

UNIFIED WATERSHED ASSESSMENT REPORT UNITED STATES VIRGIN ISLANDS

prepared by
Virgin Islands Department Of Planning and Natural Resources
and
United States Dept. Of Agriculture - Natural Resources Conservation Services

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1.0 INTRODUCTION

The Virgin Islands Department Of Planning and Natural Resources (DPNR), in conjunction with the U.S. Department of Agriculture - Natural Resources Conservation Service (NRCS), has developed this Unified Watershed Assessment Report pursuant to the Clean Water Action Plan.

A key objective of the Action Plan is to provide a new, cooperative process for restoring and protecting water quality on a watershed basis. The Action Plan calls on the territorial government to assess the condition of water resources and identify:

- X watersheds not meeting, or facing imminent threat of not meeting, clean water or other natural resource goals;
- X watersheds meeting goals but needing action to sustain water quality;
- X watersheds with pristine/sensitive aquatic system conditions on federal, state, or tribal lands; and
- X watersheds for which more information is needed to assess conditions.

Based on these assessments, DPNR identified problem watersheds that are most in need of attention beginning in the Fiscal Year 1999-2000 period. The assessments were based primarily on existing information, tools, and methodologies for evaluating watershed conditions.

The assessments are a collaborative effort involving relevant parties such as local government agencies, federal land management agencies, conservation districts and land conservation departments, nongovernmental and private organizations, and other stakeholders. The public participated during the public review and comment period beginning August 1, 1998 through August 31, 1998.

Assessments and priorities developed as a result of this process are preliminary and may need to be refined as restoration efforts go forward in future years. More detailed assessments of conditions in the most critical watersheds requiring restoration can be developed as part of Watershed Restoration Action Strategies beginning in FY 1999.

2.0 GEOGRAPHIC SCOPE AND SCALE

The territory of the United States Virgin Islands comprises 3 major islands: St. Croix, St. John, and St. Thomas. Additionally, 57 smaller islands and cays were documented in AA

Natural History Atlas to the Cays of the US Virgin Islands by Damman and Nellis (1992).

Taken together, the territory encompasses a total land area of about 135 square miles (Attachment 1), characterized by central mountain ranges and relatively small coastal plains. Peak elevations are 1,165 feet on St. Croix (Mount Eagle), 1,550 feet on St. Thomas, (Crown Mountain) and 1,297 feet on St. John (Bordeaux Mountain) . The islands are generally only 2 to 6 miles wide, with no land location far from the coastal waters. All data in this report focus on the main islands of St.Croix, St. John, and St.Thomas (although several enclosed bays within the main islands= watersheds include offshore islands and cays).

The offshore cays and small islands are an inherent piece of the natural heritage of the Virgin Islands. Additionally, as an economic asset, these offshore sites could be included within a broad ecotourism program for the territory. Many government-owned cays have already been established as wildlife reserves pursuant to Title 12 94(b)(2) V.I.Rules and Regulations. A number are important seabird nesting sites, and several are important roosting areas. The surrounding waters of most of the cays and islands teem with marine life, providing food for seabirds and for the fish and shellfish sought by commercial and recreational fishermen. They are also critical as dive sites targeted by the local diving industry.

There are no large freshwater lakes or ponds, and no perennial streams on any of the islands; only intermittent streams can be seen after heavy rainfall. The absence of large freshwater resources and perennial streams means that guts (watercourses) form the basis for watershed management in the territory.

The unified watershed assessments are based on the United State Geological Survey (USGS) 8-digit unit scale. On this scale, the USVI can be divided into 2 hydrologic units: St. Croix and St. Thomas/St. John. The condition of each two 8-digit hydrologic unit is determined by aggregating assessments from smaller watersheds, or by other means. Additionally, these watersheds can be further subdivided into smaller sub-watersheds that fall inside or "nest" within larger watersheds in order to target specific activities identified in Watershed Restoration Action Plans.

3.0 WATERSHED ASSESSMENT CRITERIA

As indicated in the Introduction, the assessment are a collaborative effort of relevant government agencies, nongovernmental and private organizations and other stakeholders. A list of contacted people, affiliated with the Virgin Islands Resource Management Cooperative (VIRMC), is provided as Attachment 2.

Assessments were based primarily on existing information, tools, and methodologies for evaluating watershed conditions. A list of references and information sources is provided as Attachment 3. The watersheds on St. Croix, St.Thomas and St. John were defined and delineated in the Sediment Reduction Program prepared by CH2MHill (1979) and are listed in Attachment 4.

3.1 Fish and Wildlife Resources/Marine Habitat

The primary natural resources of these small islands are coastal and marine. Critical natural areas include: saltwater wetlands, mangroves, sea grass beds and coral reefs. The first provides important feeding areas and habitat for many species of shorebirds,(mostly neotropical migrants) waders and the federally-listed endangered species, Brown pelican. Salt ponds are also nesting habitats for Least Terns and Bahama ducks. The associated mangroves are important habitat for many species of neotropical migrants and resident species. Additionally, mangroves reduce sediments reaching the sea, lessen flooding, and stabilize the shoreline and provide fish nursery habitat and endangered turtles habitat. The sea grass beds and reefs are important fish and shellfish habitats for a community where commercial fishing is an important part of the local economy. Likewise coral reefs are also a significant natural asset for local tourism development. All of these areas are being impacted by point and nonpoint source pollution, and flooding.

Although the focus of natural resource concern in the territory is on coastal and marine habitats, the loss of forest cover due to development activities cannot be ignored. Not only is the habitat loss impacting resident forest species such as pigeons and fruit bats, but it is a significant contributor to the islands= watershed problems.

3.2 Nonpoint Source Pollution

The critical territory-wide nonpoint source (NPS) pollution issues in the Virgin Islands are:

- 1) erosion and sedimentation (from site development);
- 2) urban runoff;
- 3) failure of onsite disposal systems;
- 4) inadequate vessel wastes disposal;
- 5) oil and hazardous material spills (VI NPS Assessment Report, 1989);
- 6) salt water intrusion into groundwater aquifers.

Nonpoint source pollution, as runoff, impairs more water bodies than any other source of pollution in the Virgin Islands. Sediment - from dirt roads, farmlands, construction sites, urban encroachments, and other disturbed soils - is the primary nonpoint source pollutant threatening the islands= water resources. The topography of the islands, with a combination of short steep slopes terminating in sensitive wetlands and marine environments make them susceptible to damage from even slight increases in erosion.

Although there are numerous problems associated with nonpoint source pollution, the two primary problems affecting the Virgin Islanders are sedimentation and bacterial contamination.

- X Sedimentation occurs when soil is eroded from the land surface, for example at construction sites, and then [deposited onto the land surface or into coastal water bodies. Sedimentation can lead to habitat loss and marine life mortality.
- X Bacterial contamination from sources such as failed septic systems, runoff from animal operations, and sewage discharged from boats can cause serious threats to human health and impair water quality with algal blooms.

3.2.1 Erosion & Sedimentation/Urban Runoff

On St. Thomas more than 70% of the land surface has a slope that exceeds 35 degrees. On St. John, about 80 % of the land surface exceeds a slope of 35 degrees, and on St. Croix, about 50% of the land surface exceeds a slope of 25 degrees. The typical soil profile of the Virgin Islands is thin clayey and overlies rock. As a result the water storage capacity of the soils is small. Once the available soil moisture capacity is filled, all additional rainfall becomes runoff. The major constituent of soil in the Territory is clay. The colloidal nature of the clays prevents them from settling readily, and results in significant sediment runoff into coastal waters. The short, steep nature of the guts contributes to streamflow at several hundred locations; making physical control and removal of fine (clayey) sediments in the runoff very difficult.

The NRCS has classified soils in the Virgin Islands by four hydrologic soil groups which are denoted by the letters A, B, C, and D, which refer to the runoff potential of the soil. Detailed soil maps for the entire territory are presented in the U. S. Virgin Islands Soil Survey. An AA@ soil has the lowest runoff potential and soil@ D@ has the highest. Approximately two-thirds of the area of the Virgin Islands has D soils and only about 10 % has an A or B designation.

A study performed in the Fish Bay watershed (St. John) documented unpaved road surface erosion of a centimeter a year that delivered, in the case of one catchment area, some 400 metric tons of sediment to the receiving salt ponds, mangrove swamps and coastal waters.

3.2.2 Onsite Disposal Systems (OSDS)

The physical characteristics of the Virgin Islands, including the topography, geology, soils and other factors that affect the performance of subsurface wastewater disposal systems, indicate that a large majority of the land area is unsuitable for the construction of conventional septic systems.

Presently, there are thousands of septic systems in operation in areas that are inappropriate for subsurface disposal. They represent not only a hazard to the environment but also to public health. Poor soil conditions, either too clayey to absorb the effluent adequately, too thin, stony or steep to allow proper treatment of the effluent, often result in ground and surface water pollution. The clays are typically so dry and well-structured that initial percolation rates are in the range of porous sands and gravel (less than 10 minutes per inch). However, upon saturation these clay soils swell and seal, dramatically reducing infiltration rates. Excessive development densities have been permitted without proper wastewater treatment facilities required. In these cases, development is allowed to proceed using septic systems, while the Government plays "catch-up" in providing regional facilities.

Because of the relatively high price of real estate in the Virgin Islands, subdivisions of as little as 3000 square feet and densities of 120 persons per acre can be permitted (R-4, Medium density). Current land development codes allow lots with OSDS to be as small as

one quarter acre for two residences. This of course leads to high density development with insufficient land allocated to meet the spatial requirements for house/cistern/septic system construction, including appropriate separation distance. When this occurs on sloping sites, the results can be particularly harmful.

3.2.3 Vessel Wastes Disposal

High bacterial counts have been detected in some bays , especially in those with a large concentration of boats and boating berths. Contamination is partly the result of sewage and wastewater discharges from the boats, particularly from Alive-on-board@ vessels. **This is probably the single largest environmental issue confronting the boating community in the Virgin Islands today and is one that remains largely unresolved because of the lack of adequate pump-out facilities.**

Efforts to increase the boating community=s awareness of the waste disposal issue and to educate boaters in ways to control the problem is the most cost-effective way to attain compliance with recommended NPS control practices. Increased awareness and improved practices by boaters will enhance water quality at marinas and in the coastal waters of the Virgin Islands.

3.2.4 Salt water intrusion

Problems related to saltwater intrusion are ubiquitous in coastal areas of the Virgin Islands, especially on St. Thomas. The seriousness of the problem is usually dependent on the intensity of urban and industrial development. Such development is often characterized by the withdrawal of water that is not later returned to the system.

Most intrusion of saltwater into freshwater can be ascribed to one of three primary practices:

- X the reversal or reduction of freshwater discharge that allows the heavier saline water to move into an area where only freshwater previously existed;
- X the accidental or inadvertent destruction of natural barriers that formerly separated bodies of fresh and saline waters; or
- X the accident or inadvertent results of the disposal of waste saline water.

A review of recent reports indicates that the groundwater table elevation in the Smith Bay area of St. Thomas has declined from approximately 30 to 40 feet below ground level (bgl) in 1990 to more than 100 feet bgl at the present time. Consequently, the water quality in the aquifer is declining due to intrusion of more saline water from the sea. This overall decline in groundwater levels and water quality in the Smith Bay aquifer results from heavy pumping of several production wells that tap the aquifer, greatly exceeding the estimated recharge rate. The collective pumping rates during the past several years from private wells and commercial water companies tapping the Smith Bay aquifer have been as high as 140,000 gpd - almost three times the sustainable amount, which effectively Amine@ the water resource. Continued pumping at these high rates will cause irreversible damage to the aquifer.

3.3 Water Quality Monitoring

3.3.1 Ambient monitoring

DPNR- Division of Environmental Protection, Ambient Monitoring Program (AMP) was established to evaluate coastal water quality by performing regular scheduled sampling of monitoring stations located in coastal waters around the three main islands - St. Croix, St. Thomas and St. John. This program utilizes a network of 64 stations around St. Croix, 57 around St. Thomas and 19 around St. John .

The following parameters are tested on a scheduled basis: fecal coliform (FC) per 100 ml by membrane filtration (MF) or multiple tube fermentation (MTF) count, turbidity (NTU), dissolved oxygen (DO), temperature (°C) and secchi depth. A certified laboratory tests FC and NTU; the other parameters are tested and recorded in the field. Most sites are sampled on a quarterly basis, however, several sites on St. Thomas, due to their remoteness, are sampled on a semi-annual basis.

3.3.2 TPDES monitoring

DPNR- Division of Environmental Protection has established the Territorial Pollutant Discharge Elimination System (TPDES) permitting program which is similar in fashion to the National Pollutant Elimination Discharge System (NPDES) pursuant to 12 V.I.C. ' 184-11 et. seq. The permittee is required to monitor the effluent for parameters specified in the permit. Regulated discharges and discharge sites include sewage treatment plant outfalls (both public and private facilities), brine discharges from reverse osmosis (and other technology) freshwater production plants, industrial facility process water discharges, and industrial facility drainage discharge.

Unfortunately, many of the regulated facilities are not in full compliance with the provisions described in their respective permits, with site inspections of these facilities and reports of unpermitted discharges indicating that the water bodies near such facilities are constantly impacted. For example, the Virgin Islands Government=s Department of Public Works (DPW) is a major violator of its permit primarily because of a poorly designed and failing sewerage system in St. Croix that permits raw sewage to flow directly into the Caribbean Sea. Fish kills at ecologically sensitive wetlands have occurred repeatedly, and swimming beaches in the HOVIC/STX Alumina watershed have been closed on numerous occasions. Another example of a continual violator is the Virgin Islands Water and Power Authority (WAPA), where oil spills at its St. Croix facility (part of the Christiansted watershed) flow directly into the Caribbean Sea.

Major TPDES outfalls such as DPW and WAPA, are of concern because they are located in the same segment of the water body where water intake occurs for the major desalination units at

Hess Oil Virgin Islands Corp. Refinery and WAPA-Richmond, respectively.

The 305(b) report provides a comprehensive status assessment of the territorial waters of the Virgin Islands and evaluates whether the territory's waters are being maintained for designated uses as defined by the Local Water Quality Standards as described in 12 V.I.C. ' 186-1 through ' 186-4. This report is submitted to EPA for inclusion in the biennial National Water Quality Inventory Report that in turn is submitted to Congress. The statements published in the 305(b) report can be used as a contributing factor to determine which water body will be on the 303(d) list of impaired water bodies.

3.3.3 Interagency cooperation/data sharing

Agricultural operations receive scrutiny in a similar fashion. If a water quality violation triggers an area investigation and a farming operation is suspected to be the cause of the water quality decline, DPNR staff will perform an assessment of the facility, including identification of problems and suggested remedies. A specified time frame within which to comply will be provided. This corrective action could also involve other interested agencies including the Department of Agriculture, National Resources Conservation Service (NRCS) and the University of the Virgin Islands Cooperative Extension Service (UVI-CES).

Federal programs, like Superfund, Resource Conservation and Recovery Act (RCRA) and UST, have not been delegated to the territory. Therefore, the Virgin Islands must have EPA Region II input in for events that would normally trigger actions under these federal programs (e.g. spills of solvents, oil-derived products and other hazardous substances affecting soils and groundwater).

Additionally, regular sampling of ambient coastal water quality is performed, recorded and archived by the USGS-Biological Resources Division (BRD) in waters under National Park Service (NPS) purview in St. John and around Buck Island, St. Croix. At this time, no formal agreement is in place between DPNR and NPS for data-sharing; although each agency provides willing access to information upon request. Water quality data is not transferred to the national STORET system on a regular basis because DPNR has not yet established a reliable computer link to the mainframe computer at EPA Region II offices in New York.

3.4 Watershed Population Density and Landuse

Urban development is the largest source of nonpoint pollution in the Virgin Islands. Because of the scarcity of flat land, especially on St. Thomas and St. John, development has taken place in areas that far exceed the typical environmental constraint of 15 percent slope. A more realistic cut-off point for development in the Territory would be areas with slopes in excess of 45 percent. Topography is therefore one of the most severe natural constraints to development in the Virgin Islands.

Low-density residential districts comprise 54 percent of the land area of St. Croix, Medium

density residential housing is an additional 7 percent. Almost 25 percent is zoned agricultural and about 1 percent is business and commercial. Slightly more than 5 percent is zoned for industrial uses with two-thirds of this zoned for heavy industry. The waterfront districts, mostly waterfront-pleasure, are about 2 percent of the total area. Large areas of low-density residential zones characterize the St. Croix coastline, with extensive public, industrial and agricultural districts along the south shore.

St. Thomas has a high population density and a higher intensity of land use when compared to the mainland United States and even other Caribbean islands. Seventy percent of the Island of St. Thomas is zoned for low density residential uses. Less than 5 percent is zoned agricultural and less than five percent is zoned industrial. The waterfront districts comprise about 4 percent of the island.

More than one-half of the land area of St. John is National Park Service land. There is very little development of any kind within the park. Most of the in holdings are low-density residential areas; for the island as a whole about 42 percent is zoned as low-density residential areas. Approximately 3 percent is zoned for medium-density residential uses. Waterfront-pleasure districts are 2.5 percent. Aside from a few acres of W-2 zoning, there are no industrial districts on the island. Most of the shoreline is part of the National Park while most of the privately held coastal parcels are either low-density residential or waterfront-pleasure.

3.5 Stormwater/Surface Water

The relatively small watersheds of the three islands, the low storage capacity of their geologic formations, and the high evapotranspiration-to-rainfall ratio has created a streamflow pattern that is highly variable, generally meager, and intermittent on an overall basis.

The major streams on each island are:

- X River Gut, Bethlehem Gut and Jolly Hill Gut on St. Croix;
- X Turpentine Run and Bonne Resolution Gut on St. Thomas; and
- X Guinea Gut and Fish Bay/Battery Gut on St. John.

There are other smaller intermittent streams and many watercourses which carry storm runoff for a short time after heavy rainstorms. Long periods between flows in major streams are often followed by flow that is frequently short and very high. River Gut on St. Croix, which handles runoff from the largest drainage basin in the territory, (about 11 square miles) had only 2 days of flow from April 1972 through October 1975.

Average-annual rainfall in the islands is about 45 in. ranging from a low of about 30 in. in the flat lowlands to a high of about 60 in. at the mountain peaks (USGS, 1984). Seventy (70) percent of the annual rainfall comes in the three months during the fall (VI 305(b) Report, 1992). Because of the aforementioned steep topography and small basins, streamflow responds quickly to rainfall. Rainfall patterns throughout the territory can be highly variable in space and time, therefore it is difficult to state, on an island wide basis, that a

given storm was for example, a 25-year storm. During any one time, a 10-year storm could be occurring on one part of the island while concurrently a 25-year storm could be occurring a few miles away. As an example, records indicate that during Hurricane Frederick in September 1979, the area around Estate Dorothea on St. Thomas experienced a maximum 24-hour rainfall depth of about 7.2 inches, which is approximately equivalent to a 50-year storm. For the same hurricane on St. Croix, the airport raingauge recorded a maximum 24-hour rainfall depth of about 16.8 inches, which is greater than a 100-year storm.

Substantial amounts of land in the Virgin Islands are subject to flooding. Flooding is a major concern in the U.S. Virgin Islands because of the islands' streamflow characteristics and topography. With the exception of Turpentine Run (perennial due to discharge from package treatment plants and POTWs), no streamflow is perennial, and the basins are steep, having slopes that exceed 35 degrees. These slopes are dissected by numerous stream courses that have steep gradients. Rain falling in the upstream part of a basin reaches the downstream part in less than an hour; therefore flooding can occur after short periods of intense rain. The major flooding problems which occur in the Virgin Islands therefore, are generally not due to increased runoff volumes associated with development but rather because of the improper use and development of historic floodplains. However, the denuding/paving of a significant portion of St. Thomas has had an effect on the increased velocity and volume of stormwater runoff.

3.6 Solid Waste Issues

The U.S. Virgin Islands has a solid waste crisis. Presently, the territory is relying exclusively on landfilling as the only option for solid waste disposal. The following sites (with their respective watersheds) have been used for the disposal of all kinds of wastes, including solid, special and hazardous:

- X Anguilla Landfill (Airport-Bethlehem-HOVIC/STX Alumina Watersheds); St. Croix
- X Bovoni Landfill (Benner Bay Watershed), St. Thomas; and
- X Susanaberg Landfill (now closed - Great Cruz Bay and Fish Bay Watersheds) on St. John.

The two landfills still in operation have underground fires that have been burning for years, with periodic flare-ups above ground. The territory is currently caught in the transitional period between unregulated and highly regulated solid waste policies as mandated by the U.S. Government. The Solid Waste Policy employed in the territory has been a simple one. The collection system relies on free public drop off for residential waste that is then hauled to a public landfill site. The government of the Virgin Islands has provided management of the system, while contracting the bulk of the work out to the private sector. Serious problems with the existing system have been exacerbated by the government's inability to adjust to changing regulatory requirements (40 CFR 258).

The Environmental Protection Agency has determined that the present landfills have been in non-compliance for 10 years. Because these landfills are not lined, and do not have an adequate surface water runoff/runoff and leachate collection system, and do not meet setback requirements from waterbodies and other sensitive areas, they are negatively impacting surrounding watersheds and adjacent water bodies. Additionally, ground water in the vicinity of the landfills

is not adequately monitored for leachate parameters. The omnipresent threat of millions of dollars in federal fines or lost federal monies continues to hang over the territory. The Federal Aviation Agency is presently attempting to force the closure of the Anguilla landfill on St Croix.

4.0 WATERSHED CATEGORIES

In accordance with the Unified Watershed Assessment Framework, the watersheds on St. Croix, St. Thomas and St. John are classified into the following four categories:

4.1 CATEGORY I: Watersheds in Need of Restoration.

These watersheds do not now meet clean water and other natural resource goals, or they face the imminent danger of not meeting clean water and other natural resource goals. The Clean Water Action Plan targets most new resources made available through the President's FY 1999 Clean Water and Watershed Restoration Budget Initiative for restoring these Category I watersheds. Selection factors include:

- X nonattainment of national clean water goals (including exceedances of state or tribal water quality standards, or impaired drinking water sources, etc.);
- X nonattainment of natural resource goals related to the aquatic systems, including goals related to habitat, ecosystem health, and living resources;
- X other appropriate measures and indicators of degraded aquatic system conditions (e.g., wetland condition and current and historical loss rates, percent impervious surface, and other measures of aquatic habitat); and
- X decline in the condition of living and natural resources that are part of the aquatic system in the watershed (e.g., decline in the populations of rare and endangered aquatic species, decline in healthy populations of fish and shellfish, etc.)

Seven watersheds on St. Croix, 4 watersheds on St. Thomas and two watersheds on St. John have been identified as Category I watersheds. These watersheds are identified in Table 1 and are depicted in Figure 1.

St. Croix:

Bethlehem
HOVIC-STX Alumina
Airport
Diamond
Southgate
Christiansted
Great Pond Bay

St. Thomas/St. John:

St. Thomas Harbor & Long Bay
Red Hook Bay
Benner Bay
Magens Bay
Great Cruz Bay
Fish Bay

It should be noted that the Salt River watershed on St. Croix is not included on the list because of the limited documented information available during the preparation of this report. This listing may be modified in the future to include Salt River as more information becomes available.

The watersheds are selected based on a number of factors as follows:

- X NPS Pollution: runoff, erosion & sedimentation, OSDS, saltwater intrusion, sewage, etc.
- X Areas of Particular Concern (APCs): Coastal Zone Management Act of 1974 (described in Attachment 5).

- X Clean Water Act Section 305(b) Report: State Biannual Water Quality Report to US Environmental Protection Agency.
- X Clean Water Act (303(d) List of Impaired Water Bodies.
- X Territorial Pollutant Discharge Elimination System (TPDES) point source discharges.
- X DEP Water Pollution Control Program list of reported unpermitted discharges and sewage bypasses.
- X DEP Underground Storage Tank Program inventory.
- X DEP Public Water Supply Supervision Program inventory of Reverse Osmosis plants utilizing sea water and/or groundwater intake.
- X USEPA List of Resource Conservation and Recovery Act (RCRA) facilities in the USVI.
- X USEPA List of Underground Injection Control (UIC) facilities in the USVI.
- X Areas of Special Significance: Federal Wildlife Refuge, VI Marine Reserve/Wildlife Sanctuary (Attachment 6), post Hugo assessment of priorities for conservation action.
- X Pesticides storage facilities under Federal Insecticide, Fungicide and Rodenticide Act (FIFRA).
- X Areas protected by the Coastal Barriers Improvement Act (CBIA) (Attachment 6).
- X DFW inventory of Fish and Wildlife Resources.
- X CZM inventory of Marine Habitats.
- X USDA-NRCS Highly Erodeable Land soil type description.
- X Others, including CERCLA sites.

The 303(d) list identifies water bodies that are considered impaired as determined primarily by scientific monitoring data, and that cannot maintain a designated use requirement because technology-based pollution controls are not stringent enough. Water bodies that indicate unsatisfactory monitoring data are not always listed. If the water body can reach its designated use requirement through other compliance/enforcement measures, the impaired water body may not be listed on the 303 (d) list even though the water body may be considered impaired.

The DEP first developed a 303 (d) list in 1996. Due to the lack of ambient monitoring data, certain water bodies were listed based on professional judgment. For 1998 the 303 (d) list had to revert to strictly data-based determinations. Certain water bodies contained in the 1996 list were de-listed and others were added as a result. For example, Christiansted Harbor was one such water body that was de-listed. The Harbor was monitored during the time period between the 1996 and 1998 lists and the data did not support the continued listing. However, a number of illegal sewer bypasses in combination with storm water runoff often leave the Harbor in violation of its Class C requirements for fecal coliform (from the sewer bypasses) and apparently very turbid (from storm water pollution).

Compounding the problem is the loss of over 50 percent of the territory=s mangrove habitat over the last 70 years, due to cutting and land fill operations to create land or provide access to water.

Few people realize the value of mangroves in filtering sediments and other pollutants that would otherwise diminish water quality in nearshore environments. Sea grass beds and coral reefs are also affected by chronic sedimentation that reduce levels of sunlight penetration and increases ecosystem stress. Coral reefs have suffered from a decline in balanced fish populations as nursery habitats were destroyed, which in turn has produced a decline in fish

catch, especially of the larger preferred species. The islands are very dependent on their coastal waters as a source of food, tourism development, recreation and visual enjoyment. A general decline in the health of the marine environment of the Virgin Islands threatens the islands= economic lifeblood - tourism - as well as diminishes the general quality of life for the territory=s citizens.

4.2 CATEGORY II: Watersheds Meeting Goals, Including Those Needing Action to Sustain Water Quality.

These watersheds meet clean water and other natural resource goals and standards and support healthy aquatic systems. All such watersheds require continuing implementation of clean water and natural resource programs to maintain water quality and conserve natural resources.

St. Croix Category II Sub-watersheds

Fort Frederik
Enfield Green
Half Penny Bay
Judith's Fancy
Orange Grove Water Got.
Manchenil Bay
Sugar Bay
Dolby Hill
Cane Garden

St. John Category II Sub-watersheds

Emmons Bay
Cocoloba

4.3 CATEGORY III: Watersheds with Pristine or Sensitive Aquatic System Conditions on Lands Administered by Federal, State, and Tribal Governments.

These watersheds have exceptionally pristine water quality, are major drinking water sources, or support sensitive aquatic system conditions. They are located on lands administered by federal, or local governments.

St. Croix Category III Sub-watersheds

Hams Bay
Long Point Bay
Long Point

St. John Category III Sub-watersheds

Maho Bay
Genti Bay
Little Lameshur
Brown Bay
Grootpan

4.4 CATEGORY IV: Watersheds With Insufficient Data to Make an Assessment.

These watersheds lack data, critical data elements, or the data density needed to make a reasonable assessment.

St. Croix Category IV Sub-watersheds

Whim Prosperity
Good Hope
Spring Bay
Solitude Bay
Rust Up Twist

St. Thomas Category IV Sub-watersheds

Bordeaux Point
Santa Maria Bay
Krabbepan Point
Cyril R King Airport
Dorothea

5.0 WATERSHED RESTORATION PRIORITIES

DPNR, working with appropriate agencies, organizations, and the public, has developed a list of watershed restoration priorities for targeting new resources to accelerate restoration in FY 1999 and 2000. This priority list for FY 1999 and 2000 is preliminary and may be refined as restoration programs go forward in future years.

The following elements were evaluated in the watershed restoration priority setting process:

- X criteria for defining watersheds in most need of restoration;
- X consideration of existing restoration priorities;
- X a long term action schedule for developing response plans and focusing on 1999-2000;
- X a process for involving diverse federal and local agencies, conservation district/land conservation departments, non-governmental and private voluntary organizations, the public, and others in priority setting.

5.1 Criteria for Defining Watersheds in Most Need of Restoration

During the assessment process, it became apparent that the Category I watersheds fall into two major categories:

- # industrial/urban watersheds; and
- # natural resource watersheds.

Each group has different problems that require different solutions and therefore need to be considered separately. It should be noted that some watersheds can be placed into each group.

Industrial/urban watersheds contain industry, urban areas, landfills or sewage outfalls. This category

includes the watersheds of St. Thomas Harbor (urban), Red Hook Bay (urban), Benner Bay (landfill/industrial) Great Cruz Bay (urban), Christiansted (urban/sewage), Sandy Point (urban/sewage) Bethlehem (industrial/sewage), HOVIC-STX Alumina (Industrial), Airport (landfill/industrial) and Diamond (industrial). The last four constitute the South Shore Industrial area on St. Croix. These areas have problems with point source pollution, urban runoff and other human development related impacts.

Natural resource watersheds include the following watersheds: Altoona sub-watershed of the Christiansted watershed and Vessup Bay sub-watershed of the Red Hook watershed. All these watersheds terminate in the sea, lagoons or saltwater ponds. All of these areas are important wildlife habitats and many are important as fish nurseries.

5.2 Highest Priority Category I Watersheds

In accordance with the Unified Watershed Assessment Framework, this discussion is divided into three sections as follows:

- X an identification of specific Category I watersheds most in need of restoration, i.e. highest priority watersheds, beginning in 1999-2000;
- X a preliminary long-term schedule for attention to all remaining Category I watersheds i.e. moderate and lowest priority watersheds; and
- X a description of the processes, participants, rationale, and information used to make priority decisions.

The restoration priorities focused primarily on Category I watersheds.

<u>St. Croix Category I :</u>	<u>Priority Ranking</u>	<u>Schedule for Developing Response Plans</u>
Bethlehem	1 (Highest)	1999-2000
HOVIC-STX Alumina	1 (Highest)	1999-2000
Airport	1 (Highest)	1999-2000
Diamond	1 (Highest)	1999-2000
Christiansted	2 (Moderate)	2000-2002
Southgate	3 (Lowest)	2000-2002
Great Pond Bay	3 (Lowest)	2000-2002
<u>St. Thomas/St. John Category I:</u>		
Benner Bay	1 (Highest)	1999-2000
St. Thomas Harbor & Long Bay	2 (Moderate)	2000-2002
Fish Bay	2 (Moderate)	2000-2002
Red Hook Bay	3 (Lowest)	2000-2002
Magens Bay	3 (Lowest)	2000-2002
Great Cruz Bay	3 (Lowest)	2000-2002

As mentioned previously, the identification of Category I watersheds are a collaborative effort involving relevant parties such as local government agencies, federal land management agencies, conservation districts and land conservation departments, nongovernmental and private organizations, and other stakeholders.

6.0 CONCLUSION

DPNR completed and submitted the Comprehensive Land and Water Use Plan (CLWUP) to the Governor for review and approval. The CLWUP also includes the Virgin Islands Development Law (VIDL). The CLWUP is under review by the Governor and subsequent to his review will be submitted to the Legislature. In the event that the CLWUP does not receive the Governor's or Legislative approval, DPNR will be preparing a strategy for achieving approval of the key sections of the proposed VIDL that can be submitted as amendments to the VI Coastal Zone Management Act (VICZMA). If approved, it will be a strong component in improving land and water use management in the coastal zone.

Presently, DPNR is the territorial agency responsible for implementing:

- X **the Nonpoint Source Management Program Section 319 of the Clean Water Act 1987 Amendments, and**
- X **the Coastal Nonpoint Pollution Control Program Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990.**

Section 319 Nonpoint Source Program is a management program which provides an assessment of nonpoint pollution and specifies and implements nonpoint source controls. The program strives to enhance coastal water quality by funding various projects, ranging from information and education programs to highly technical applications of nonpoint source control technology. Section 6217 Coastal Nonpoint Pollution Control Program offers enforceable policies that are sufficiently comprehensive and specific to regulate land uses, water uses, and coastal development and is granted the authority to implement the enforceable policies.

DPNR-Division of Environmental Protection is reviewing the existing Onsite Sewage Disposal System Rules and Regulations to determine if failures of these conventional septic systems are attributable to a lack of adherence to the rules and regulations. Additionally, the Division will be recommending modifications to the regulations, as necessary, to reduce failures of the traditional OSDS that are attributable to poor design, siting, operation, maintenance, etc, within the next twelve months.

Moreover, the Division also expects to develop and adopt the Virgin Islands Storm Water Regulations and related Permitting program. The Virgin Islands Stormwater Regulation will encompass both Territorial Pollutant Discharge Elimination System permitted sources (point sources) and other nonpoint sources which may have adverse environmental impacts. These areas will include stormwater discharges associated with municipal facilities, industrial and construction sites, in the Virgin Islands.

With continued urbanization and the expansion of tourism-related facilities, the coastal environment will continue to confront significant pressures that must be managed carefully to avoid depletion or deterioration of the territory's precious natural resources. A balance must be maintained between the economic imperatives of development and the preservation needs of conservation.

ATTACHMENT 1
ISLANDS AND CAYS OF THE US VIRGIN ISLANDS

From AA Natural History Atlas to the Cays of the US Virgin Islands@ by Damman and Nellis (1992).

The most recent population data from the 1990 census indicate that the territory has a population of 101,809 persons: 50,139 on St. Croix, 48,166 on St. Thomas, and 3,504 on St. John.

	<u>St. Croix</u>	<u>St. Thomas</u>	<u>St. John</u>	<u>Total</u>
Population	50,139	48,166	3,504	101,809
Land area (acres)	52,980	17,224	12,356	82,560
Shoreline(miles)	64	53	50	167

<u>Cay/ Island</u>	<u>Owner</u>	<u>Acres</u>	<u>Elevation</u>	<u>Shorelines</u>
1). Boody Rock	V.I. Government		0.5	35 ft. 150 yds.
2). Bovoni Cay	Private		49.9	75 ft. 2.5 mi.
3). Buck Island(STX)	U.S. Government		179.6	360 ft. 2.5 mi.
4). Buck	U.S. Gov.		41.5	125 ft. 2.1 mi.
5). Capella	U.S. Gov.		22.0	121 ft. 1.8 mi
6). Carvel Rock	V.I. Gov.		0.4	67 ft. 0.1 mi.
7). Cas Cay	V.I Gov.		14.8	99 ft. 0.2 mi.
8). Cinnamon Cay	Private		1.0	32 ft. 0.2 mi.
9). Cockroach Cay	V.I. Gov.		19.0	151 ft. 1.9 mi.
10). Cocoloba Cay	U.S. Gov.		1.0	36 ft. 0.2 mi.
11). Congo Cay	V.I. Gov.		25.5	170 ft. 1.6 mi.
12). Cricket Rock	V.I. Gov.		2.5	46 ft. 525 yds.
13). Current Rock	Private		0.4	13 ft. 100 yds.
14). Dog Island	V.I. Gov.		12.1	78 ft. 0.9 mi.
15). Dutchcap Cay	V.I. Gov.		31.8	278 ft. 1800 yds.
16). Fish Cay	Private		0.3	21 ft. 0.1 mi.
17). Flanagan Island	V.I. Gov.		21.6	127.6 ft. 0.8 mi.
18). Flat Cay	V.I. Gov.		2.9	32 ft. 633 yds.
19). Frenchcap Cay	V.I. Gov.		10.5	183 ft. 700 yds.
20). Grass Cay	V.I. Gov.		48.8	230 ft. 0.3 mi.
21). Great Hana Lollick	Private		489.2	704 ft. 4.2 mi
22). Great St. James	Private		156.9	175 ft. 3.9 mi.
23). Green Cay (STT)	No Record		0.7	24 ft. 280 yds
24). Green Cay (STX)	U.S. Gov.		12.8	63 ft. 1500 yds.
25). Hassel Island	U.S. Gov.&Priv.		39.6	267 ft. 2.75 mi.
26). Henlay Cay	U.S. Gov.		11.4	70 ft. 1367 yds.
27). Inner Braas	Private		127.9	256 ft. 2.4 mi.
28). Kalkun Cay	V.I. Gov.	3.5		73 ft. 733 yds.
29). LeDuck	V.I. Gov.		13.5	85 ft. 1.0 mi.
30). Little Hans Lollick	Private		100.5	204 ft. 2.0 mi.
31). Little St. James	Private	68.7		142 ft. 2.2 mi.

32). Lovanoo Cay	Private		117.9	255 ft.	2.6 mi.
33). Mingo Cay	Private		48.3	186 ft.	1.4 mi.
34). Outer Braas	V.I. Gov.		107.9	412 ft.	2.2 mi.
35). Patricia Cay	Private		33.4	75 ft.	1.3 mi.
36). Pelican Cay	Private		4.5	30 ft.	225 yds.
37). Perkins Cay	V.I. Gov.		0.6	25 ft.	262 yds.
38). Protestant Cay	V.I. Gov.		7.1	33 ft.	525 yds.
39). Ram Goat (Durlces)	U.S. Gov.		2.7	30 ft.	401 yds.
40). Rata Cay (Durlces)	U.S. Gov.		0.5	15 ft.	300 yds
41). Rotto Cay	Private		2.0	33 ft.	401 yds
42). Ruth Cay (STX)	V.I. Gov.		35.2	37 ft.	1.2 mi.
43). Saba Island	V.I. Gov.		30.3	202 ft.	1.0 mi.
44). Sail Rock	V.I. Gov.		1.6	125 ft.	333 mi.
45). Salt Cay	V.I. Gov.		55.8	242 ft.	1.75 mi
46). Savana Island	V.I. Gov.		173.9	269 ft.	3.1 mi.
47). Shark Island	V.I. Gov.		1.3	32 ft.	394 yds
48). Steven Cay	V.I. Gov.		2.1	32 ft.	787 yds
49). Sula Cay	V.I. Gov.	1.9		75 ft.	501 yds
50). Thatch Cay	Private		237.0	482 ft.	5.8 mi.
51). Trunk Cay	U.S. Gov.		1.0	48 ft.	525 yds.
52). Turtledove	V.I. Gov.		3.7	50 ft.	525 yds.
53). Two Brothers	No Record		0.4	10 ft.	300 yds.
54). Water Island	U.S.Gov.		491.6	294 ft.	7.04 mi
55). Watermelon Cay	Private		9.7	25 ft.	91 yds
56). West Cay	V.I. Gov.		40.3	121 ft.	1.6 mi.
57). Whistling Cay	U.S. Gov.		1.3	202 ft.	1444 yds.

ATTACHMENT 2

VIRGIN ISLANDS RESOURCE MANAGEMENT COOPERATIVE (VIRMC) MAILING LIST

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The five lists are:

Caribbean Biodiversity Conservation -- this list is mostly run out of our Biodiversity Conservation Office in Antigua by Kevel Lindsay. The list membership includes scientists and researchers working in the region and natural resource planners and managers.

"Environmental Working Group' of the Forum of Organizations of Civil Society for the Wider Caribbean." This is a bi-lingual list, sort of the Environmental SIG (Special Interest Group) for NGOs trying to be involved in the policy deliberations of the Association of Caribbean States.

Caribbean GIS Users -- News of interest to regional users and implementers of geographic information systems and remote sensing applications. We also forward some GIS job postings to this list. This list also includes some discussion of metadata issues in the Eastern Caribbean.

VIRMC -- The Virgin Islands Research Management Cooperative -- Information for researchers on biological or natural resources management issues in the area bounded roughly by the Virgin Banks -- from the Mona Passage to the Anegada Passage. This list also reflects [our founding president] Ed Towle's long-term leadership in Coastal Zone Management strategies and tactics.

Caribbean Consulting Group for Small Island Developing States Information Network (SIDSNet)- Coordinated by UNDP Trinidad, this list is designed to provide technical and policy input to the organizers of the of SIDSNET. Priority attention is given to management of the web site through commitment by Group Members to input /update/ edit /screen contents of the site on issues, themes and requirements for sustainable development in Caribbean small island developing states.

ATTACHMENT 3

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Coastal Barriers Resource Designated areas

L. Preseverance Bay	704
M. Fortuna Bay	707
Total:	<u>18,952</u>

N. Hawksnest	1,305
O. Maho Bay	1,116
P. Leinsterbay	795
Q. Minnebeck Bay	629
R. Coral Bay	3,003
S. Great Lameshur Bay	1,545
T. Genti Bay	1,208
U. Fish Bay	1,503
V. Rendezvous Bay	416
W. Great Cruz Bay	529
Total:	<u>12,049</u>

ATTACHMENT 5

AREAS OF PARTICULAR CONCERN

The Coastal Zone Management Act of 1974 defines areas of particular concern (APC). DPNR incorporated criteria for APC designation (15 CFR Part 923) and developed seven categories of areas relevant to the Virgin Islands.

1. Significant Natural Areas - These are areas of unique, scarce, or fragile natural habitat or physical features; areas of high natural productivity; or essential habitat for living resources, endangered species including fish and wildlife and various levels of the food chain critical to their well being. Examples of significant areas are unique or remnant plant and animal species of special interest; natural areas that provide scientific and educational value; and areas necessary for nesting, spawning, rearing of young, or resting during migration. Also included are areas needed to protect, maintain or replenish coastal lands and resources.

2. Culturally Important Areas - These are coastal lands and waters where sites of historic and archaeological significance, cultural or traditional value, or scenic importance are located.

- 3 Recreation Areas - Coastal lands and waters of substantial recreational value and/or opportunity. Examples include areas well suited for public parks, beaches, boat launching and mooring and other recreational activities.

4. Prime Industrial and Commercial Areas - Those coastal lands and waters with existing and potential geologic and topographic amenability to industry and/or commercial development, especially those requiring a waterfront location.

5. Developed Area - Those urbanized or highly populated and intensively developed areas, where shoreline utilization and water uses are highly competitive or in conflict.

6. Hazard Areas - Coastal locations that, if developed, would pose a hazard because of periodic flooding, storms. erosion or land settlement.

7. Mineral Resources - Coastal areas with existing or potentially important mineral resources, particularly sand deposits for commercial extraction.

St. Croix APCs

Southshore Industrial Area

Resource uses

As the territory's most important industrial complex, this area presents special problems to resource management. The Southshore Industrial Area' APC boundaries encompass rapidly growing commercial and residential tracts as well as important wildlife areas and sea turtle nesting beaches. Major industries include VIALCO, Hess Oil Refinery and the Virgin Islands Rum Industries, Ltd. Tailings (red mud) from alumina processing have been accumulating since operations began in the late 1960's. The environmental impact of

the byproduct is unclear, but they are unsightly. Oil seepage from the Hess Oil Refinery has been noted for decades and other hydrocarbon storage sites have contaminated the groundwater supply. Local fishermen vie with boat traffic to access the fishing grounds in the Alucroix Channel.

Water Quality

The waters in this area are designated as Class C and have been termed as "stressed" by the USEPA. Several sewage drainage sites infuse the area, causing concern for the well-being of humans and wildlife. Effluent from the rum distillery was determined to be toxic to marine life and may even affect nesting sea turtles at Sandy Point. Heavy metal concentrations are above standard, and Storm water runoff adds to the burden.

Summary

The Southshore Industrial Area's existing environmental limits have been and will continue to be overreached. Future development will exacerbate the situation unless strict enforcement and cleanup takes place. However, a variety of factors must be taken into account, such as the economic position of the island, natural habitat preservation, and recreational opportunities.

Christiansted Waterfront

Resource uses

The boat launch facility at Altona Lagoon underwent improvements which were completed by May 1993. This may be a nursery area for recreationally important fish: a study began in April 1993 to investigate the possibility. Commercial and recreational fishing and shrimping in Altona Lagoon is now regulated by the DPNR.

The V.I. Port Authority owns and operates the Gallows Bay commercial dock, which is in need of renovation. The dock receives much boat traffic from cargo vessels, fishing boats, and inter-island craft.

The waterfront area is subjected to heavy traffic congestion and inadequate parking due to its numerous hotels and shops. More threatening are Christiansted's water supply and sewer piping systems, which are in need of major repairs.

Water Quality

Christiansted Harbor's water are considered to be in Class C as described under the Water Pollution Control Act. This indicates that the harbor has been impacted by toxic, conventional and unconventional pollutants. A major source of water quality degradation, including thermal pollution, comes from emergency effluent flowing from the LBJ pump station. The DPNR/DEP must be notified by the DPW within 24 hours of a malfunction so as to notify the public and close the beaches in the western harbor. Bacterial contamination is a concern as well, since the public water supply comes from chlorinated, desalinated sea water. Water Gut drains a 327 acre watershed into the harbor, and the waters near the water entry point are frequently in violation of bacterial Class C limits. Sediment sampling conducted since 1983 by both DPNR and the USEPA also show excessive amounts of heavy metals, phosphorous, and DDE in the harbor. Tributyltin from

antifouling paint on foreign vessels and oil discharge from boats in the harbor originating from the harbor's only marina, St. Croix Marine, continue to be a concern.

Results from numerous water quality and biological surveys indicate a worsening problem, particularly as growth and development plans for this area are underway. Although Christiansted Harbor will never be able to return to a pristine condition, it is possible, through mutual efforts of private and government agencies, to mitigate current degradation sources.

Southgate Pond/Chenay Bay

Resource uses

The Southgate Pond/Chenay Bay area includes one of St. Croix remaining wetlands and is situated in a large flood plain. Many endangered species inhabit this locality, including federally listed sea turtles that use the beaches as nesting grounds. Despite the ecological fragility and the recognized need for environmental protection, the CZM has issued four permits for major commercial developments. Commercial developments in the area include Green Cay Marina, located on the western shore of Southgate Pond, Chenay Bay Beach Resort, and Tamarind Reef Hotel. Much of the eastern portion remains undeveloped.

Water Quality

The waters in Chenay Bay and Green Cay Marina have been monitored since 1968. Though the bay usually remains clear and clean, storm water runoff can cause periodic turbidity. Most water quality impacts have come from Green Cay Marina, which has been cited for previous water pollution. Bacterial and heavy metal concentrations have been higher than allowed.

Summary

Conservation efforts are at odds with development pressures the Southgate Pond/Chenay Bay area. There are sufficient scientific data to indicate that the region requires special protection: it is classified as an Area of Particular Concern, an Area for Preservation and Restoration and is included in the Virgin Islands Coastal Barrier Resources System. Despite the recognition, it appears as though development will still be allowed to continue.

St. Croix Reef System

Resource uses

This APC includes the coral reefs from Davis Beach on the north side of St. Croix, around the east end, and then stops at Great Pond Bay on the south shore. The Buck Island Reef National Monument and the Green Cay Wildlife Refuge are contained within its boundaries. Commercial fishing and recreational activities such as water skiing, SCUBA diving, pleasure boating and jet skiing are the main resource uses in this area. Most conflicts arise from competition for boat moorings and between "active" and "passive" X.

Water Quality

Terrestrial runoff is the primary factor in reduced water quality, mainly in nearshore waters. Sedimentation, nutrient loading, and bacteria levels from poorly functioning septic

systems and vessel waste are of concern as well. Oil and grease can also affect the health of coral reefs.

Summary

Degradation to St. Croix's reefs can be caused by natural occurrences, but human-borne damage due to over fishing and pollution can be controlled.

Great Pond and Great Pond Bay

Resource uses

This area is not substantially developed, but as of September 1993, plans to build a 350-room hotel, 600 condominium units, and a 18-hole golf course were in the works. The Boy Scout Council, who own land in the area, successfully reduced the size and scope of the original project, which had included a marina.

Water Quality

Great Pond/Great Pond Bay water are placed under Class B and usually stays well under the upper limits. Continual monitoring, especially after construction begins on the new site, will be of utmost importance in this area.

Summary

No substantial impacts occur in the Great Pond/Great Pond Bay area, but potential problems could stem from nearby development. Preservation initiatives may serve to keep the area unharmed. Preventative measures must be heavily implemented.

St. John APCs

Enighed Pond-Cruz Bay

Resource uses

The Cruz Bay area is home to 2469 out of 3504 St. John residents. The town is significant culturally as well as commercially. Over 2000 people travel between St. John and St. Thomas: the ferry dock is located in Cruz Bay, which also serves as a U.S. port of entry. Space is limited, as a majority of the island is National Park. Unplanned development has resulted in violations of building codes and incompatible land uses. Boat fuel for ferries is stored in The Creek area, with little regard for safety measures. Other marine-related industries include a boatyard in Caneel Bay.

Water Quality

Both the DPNR/DEP and the Virgin Islands National Park conduct water quality sampling. The Creek has been in violation of its Class B standards for clarity, due to storm sewer discharges and heavy commercial boat use. Cruz Bay waters are usually clearer than those of The Creek but are still quite turbid. Although the bay is classified as "fishable/swimmable", the water quality is still questionable.

Summary

The haphazard manner of progress in Cruz Bay must be evaluated and regulated before the situation becomes critical. The proposed sewage treatment plant at Enighed Pond

needs to meet very rigid standards so the problem is not aggravated.

Chocolate Hole - Great Cruz Bay

Resource uses

The watershed which drains into Great Cruz Bay contains developments such as: the not yet completed Virgin Grand Estates, which consists of 99 homesites, Virgin Grand Villas, and the Hyatt Regency hotel. Future development remains a possibility, and as of May 1993, 79 boats utilize the bay. Chocolate Hole is less developed, and a 70 unit hotel project was abandoned after the site clearing stage. The Villa St. John accommodates 12 people and uses a septic tank system for waste disposal. Most use conflicts arise due to increasing boat anchoring and mooring which has reduced maneuverability in the area. Other conflicts include small craft use and snorkeling/diving activities.

Water Quality

Maintenance of water quality is of utmost importance in this APC. Dredging in the late 1960's and mid-1980's have significantly increased turbidity in Great Cruz Bay. Further development would elevate sediment loading without strict control measures in place. Vessel waste discharge has become more of a concern as boaters use the bay for anchorage. At this point, only turbidity is tested for in this area; obviously, bacterial and chemical levels need to be monitored as indicators of impacts. A closed solid waste dump at Estate Susannaberg may be contributing pollution to the watershed, but the effects are unknown.

Summary

Future development within the Chocolate Hole/Great Cruz Bay area needs to be strictly managed. The Estate Susannaberg dump could be leaching contaminants and needs thorough evaluation. Boating traffic, which also poses to be a threat to coastal water quality, also requires immediate management.

St. Thomas

St. Thomas Harbor and Waterfront

Resource uses

This APC is heavily used for industrial and commercial purposes. There are two major cruise ship docks and many boat anchorages and marinas within the area. Frenchman's Reef Beach Resort, which has 525 guest rooms and numerous facilities, along with the 96-room Morningstar Beach Resort, occupy Muhlenfels point and utilize on-site wastewater treatment and desalination plants. The area is also densely packed with housing; there is little green space left after a period of extraordinary growth and development. As boat traffic has greatly increased, congestion has become a safety risk, as well as space limitations. Motor vehicle congestion is a major problem along the waterfront.

Water Quality

There is dire need for pump-out facilities throughout the territory, but the St. Thomas Harbor situation is especially critical. Water pollution in the harbor comes from five main sources: 1) runoff sedimentation and propeller wash; 2) leaking sewer pipes and Storm water flow; 3) vessel waste discharge; 4) solid waste from both land and vessels and 5) oil contamination from both land and sea dumping/leaks. Incomprehensibly, there is no

consistent water quality monitoring system. Therefore, specific regulation implements will have little scientific backing.

Summary

A thorough examination concerning the extent of the degradation in the St. Thomas Harbor/Waterfront area is urgently needed. Only then can cleanup efforts be organized and implemented. Rapid growth has not been appropriately managed and may have very negative effects on the health of the waters in and around St. Thomas harbor.

Magens Bay

Resource Use

Magens Bay is one of the most popular beaches on the island and littering becomes a problem during periods of heavy usage. The area is also a favorite with boaters, which causes problems when swimmers and snorkelers venture outside of the designated swimming area. Most of the development of the Magens Bay area has been private housing and several condominium and four-plexes. Housing construction continues, with little commercial property in the watershed. Runoff from this watershed can be potentially harmful, as the soil is very thin on the steep slopes above the bay.

Water Quality

Following Hurricane Hugo of September, 1989, the Magens Bay watershed experienced an unquantified amount of hydrocarbon pollution due to the increased use of gasoline-powered generators. The amount of sewage runoff has also been untested, although two water sampling stations are in place in the bay. As Class B waters, Magens Bay usually remains well below its water quality parameters.

Summary

Although there is no substantial pollution in Magens Bay, the possibility still remains. Continuing development and excessive beach use need to be managed through regulations and public education.

Mandahl Bay

Resource Use

The construction of two stone jetties at Mandahl Beach has resulted in the loss of beach sands; therefore, public usage of the beach has significantly declined. Although plans to design a marina in Mandahl Bay have been proposed, there are no immediate intentions to proceed. The area may be established as a part of the Territorial Park System which would be in conflict with future development. The salt pond and other natural features has allowed Mandahl Bay to be an excellent location for educational field trips.

Water Quality

The Mandahl Salt Pond is tested for water quality and Storm water runoff has negatively impacted the pond periodically. Elevated, though isolated, levels of fecal coliform bacteria have been reported, probably due to septic tank effluent. The pond acts as a sediment trap for the bay, but turbidity following a heavy rainfall has been reported in nearshore waters.

Summary

The proposed marina would degrade the land and water quality of the Mandahl Bay area. The area should be preserved for nature conservation and as a recreational spot. Development practices should include adequate sewage disposal systems and well-built drainage structures.

Vessup Bay/Red Hook

Resource Use

The Vessup Bay/Red Hook area is the center of an increasing amount of inter-island transportation and commercial activity. This has resulted in rapid housing development, upgrading of roads, and construction of a new wastewater treatment center. New housing developments have been connected to the sewage treatment plant at Vessup Bay, so additional leaching from septic tanks should be averted. The area is also popular for recreational activities, and several hotels and condominiums utilize the beaches. Both Vessup Bay and Red Hook are used as anchorages and experience heavy boat traffic. Oil disposal has also been a problem, as it is in the rest of the territory.

Water Quality

The development boom in Vessup Bay/Red Hook has resulted in nutrient and sediment loading in the area. The waters are tested every three months in two locations. The lack of pump-out facilities adds more contamination to the water. The Red Hook salt pond is very important to the ecology of the region, but plans to use the pond as a marina are being developed.

Summary

A balance between sustaining both commercial and biological resources needs to be found for this APC. The importance of business interests needs to be considered, while the remaining wildlife needs to be protected as well. Future progress on the east end should not occur without careful forethought.

Mangrove Lagoon/ Benner Bay

Resource Use

Almost one-third of the residents of St. Thomas live within this watershed. Numerous businesses also exist, with many marina/ marina-related businesses in Benner Bay. With few restraints on development in the past, the numerous homes and businesses surrounding the water's edge have essentially hampered public access. Poor water quality has also thwarted public usage.

Water Quality

With heavy land and water usage, the waters of Benner Bay are nutrient loaded and quite unhealthy. The four wastewater treatment plants in the area have repeatedly violated their discharge permits and create public health hazards.

ATTACHMENT 6
MARINE RESERVES AND WILDLIFE SANCTUARIES
COASTAL BARRIER IMPROVEMENT ACT

Marine Reserves and Wildlife Sanctuaries are designated by the Commissioner of DPNR. There is presently a total of three Marine Reserves and Sanctuaries in St. Thomas/St. John and adjacent Cays - "Compass Point Pond", a Salt Pond, at Benner Bay, "Cas Cay/Mangrove Lagoon Marine Reserve and Wildlife Sanctuary" and St. James Marine Reserve and Wildlife Sanctuary at Cas Cay & Mangrove Lagoon, and in Jersey Bay, St. James Bay and St. James Cut; and one in St. Croix - "Salt River Bay Marine Reserve and Wildlife Sanctuary" at Salt River Bay St. Croix

In 1990, The Federal Coastal Barrier Improvement Act was established to protect coastal barriers remaining within the United States and its Territories. The purpose of this system is to "Halt development in low-lying areas subject to natural disaster like flooding and hurricanes. "To stop wasteful federal expenditures in these areas. "To protect valuable natural resources from being destroyed by unwise economic development. Twenty-two (22) shoreline areas of the VI have been approved for protection through this Act. The 22 areas include on St. Thomas: Magens Bay, Mandahl Bay, Newfound Bay, Lagoon Point, Fish Bay, Sprat Point, Limestone Bay, Perseverance Bay, Smith Bay, Vessup Bay, Great Bay and Jersey Bay; on St. Croix: Salt River Bay, Altona Lagoon, Rust Op Twist, Southgate Pond, Coakley Bay, Krause Lagoon and Westend Saltpond