tree	S	I	Wo/Oa
		<i>S. racemosum</i>	Turkey berry, wild eggplant	S	I	Wo
STERCULIACEAE		<i>Helicteres jamaicensis</i>	Cats balls, cow bush	S	N	Wo
		<i>Guazuma ulmifolia</i>	Gunstock	T	N	Fo
		<i>Melochia nodiflora</i> ??		H	N	Oa/Be/Cl
		<i>M. pyramidata</i>		H	N	Oa
		<i>M. tomentosa</i>	Broom weed	H	N	Oa/Be/Cl
		<i>Sterculia foetida</i>	Stinky sterculia	T	N	Wo
		<i>Waltheria indica</i>	Marsh-mallow	H	N	Oa/We
SURIANACEAE		<i>Suriana maritima</i>	Bay cedar	S	N	Be
THEOPHRASTACEAE		<i>Jacquinea arborea</i>		S	N	Wo/Be/Oa
		<i>J. berterii</i>	Barbasco	S	N	Wo/Be/Oa
MYRSINACEAE		<i>Ardisia obovata</i>		S	N	Fo/Wo
TILLIACEAE		<i>Corchorus cf. aestuans</i>		H	N	Oa
		<i>C. hirsutus</i>	Jack switch	S	N	Oa/Be/Cl/Ro
THYMELAEACEAE		<i>Daphnopsis americana</i>		S	N	Fo/Wo
VERBENACEAE		<i>Clerodendrum aculeatum</i>	Privet, haggard bush	S	N	Wo/Oa/Be
		<i>Citharexylum fruticosum</i>	Fiddlewood	T	N	Wo
		<i>Lantana camara</i>	Red sage	S	N	
		<i>L. involucrata</i>	Sage	S	N	Wo/Oa
		<i>Stachytarpetta jamaicensis</i>	Worry-wine	H	N	We
VITACEAE		<i>Cissus trifoliata</i>		V	N	Fo/Wo
		<i>C. verticillata</i>	Pudding vine	V	N	Fo/Wo
AGAVACEAE		<i>Agave missonium</i>	Century plant, agave	S	N/C	Fo/Wo
		<i>Sansiviera cf. hyacinthoides</i>	Iguana tail	H	I	Fo/Wo/Ga
AMARYLLIDACEAE		<i>Hymenocallis caribaea</i>	Spider lily	H	N/C	Ga
ARECACEAE		<i>Coccothrinax alta</i>	Tyre palm	T	N	Fo
		<i>Cocos nucifera</i>	Coconut palm	T	I/C/n	Be/Oa/Ga
ARACEAE		<i>Anthurium crenatum</i>		H	N	Fo/Wo
ASPHODELACEAE		<i>Aloe vera</i>	Medicine aloe, aloe	H	I/C/n	Wo/Ga
BROMELIACEAE		<i>Aechmea lingulata</i>	Wild pineapple	H	N	Fo/Wo/Oa
		<i>Ananas comosus</i>	Pineapple	H	I	Fo/Wo/Ga
		<i>Bromelia pinguin</i>	Pinguin, wild pineapple	H	I?	Fo/Wo/Oa
		<i>Pitcairnia angustifolia</i>	Pinguin, wild pineapple	H	I/C/n	Fo/Wo/Oa

FAMILY	SUBFAMILY	SCIENTIFIC NAME	COMMON NAME	GROWTH FORM	ORIGIN	HABITAT
		<i>Tillandsia fasciculata</i>	Wild pine	H	N	Wo/Oa
		<i>T. utriculata</i>	Wild pine	H	N	Fo/Wo
COMMELINACEAE		<i>Callisia repens</i>	Callisia	H	I/C	Ga
		<i>Commelina cf. diffusa</i>	French weed	H	N	Fo/Wo/Oa/We
SMILACACEAE		<i>Smilax coriacea</i>	Greenbriar	V	N	Fo/Wo
CYPERACEAE		<i>Cyperus nanus</i>		H	N	Wo/Oa
		<i>C. cf. planifolius</i>		H	N	Oa/Be
		<i>C. sp.</i>		H	N	Be/Oa/Wet
		<i>Fimbristylis cymosa</i>		H	N	Be/Oa/Wet
		<i>F. ferruginea</i>		H	N ?	Be/Oa/Wet
		<i>Scleria lithosperma</i>		H	N	Fo/Wo
HYDROCHARITACEAE		<i>Thalassia testudinum</i>	Turtle grass	H	N	Wet
PIPERACEAE		<i>Peperomia humilis</i>		H	N	Fo/Wo
		<i>P. myrtifolia</i>		H	N	Fo/Wo
ORCHIDACEAE		<i>Epidendrum ciliare</i>	Christmas orchid, eye-lash orchid	H	N	Fo/Wo/Ro/Cl
		<i>Psychilis macconnelliae</i>	Butterfly orchid	H	N	Fo/Wo/Ro/Cl
		<i>Tolumnia prionochila</i>	Yellow dancing lady	H	N	Fo/Wo
POACEAE		<i>Antheophora hermaphrodita</i>	Oldfield grass	H	I	Wo/Oa
		<i>Bothriochloa cf. pertusa</i>	Hurricane grass	H	I ?	Wo/Oa/We
		<i>Cenchrus echinatus</i>	Sandbur, sand-spurs, bur-grass	H	N	Be
		<i>cf. Pennisetum setosum</i>		H	I ?	Oa/We
		<i>Chloris barbata</i>	Purple top	H	I/n	Oa/We
		<i>Cynodon dactylon</i>		H	I	Wo/Oa
		<i>Digitaria bicornis ?</i>		H	N	Wo/Oa/We
		<i>D. insularis</i>		H	N	Wo/Oa/We
		<i>Digitaria sp.</i>		H	N	Wo/Oa/We
		<i>Echinochloa colona</i>		H	I	Wo/Oa/We
		<i>Eleusine indica</i>	Goose grass	H	I/n	We
		<i>Eragrostis amabilis</i>		H		
		<i>Melinis repens</i>	Natal redtop	H	I	We
		<i>cf. Oplismenus hirtellus</i>		H	N	Wo/Oa
		<i>Panicum maximum</i>	Guinea grass	H	I/C/n	Wo/Oa/We
		<i>Paspalidum germinatum</i>		H	I	Wo/Oa
		<i>Paspalum laxum</i>		H	N	Wo/Oa
		<i>Paspalum sp.</i>		H	I ?	Oa/We
		<i>Spartina patens</i>	Cordgrass	H	N	Be
		<i>Sporobolus virginicus</i>	Salt grass	H	N	Wet/Be
		<i>Urochloa fasciculatun</i>		H	N ?	Wo/Oa/We
		<i>Urochloa sp.</i>		H	N	Wo/Oa/We

TABLE KEY

<u>Habitat:</u>	<u>Growth Form:</u>	<u>Origin:</u>	<u>Species:</u>
Be beach	Aq aquatic	C cultivated	cf. identification not yet confirmed
Cl cliffs	H herb	I introduced	? presence uncertain
Fo forests	S shrub	N native	
Ga gardens	T tree	n naturalised	
Oa open areas	V vine	? origins questionable	
Ro rocks			
We weed			
Wet wetlands			
Wo woodlands			

OVERVIEW OF LIST OF PLANT SPECIES

The totals for the plant species identified in Appendix 2 are as follows:

Number of species:	332
Number of families:	89
Number of herbs:	115
Number of trees:	103
Number of vines:	38
Number of shrubs:	76
Number of introduced species	54 (approximately)

These are approximate totals since the numbers will undoubtedly increase as more field observations take place.

Rare Caribbean endemic plant species on the Profile islands are listed below. These are species endemic to the West Indies and are highlighted not only because they are native to the region but also because they are relatively uncommon. (The reader is also referred to Table 12 which lists plant species of special conservation concern in the Profile islands.)

- *Opuntia rubescens*
- *Guaiacum officinale*
- *Argythamnia stahlia*
- *Fluggea acidoton*
- *Crotalaria lotifolia*
- *Erythrina eggersii*
- *Poitea florida*
- *Bastardiopsis eggersii*
- *Henriettea cf. macfadyenii*
- *Tetrazygia cf. elaeagnoides*
- *Coccothrinax alta*

Appendix 3 — Table 1
Preliminary List of Marine Plants Identified during the Marine Survey Phase
of the Jost Van Dyke Environmental Profile Project

Scientific Name	Common Name
Phylum Chlorophyta — Green Algae	
<i>Enteromorpha flexuosa</i>	Green Tube Alga
<i>Bryopsis plumosa</i>	Plume Alga
<i>Chaetomorpha crassa</i>	Green Moss
<i>Derbesia</i> sp.	Green Fuzz
<i>Cladophora</i> sp.	Green Ball Alga
<i>Caulerpa verticillata</i>	Green Turf Alga
<i>Caulerpa sertularioides</i>	Green Feather Alga
<i>Ventricaria ventricosa</i>	Sea Pearl
<i>Valonia utricularis</i>	Creeping Bubble Alga
<i>Valonia macrophysa</i>	Elongated Sea Pearls
<i>Dictyosphaeria ocellata</i>	Small Bubble Alga
<i>Dictyosphaeria cavernosa</i>	Green Bubble Weed
<i>Udotea flabellum</i>	Mermaid Fan
<i>Penicillus capitatus</i>	Mermaid's Shaving Brush
<i>Halimeda copiosa</i>	Large Leaf Hanging Vine
<i>Halimeda incrassata</i>	Three Finger Leaf Alga
<i>Halimeda opuntia</i>	Watercress Alga
Phylum Phaeophyta — Brown Algae	
<i>Dictyota</i> sp.	Y Branched Alga
<i>Dictyopteris jolyana</i>	Brown Alga
<i>Padina sanctae-crucis</i>	Scroll Alga
<i>Lobophora variegata</i>	Encrusting Fan-Leaf Alga
<i>Sargassum natans</i>	Sargasso Weed
<i>Sargassum platycarpum</i>	Sargassum Alga
Phylum Rhodophyta — Red Algae	
<i>Ceramium</i> sp.	Red Cylindrical Alga
<i>Wrangelia argus</i>	Pink Bush Alga
<i>Chondria littoralis</i>	Tuff Alga
<i>Liagora mucosa</i>	Red Goopy Alga
<i>Bostrychia tenella</i>	Red Moss Alga
<i>Laurencia obtusa</i>	Clump Alga
<i>Laurencia papillosa</i>	Knobby Branch Alga
<i>Gracilaria</i> sp.	Sea Moss
<i>Amphiroa brasiliiana</i>	Twig Alga
<i>Neogonolithon spectabile</i>	Calcareous Red Alga
<i>Lithophyllum congestum</i>	Pink Branched Alga
<i>Titanoderma</i> sp.	Pink Encrusting Alga
<i>Porolithon pachydermum</i>	Reef Cement
Phylum Cyanophyta — Blue-Green Algae	
<i>Schizothrix calcicola</i>	Fuzzy Blue-Green Alga
<i>Phormidium corallyticum</i>	Blank Band Disease
Phylum Angiospermae — Flowering Plants	
<i>Syringodium filiforme</i>	Manatee Grass
<i>Halodule wrightii</i>	Shoal Grass
<i>Thalassia testudinum</i>	Turtle grass

Appendix 3 — Table 2
Preliminary List of Marine Invertebrates Identified during the Marine Survey Phase
of the Jost Van Dyke Environmental Profile Project

Scientific Name	Common Name
Phylum Porifera — Sponges	
Class Demospongiae	
<i>Aplysina fistularis</i>	Yellow Tube Sponge
<i>Aplysina lacunosa</i>	Convoluted Barrel Sponge
<i>Agelas wiedenmyeri</i>	Brown Clustered Tube Sponge
<i>Agelas conifera</i>	Brown Tube Sponge
<i>Ircinia strobilina</i>	Black Ball Sponge
<i>Cinachyra</i> sp.	Orange Ball Sponge,
<i>Holopsamma helwigi</i>	Lumpy Overgrowing Sponge
<i>Plakortis angulospiculatus</i>	Viscous Sponge
<i>Anthosigmella varians</i>	Brown Variable Sponge
<i>Cliona langae</i>	Coral Encrusting Sponge
<i>Cliona delitrix</i>	Red Boring Sponge
Phylum Cnidaria — Corals, Hydroids, Anemone	
Class Hydrozoa	
	Hydroid
<i>Gymnangium</i> sp.	Hydroid
<i>Halocordyle disticha</i>	Christmas Tree Hydroid
<i>Dentitheca dendritica</i>	Feather Bush Hydroid
<i>Macrorhynchia allmani</i>	Stinging Hydroid
<i>Millepora alcicornis</i>	Branching Fire Coral
<i>Millepora complanata</i>	Blade Fire Coral
Class Scyphozoa	
<i>Aurelia aurita</i>	Moon Jelly
Class Anthozoa	
<i>Condylactis gigantea</i>	Giant Anemone
<i>Stichodactyla helianthus</i>	Sun Anemone
<i>Bartholomea annulata</i>	Corkscrew Anemone
<i>Aiptasia tagetes</i>	Pale Anemone
<i>Zoanthus pulchellus</i>	Mat Zoanthid
<i>Plexaura flexuosa</i>	Bent Sea Rods
<i>Pseudoplexaura</i> sp.	Porous Sea Rods
<i>Eunicea</i> sp.	Knobby Sea Rods
<i>Muricea elongata</i>	Orange Spiny Sea Rods
<i>Pseudopterogorgia</i> sp.	Sea Plumes
<i>Pterogorgia citrina</i>	Yellow Sea Whip
<i>Gorgonia ventalina</i>	Common Sea Fan
<i>Gorgonia flabellum</i>	Venus Sea Fan
<i>Acropora cervicornis</i>	Staghorn Coral
<i>Acropora palmata</i>	Elkhorn Coral
<i>Porites branneri</i>	Blue Crust Coral
<i>Porites porites</i>	Finger Coral
<i>Dendrogyra cylindrus</i>	Pillar Coral
<i>Cladocora arbuscula</i>	Tube Coral
<i>Madracis mirabilis</i>	Yellow Pencil Coral
<i>Stephanocoenia michilini</i>	Blushing Star Coral
<i>Montastraea annularis</i>	Boulder Star Coral
<i>Montastraea cavernosa</i>	Great Star Coral

Scientific Name	Common Name
<i>Dichocoenia stokesi</i>	Elliptical Star Coral
<i>Siderastrea siderea</i>	Massive Starlet Coral
<i>Diploria strigosa</i>	Symmetrical Brain Coral
<i>Diploria labyrinthiformis</i>	Grooved Brain Coral
<i>Meandrina meandrites</i>	Maze Coral
<i>Manicina areolata</i>	Rose Coral
<i>Agaricia agaricites</i>	Lettuce Coral
<i>Scolymia wellsi</i>	Solitary Disk Coral
<i>Mussa angulosa</i>	Spiny Flower Coral
<i>Eusmilia fastigiata</i>	Smooth Flower Coral
Phylum Ctenophora — Comb Jellies	
Class Tentaculata	
<i>Mnemiopsis maccadyi</i>	Sea Walnut
Phylum Platyhelminthes	
Class Turbellaria	
<i>Pseudoceros texarus</i>	Netted Flatworm
Phylum Annelida — Segmented Worms	
Class Polychaeta	
<i>Hermodice carunculata</i>	Bearded Fireworm
<i>Arenicola cristata</i>	Southern Lugworm
<i>Sabellastarte magnifica</i>	Magnificent Feather Duster
<i>Bispira brunnea</i>	Social Feather Duster
<i>Notaulax occidentalis</i>	Yellow Fanworm
<i>Anamobaea orstedii</i>	Split-Crown Feather Duster
<i>Spirobranchus giganteus</i>	Christmas Tree Worm
<i>Eupolymnia crassicornis</i>	Spaghetti Worm
Phylum Arthropoda — Jointed Leg Animals	
Class Crustacea	
<i>Stenopus hispidus</i>	Banded Coral Shrimp
<i>Periclimenes pedersoni</i>	Pederson Cleaner Shrimp
<i>Periclimenes yucatanicus</i>	Spotted Cleaner Shrimp
<i>Alpheus armatus</i>	Red Snapping Shrimp
<i>Panulirus argus</i>	Caribbean Spiny Lobster
<i>Petrochirus Diogenes</i>	Giant Hermit
<i>Paguristes puniticeps</i>	White Speckled Hermit
<i>Paguristes cadenati</i>	Red Reef Hermit
<i>Petrolisthes armatus</i>	Green Porcelain Crab
<i>Mithrax sculptus</i>	Green Clinging Crab
<i>Mithrax spinosissimus</i>	Channel Clinging Crab
<i>Percnon gibbesi</i>	Nimble Spray Crab
<i>Callinectes sp.</i>	Blue Crab
<i>Stenorhynchus seticornis</i>	Yellowline Arrow Crab
<i>Microphrys bicornuta</i>	Speck-Claw Decorator Crab
<i>Gonodactylus oerstedii</i>	Swollen-Claw Mantis
<i>Gonodactylus curacaoensis</i>	Dark Mantis
<i>Anilocra laticaudata</i>	Soldierfish Isopod
<i>Mysidium sp.</i>	Mysid Shrimp
Subclass Cirripedia	
<i>Thoracica</i>	Sessile Barnacles
<i>Lepas anatifera</i>	Smooth Goose-Neck Barnacle

Scientific Name	Common Name
Phylum Ectoprocta — Bryozoans	
Class Gymnolaemata	
<i>Schizoporella violacea</i>	Tubular-Horn Bryozoan
Phylum Mollusca — Snails, Bivalves, Octopus, Squid	
Class Gastropoda	
<i>Strombus gigas</i>	Queen Conch
<i>Strombus costatus</i>	Milk Conch
<i>Fasciolaria tulipa</i>	True Tulip
<i>Cymatium pileare</i>	Atlantic Hairy Triton
<i>Oliva reticularis</i>	Netted Olive
<i>Lithopoma tectum</i>	West Indian Starsnail
<i>Cerithium litteratum</i>	Stocky Cerith
<i>Cyphoma gibbosum</i>	Flamingo Tongue
<i>Bulla striata</i>	Striate Bubble
<i>Berthellina engeli</i>	Apricot Sidegill Slug
<i>Tridachia crispate</i>	Lettuce Sea Slug
<i>Discodoris evelinae</i>	Brown Do
Class Bivalvia	
<i>Spondylus americanus</i>	Atlantic Thorny-Oyster
<i>Lima scabra</i>	Rough Fileclam
<i>Lima lima</i>	Spiny Fileclam
<i>Pinctada radiata</i>	Atlantic Pearl-Oyster
<i>Pteria colymbus</i>	Atlantic Wing-Oyster
<i>Pinna camea</i>	Amber Penshell
<i>Tellina radiata</i>	Sunrise Tellin
Class Amphineura	
<i>Acanthopleura granulate</i>	Fuzzy Chiton
Class Cephalopoda	
<i>Sepioteuthis, sepioidea</i>	Caribbean Reef Squid
<i>Octopus vulgaris</i>	Common Octopus
Phylum Echinodermata — Sea Stars, Urchins, Sea Cucumbers	
Class Crinoidea	
<i>Davidaster rubiginosa</i>	Golden Crinoid
Class Asteroidea	
<i>Ophidiaster guildingii</i>	Comet Star
<i>Oreaster reticulatus</i>	Cushion Sea Star
<i>Astropecten articulatus</i>	Beaded Sea Star
Class Ophiuroidea	
<i>Ophionereis reticulata</i>	Reticulated Brittle Star
<i>Ophiocoma echinata</i>	Blunt-Spined Brittle Star
<i>Ophioderma appressum</i>	Banded-Arm Brittle Star
<i>Astrophyton muricatum</i>	Giant Basket Star
Class Echinoidea	
<i>Diadema antillarum</i>	Long-Spined Urchin
<i>Echinometra lucunter</i>	Rock-Boring Urchin
<i>Lytechinus variegatus</i>	Variogated Urchin
<i>Eucidaris tribuloides</i>	Slate-Pencil Urchin
<i>Tripneustes ventricosus</i>	West Indian Sea Egg
<i>Meoma ventricosa</i>	Red Heart Urchin
<i>Clypeaster subdepressus</i>	Sand Dollar

Scientific Name	Common Name
Class Holothuroidea	
<i>Holothuria mexicana</i>	Donkey Dung Sea Cucumber
<i>Holothuria impatiens</i>	Slender Sea Cucumber
Phylum Chordata	
Subphylum Urochordata - Tunicates	
Class Ascidiacea	
<i>Polycarpa spongiabilis</i>	Giant Tunicate
<i>Clavelina picta</i>	Painted Tunicate
<i>Polyandrocarpa tumida</i>	Mottled Social Tunicate
<i>Trididemum solidum</i>	Overgrowing Mat Tunicate

Appendix 3 — Table 3
Preliminary List of Fish Species Identified during the Marine Survey Phase
of the Jost Van Dyke Environmental Profile Project

Key to Abundance:
S Single **M** Many (11-100)
F Few (2-10) **A** Abundance (100+)

Scientific Name	Common Name	Abundance
Family Chaetodontidae		
<i>Chaetodon striatus</i>	Banded Butterflyfish	M
<i>Chaetodon capistratus</i>	Four-eye Butterflyfish	A
Family Pomacanthidae		
<i>Holocanthus ciliaris</i>	Queen Angelfish	F
<i>Pomacanthus paru</i>	French Angelfish	F
<i>Holocanthus tricolor</i>	Rock Beauty	F
Family Acanthuridae		
<i>Acanthurus coeruleus</i>	Blue Tang	A
<i>Acanthurus bahianus</i>	Ocean Surgeonfish	A
<i>Acanthurus chirurgus</i>	Doctorfish	F
Family Carangidae		
<i>Caranx ruber</i>	Bar Jack	A
<i>Caranx latus</i>	Horse-Eye Jack	M
<i>Trachinotus goodie</i>	Palometa	F
Family Scombridae		
<i>Scomberomorus regalis</i>	Cero	F
Family Belonidae		
<i>Playbelone argalus</i>	Keeltail Needlefish	M
<i>Tylosurus crocodiles</i>	Houndfish	M
Family Sphyrnidae		
<i>Sphyrna barracuda</i>	Great Barracuda	F
Family Sparidae		
<i>Calamus calamus</i>	Saucereye Porgy	F
<i>Calamus pennatula</i>	Pluma	F
Family Kyphosidae		
<i>Kyphosus sp.</i>	Chub	F
Family Gerreidae		
<i>Gerres cinereus</i>	Yellowfin Mojarra	A
Family Atherinidae		
	Silversides	A
Family Haemulidae		
<i>Haemulon flavolineatum</i>	French Grunt	A
<i>Haemulon plumieri</i>	White Grunt	A
<i>Haemulon carbonarium</i>	Caesar Grunt	M
<i>Haemulon sciurus</i>	Bluestriped Grunt	A
<i>Haemulon aurolineatum</i>	Tomtate	A
<i>Haemulon macrostomum</i>	Spanish Grunt	S
<i>Haemulon album</i>	Margate	S
Family Lutjanidae		
<i>Lutjanus surinamensis</i>	Mutton Snapper	F
<i>Lutjanus griseus</i>	Gray Snapper	M
<i>Lutjanus jocu</i>	Dog Snapper	S

Scientific Name	Common Name	Abundance
<i>Lutjanus mahogoni</i>	Mahogany Snapper	A
<i>Lutjanus apodus</i>	Schoolmaster	A
<i>Lutjanus synagris</i>	Lane Snapper	M
<i>Ocyurus chrysurus</i>	Yellowtail Snapper	A
Family Pomacentridae		
<i>Stegastes diencaeus</i>	Longfin Damselfish	A
<i>Stegastes fuscus</i>	Dusky Damselfish	A
<i>Stegastes planifrons</i>	Threespot Damselfish	A
<i>Stegastes variabilis</i>	Cocoa Damselfish	F
<i>Stegastes leucostictus</i>	Beaugregory	A
<i>Stegastes partitus</i>	Bicolor Damselfish	A
<i>Microspathodon chrysurus</i>	Yellowtail Damselfish	A
<i>Abudefduf saxatilis</i>	Sergeant Major	A
<i>Chromis cyanea</i>	Blue Chromis	A
<i>Chromis multilineata</i>	Brown Chromis	M
Family Serranidae		
<i>Hypoplectrus unicolor</i>	Butter Hamlet	M
<i>Hypoplectrus puella</i>	Barred Hamlet	A
<i>Hypoplectrus chlorurus</i>	Yellowtail Hamlet	M
<i>Hypoplectrus nigricans</i>	Black Hamlet	M
<i>Hypoplectrus sp.</i>	Tan Hamlet	F
<i>Epinephelus cruentatus</i>	Graysby	M
<i>Epinephelus guttatus</i>	Red Hind	M
<i>Epinephelus fulvus</i>	Coney	F
<i>Serranus tigrinus</i>	Harlequin Bass	F
Family Grammatidae		
<i>Gramma loreto</i>	Fairy Basslet	A
Family Scaridae		
<i>Scarus vetula</i>	Queen Parrotfish	A
<i>Sparisoma viride</i>	Stoplight Parrotfish	A
<i>Scarus taeniopterus</i>	Princess Parrotfish	A
<i>Scarus croicensis</i>	Striped Parrotfish	A
<i>Sparisoma aurofrenatum</i>	Redband Parrotfish	A
<i>Sparisoma chrysopterus</i>	Redtail Parrotfish	F
<i>Sparisoma rubripinne</i>	Yellowtail Parrotfish	A
<i>Sparisoma atomarium</i>	Greenblotch Parrotfish	M
<i>Cryptotomus roseus</i>	Bluelip Parrotfish	F
Family Labridae		
<i>Clepticus parae</i>	Creole Wrasse	A
<i>Halichoeres radiatus</i>	Puddingwife	A
<i>Halichoeres garnoti</i>	Yellowhead Wrasse	A
<i>Thalassoma bifasciatum</i>	Bluehead	A
<i>Halichoeres bivittatus</i>	Slippery Dick	A
<i>Halichoeres maculipinna</i>	Clown Wrasse,	F
<i>Halichoeres poeyi</i>	Blackear Wrasse	M
Family Holocentridae		
<i>Holocentrus adscensionis</i>	Squirrelfish	A
<i>Holocentrus rufus</i>	Longspine Squirrelfish	F
<i>Holocentrus coruscum</i>	Reef Squirrelfish	F
<i>Holocentrus vexillarius</i>	Dusky Squirrelfish	M
<i>Myripristis jacobus</i>	Blackbar Soldierfish	F

Scientific Name	Common Name	Abundance
Family Priacanthidae		
<i>Priacanthus cruentatus</i>	Glasseye Snapper	F
Family Apogonidae		
<i>Apogon aurolineatus</i>	Bridle Cardinalfish	F
<i>Phaeoptyx xenus</i>	Sponge Cardinalfish	M
<i>Astrapogon puncticulatus</i>	Blackfin Cardinalfish	F
Family Gobiidae		
<i>Gobiosoma evelynae</i>	Sharknose Goby	A
<i>Gobiosoma chancei</i>	Shortstripe Goby	M
<i>Gnatholepis thompsoni</i>	Goldspot Goby	M
<i>Coryphopterus dicrus</i>	Colon Goby	F
<i>Coryphopterus glaucofraenum</i>	Bridled Goby	A
<i>Coryphopterus</i> sp.	Glass Goby	A
Family Labrisomidae		
<i>Labrisomus nuchipinnis</i>	Hairy Blenny	F
<i>Malacoctenus boehlkei</i>	Diamond Blenny	M
<i>Malacoctenus triangulates</i>	Saddled Blenny	A
<i>Malacoctenus gilli</i>	Dusky Blenny	M
<i>Malacoctenus macropus</i>	Rosy Blenny	A
Family Chaenopsidae		
<i>Acanthemblemaria spinosa</i>	Spinyhead Blenny	F
Family Blenniidae		
<i>Ophioblennius atlanticus</i>	Redlip Blenny	M
Family Opistognathidae		
<i>Opistognathus aurifrons</i>	Yellowhead Jawfish	M
Family Bothidae		
<i>Bothus lunatus</i>	Peacock Flounder	F
Family Scorpaenidae		
<i>Scorpaena plumieri</i>	Spotted Scorpionfish,	S
Family Synodontidae		
<i>Synodus intermedius</i>	Sand Diver	A
Family Cirrhitidae		
<i>Amblycirrhitus pinos</i>	Redspotted Hawkfish	F
Family Aulostomidae		
<i>Aulostomus maculates</i>	Trumpetfish	M
Family Malacanthidae		
<i>Malacanthus plumieri</i>	Sand Tilefish	F
Family Tetraodontidae		
<i>Sphoeroides spengleri</i>	Bandtail Puffer	M
<i>Canthigaster rostrata</i>	Sharpnose Puffer	A
<i>Diodon hystrix</i>	Porcupinefish	F
Family Ostraciidae		
<i>Lactophrys quadricornis</i>	Scrawled Cowfish	F
<i>Lactophrys triqueter</i>	Smooth Trunkfish	M
Family Balistidae		
<i>Balistes vetula</i>	Queen Triggerfish	F
<i>Cantherhines pullus</i>	Orangespotted Filefish	M
<i>Cantherhines macrocerus</i>	Whitespotted Filefish	F
<i>Monacanthus tuckeri</i>	Slender Filefish	F
Family Mullidae		
<i>Pseudupeneus maculates</i>	Spotted Goatfish	A
<i>Mulloidichthys martinicus</i>	Yellow Goatfish	A

Scientific Name	Common Name	Abundance
Family Sciaenidae		
<i>Equetus punctatus</i>	Spotted Drum	F
<i>Equetus acuminatus</i>	Highhat	M
Family Muraenidae		
<i>Gymnothorax funebris</i>	Green Moray,	S
<i>Gymnothorax moringa</i>	Spotted Moray	F
<i>Gymnothorax vicinus</i>	Purplemouth Moray	S
Family Congridae		
<i>Heteroconger halis</i>	Brown Garden Eel	A
Family Dasyatidae		
<i>Dasyatis Americana</i>	Southern Stingray	F
Marine Reptiles:		
<i>Eretmochelys imbricota</i>	Hawksbill Turtle	Several
<i>Chelonia mydas</i>	Green Turtle	One