The 2004 Integrated Water Quality Monitoring and Assessment Report for the United States Virgin Islands

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Submitted by the Division of Environmental Protection, Department of Planning and Natural Resources, Government of the Virgin Islands of the United States

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Part I. EXECUTIVE SUMMARY

A. Purpose

The 2004 US Virgin Islands Integrated Water Quality Monitoring and Assessment Report was prepared by the Department of Planning and Natural Resources, Division of Environmental Protection (DPNR/DEP) and is intended to satisfy abbreviated reporting requirements under section 305(b) of the Federal Clean Water Act (CWA). This report also is intended to satisfy the requirements of section 303(d) of the Federal CWA by developing a list of assessment units that will require Total Maximum Daily Loads (TMDLs). This report provides an assessment of the water quality conditions of the Virgin Island's surface and ground water resources for the period covering fiscal years 2002-2003. (October 1, 2001 through September 30, 2003).

B. Overview of Water Quality Conditions and Trends

Water quality in the US Virgin Islands is generally good but declining due to an increase in point and non-point source discharges into the marine environment. Sources such as direct discharges, uncontrolled run-off and vessel wastes increase stresses on Virgin Islands (VI) waters. The lack of public awareness about the importance of the USVI waters contributes to the degradation of the water quality.

1. Surface Water

Non-point source pollution is the major source of surface water contamination in the Virgin Islands. Non-point source pollution can be attributed to several causes such as:

- Failure to properly install effective silt control devices during construction,
- Failure to contain storm water run-off from unpaved roads,
- Failure of on-site disposal systems (OSDS).

The discharging of wastes overboard directly into the sea by boat owners and the difficulty in regulating such activity also contributes to non-point source pollution problems seen in the Virgin Islands. Point Source Pollution can be attributed to a failing and overloaded municipal sewage system. Poor preventive maintenance practices due to lack of funding within the Department of Public Works, and negligence result in a pattern of frequent "bypasses" that empty sewage directly into the waters of the Virgin Islands.

2. Ground Water

The contamination of groundwater in the Virgin Islands is attributed to:

- Bacteriological contamination from failing septic systems
- Leaking municipal sewer lines
- Migration of contamination from previous injections and disposal practices

- Frequent sewage bypasses (generally described as discharges direct to the sea, but with some percolation into sub-soils).

Other sources of contamination include the intrusion of salt water caused by the over-pumping of the aquifers, the invasion of volatile organic compounds (VOC's) contamination from leaking underground storage tanks, and the indiscriminate discharging of waste oil onto the surface of the ground.

C. Program Initiatives

Under the provisions of the Federal and Local Water Pollution Control Act, the Virgin Islands Water Pollution Control (WPC) Program is mandated to conserve, protect, preserve, and improve the quality of water for public use, and the propagation of wildlife, fish and aquatic life for the USVI. Involved in the preservation of water quality will be the assurance that all projects are in compliance with the Water Quality Standards as set forth in the Virgin Islands Environmental Laws and Regulations.

In addition, the program-reporting period (FY 2002 and FY 2003) saw water quality management activities in the Virgin Islands being planned for integration for management and reporting purposes with the Unified Watershed Assessment process of the Clean Water Action Plan. This Virgin Islands Water Quality Assessment presents water quality assessment information in a format that preserves the Virgin Islands long-term data series by using the same water quality monitoring sites. This report also indicates how this data can be summarized at a level that is compatible for both Water Quality Assessment and the Unified Watershed Assessment process.

The Virgin Islands is presently enhancing and strengthening its territorial Water Pollution Control Act and revising its Water Quality Standards. This has been an ongoing process from the previous 305(b) and 303(d) reporting periods. To date, the water quality standard revision is completed but not yet promulgated. The territory has also developed new regulations for the controlling of urban storm water runoff particularly on construction sites. Furthermore, DPNR-DEP will be advocating the use of best management practices in the *Revised Handbook for Homebuilders and Developers.* DPNR is in the process of developing Total Maximum Daily Loads (TMDL' s) for various assessment units identified in the 2000 303(d) impaired assessment units listing as well as apply for additional funding through the 604(b) Water Quality Management Planning (WQMP), formerly known as the 205(j) program, to achieve some these Management tasks.

D. Summary of Classified Uses

VI waters are classified into three (3) groups based on designated uses: Class A, B. and C:

Class A waters are for the preservation of natural phenomena requiring special conditions with existing natural conditions that shall not be changed. Class A water standards are the most stringent of the three (3) classes because of its pristine or near-pristine state.

Class B and C waters are for the propagation of desirable species of marine life and for primary contact recreation.

Class C waters have less stringent water quality standards than Class B.

Detailed specifications for these classes are presented in Part II, Section B, below.

All waters of the Virgin Islands are designated for fish consumption, aquatic life support, primary contact recreation, and secondary contact uses pursuant to the Virgin Islands Water Quality Standard, Title 12, Chapter 7, §186-1 of the Virgin Islands Rules and Regulations (VIRR).

E. Highlights of the Rest of this Report

- Part II maps and explains the new geographic delineation used by the Department of Planning and Natural Resources to report on this Water Quality Assessment, and to display the effects on watersheds and watershed restoration priorities in the Virgins Islands.
- Part III reports on surface water quality issues in the Virgin Islands.
- Part IV reports groundwater and related non-point source issues in the Virgin Islands Department of Planning and Natural Resources.

PART II: BACKGROUND

A. Resource Overview

The territory of the United States Virgin Islands comprises three major islands: St. Croix, St. John, and St. Thomas. Additionally, Damman and Nellis (1992) documented 57 smaller islands and cays in A Natural History Atlas to the Cays of the US Virgin Islands. Taken together, the territory encompasses a total land area of about 136 square miles or 110,000 acres (Table II.A.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 return of Water Island to the control of the Government of the US Virgin Islands, after 50-some years of direct federal administration (first as a fort by the Department of the Army during the Second World War, and later as the responsibility of the US Department of the Interior) raises the question of whether this areas should be treated as a fourth island. Because the area is small (less than 600 acres or 1 square mile), and because the island is practically within St. Thomas Harbor, for the purposes of the Water Quality Assessment Water Island will be treated as another offshore cay or small inhabited island, such as Hassel Island or Great St. James.

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 eco-tourism program for the territory. Many government-owned cays have already been established as wildlife reserves pursuant to Title 12 94(b)(2) VI 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; intermittent streams can only 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.

This Water Quality Assessment is based on the United States Geological Survey (USGS) 8-digit Hydrologic Units for the US Virgin Islands, which designate two Virgin Islands watersheds: one for St. Croix, and one for the combined islands of St. Thomas and St. John.

In addition, this Water Quality Assessment also uses 11- and 14-digit Hydrologic Unit definitions, in the process of being finalized by the US Geological Service of the US Department of Interior and the Natural Resources Conservation Service of the US Department of Agriculture, to define territorial *Watersheds*. Within these fourteen draft watersheds (seven on St. Croix, four on St. Thomas, and three on St. John), the Virgin Islands have defined waterbody *Assessment Units*, which correspond to coastal elements of watersheds.

Table II.A.1 Characteristics of Virgin Islands Watersheds and Islands

Official Watersheds	St. Croix	St. Thomas-St. John		
TOPICS/Islands	St.Croix	St. Thomas	St. John	Total
Population	**51,389**	**54,259**	**4,014**	**109,661**
Land Area (square miles)	**84**	**32**	**20**	**136**
Land Area (acres)	**53,499**	**17,489**	**12,323**	**83,311**
Tidal/sub-tidal wetlands (square miles)	**2.5**	**2.4**	**1.1**	**5.9**
Coastal Shoreline	**70.3**	**52.8**	**49.7**	**172.8**
Embayments (square miles)	**1.5**	**0.9**	**0.1**	**3.0**

Figure II.A.1 St. Croix subwatersheds and assessment units

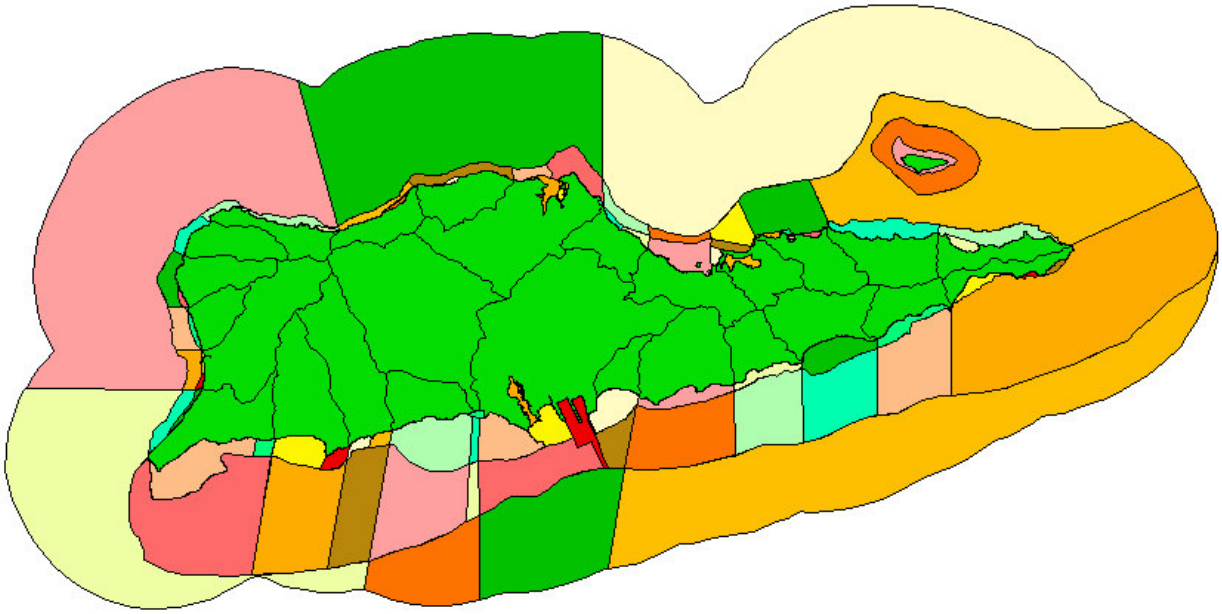
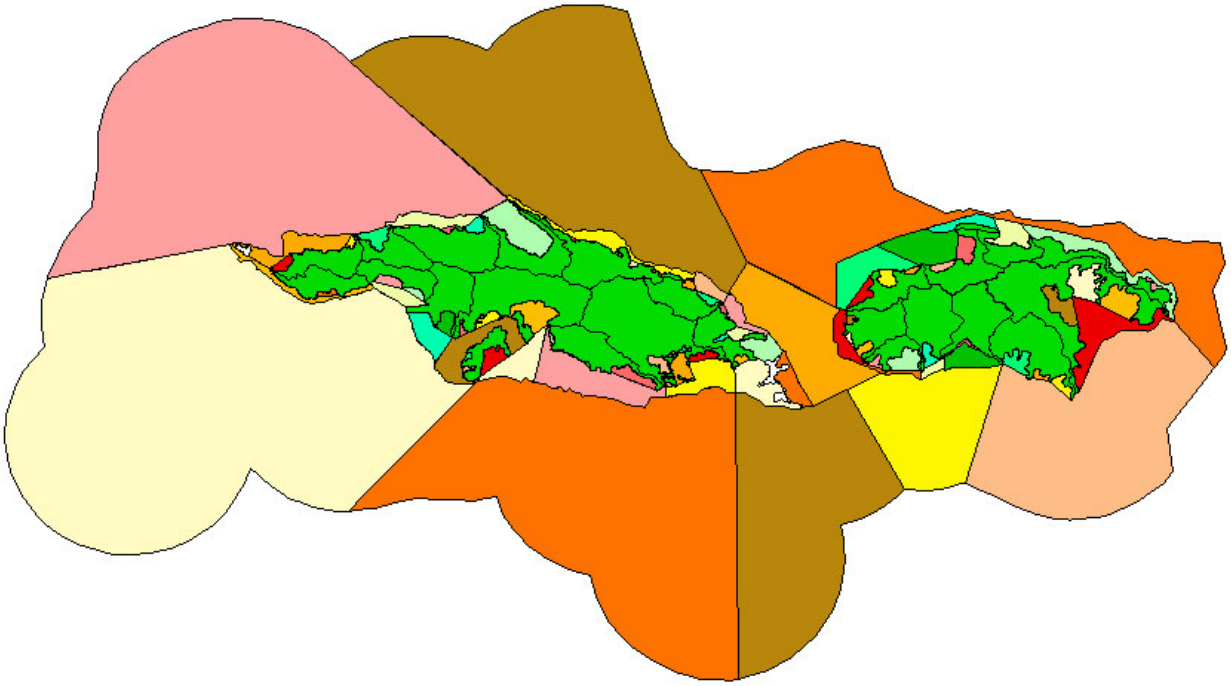


Figure II.A.2 St. Thomas/St. John subwatersheds and assessment units



The 14-digit Hydrologic Unit delineations are to be integrated with the list of watersheds used for the analysis in the Unified Watershed Assessment: See Part III below.

Table II A.2 Sub-watersheds Listed in the Unified Watershed Assessment [vii]
The watersheds on St. Croix, St. Thomas and St. John are as follows [viii]:

St. Croix					
Label Watersheds	**Acres**	**UWA Category**	**Label Watersheds**	**Acres**	**UWA Category**
A. Northside	2,258		N. Bugby Hole	998	2
B. Baron Bluff	1,262	4	O. Cane Garden Bay	1,527	2
C. Salt River Bay	3,510	2	P. HOVENSA	7,642	1
D. Princess	2,182		Q. Bethlehem	6,689	1
E. Christiansted	1,225	1	R. Airport	1,654	1
F. Altoona Lagoon	1,239		S. Diamond	2,577	1
G. Southgate	1,597	1	T. Long Point Bay	2,044	2
H. Solitude	1,691	4	U. Sandy Point	2,735	4
I. Teagues Bay	1,061		V. La Grange	3,137	2
J. Turner Hole	711		W. Prosperity	967	4
K. Madam Carty	1,128		X. Creque Dam	703	
L. Great Pond Bay	2,007	1	Y. Butler Bay	918	
M. Laprey Valley	1,853		Z. Rams Bay	757	
Total St. Croix Acres 54,072					

St. Thomas					
Label Watersheds	**Acres**	**UWA Category**	**Label Watersheds**	**Acres**	**UWA Category**
A. Botany Point	945	4	H. Benner Bay	3,666	1
B. Santa Maria Bay	867	4	I. Frenchman Bay	1,137	
C. Dorothea Bay	1,861	4	J. St. Thomas Harbour	2,696	1
D. Magens Bay	1,210	1	K. Cyril E. King Airport	1,524	4
E. Mandahl Bay	1,883		L. Preseverance Bay	704	
F. Smith Bay	902		M. Fortuna Bay	707	
G. Redhook Bay	850	1			
Total St. Thomas 18,952					
St. John					

N. Hawksnest	1,305		S. Great Lameshur Bay	1,545	3
O. Maho Bay	1,116	3	T. Genti (Reef) Bay	1,208	3
P. Leinster Bay	795		U. Fish Bay	1,503	1
Q. Minnebeck Bay	629	3	V. Rendezvous Bay	416	
R. Coral Bay	3,003		W. Great Cruz Bay	529	1
			X. Mary Point	110	
St. John Total Acres 12,159					

These watersheds align closely with the larger 14-digit Hydrologic Units drafted by the USGS and the NRCS. In the current biennial planning period (FY 2000 and FY 2001), the Virgin Islands Department of Planning and Natural Resources will provide a detailed integration and overlay of these two systems.

The alignment is as follows:

Table II.A.3 Alignment of 14-Digit HUs and Watersheds

8-Digit	11-Digit	14-Digit	Name	Acres
21020002			**St. Croix Watershed**	**54,072**
	21020002010		**North St. Croix**	**22,507**
		21020002010010	Northwest St. Croix	6,482
			V. La Grange	3,137
			W. Prosperity	967
			X. Creque Dam	703
			Y. Butler Bay	918
			Z. Rams Bay	757
		21020002010020	Northcentral St. Croix	7,030
			A. Northside	2,258
			B. Baron Bluff	1,262
			C. Salt River Bay	3,510
		21020002010030	Northeast St. Croix	8,995
			D. Princess	2,182
			E. Christiansted	1,225
			F. Altoona Lagoon	1,239
			G. Southgate	1,597

		H. Solitude	1,691
		I. Teagues Bay	1,061
21020002020		**South St. Croix**	**31,565**
	21020002020010	Southeast St. Croix	8,224
		J. Turner Hole	711
		K. Madam Carty	1,128
		L.. Great Pond Bay	2,007
		M. Laprey Valley	1,853
		N. Bugby Hole	998
		0. Cane Garden Bay	1,527
	21020002020020	Southparts St. Croix	7,642
		P. Hovic-Vialco	7,642
	21020002020030	Airport St. Croix	8,343
		Q. Bethlehem	6,689
		R.Airport	1,654
	21020002020040	Southwest St. Croix	7,356
		S. Diamond	2,577
		T. Long Point Bay	2,044
		U. Sandy Point	2,735
21020001		**St. Thomas-St. John Watershed**	
21020001010		**St. Thomas**	**18,952**
	21020001010010	Northwest St. Thomas	4883
		A. Botany Point	945
		B. Santa Maria Bay	867
		C. Dorothea Bay	1,861
		D. Magens Bay	1,210
	21020001010020	Northeast St. Thomas	3,635
		E. Manual Bay	1,883
		F. Smith Bay	902
		G. Redhook Bay	850
	21020001010030	Southeast St. Thomas	4,803

		H. Benner Bay	3,666
		I. Frenchman Bay	1,137
	21020001010040	Southwest St. Thomas	5,631
		J. St. Thomas Hobart	2,696
		K. Cyril E King Airport	1,524
		L. Preseverance Bay	704
		M. Fortuna Bay	707
21020001020		**St. John**	**12,049**
	21020001020010	North St. John	3,845
		N. Hawksnest	1,305
		0. Maho Bay	1,116
		P. Leinster Bay	795
		Q. Minnebeck Bay	629
	21020001020020	Southeast St. John	4,548
		R. Coral Bay	3,003
		S. Great Lameshur Bay	1,545
	21020001020030	Southwest St. John	3,656
		T. Genti (Reef) Bay	1,208
		U. Fish Bay	1,503
		V. Rendezvous Bay	416
		W. Great Cruz Bay	529

Table II.A.4 Assessment Units, Square Miles and Monitoring Sites

Assessment Unit ID	Assessment Unit Name	Class	AU Size (sq. mi.)	Associated Monitoring Stations
VI-STT-01	Botany Bay	B	0.1576	STT-9 Botany Bay
VI-STT-02	Stumpy Bay	B	0.0597	STT-10 Stumpy Bay
VI-STT-03	Botany Bay subwatershed, offshore	B	1.309	There are currently no monitoring stations within this assessment unit.
VI-STT-04	Santa Maria Bay	B	0.3617	STT-11 Santa Maria Bay
VI-STT-05	Caret Bay	B	0.0266	STT-12 Caret Bay

VI-STT-06	Neltjeberg Bay	B	0.0562	STT-13B Neltjeberg Bay
VI-STT-07	Dorothea	B	0.0254	STT-13 Dorthea
VI-STT-08	Hull Bay	B	0.2049	STT-14 Hull Bay
VI-STT-09	Dorothea Bay subwatershed, offshore	B	0.7673	There are currently no monitoring stations within this assessment unit.
VI-STT-10	Magens Bay	B	1.6208	STT-15A, STT-15B Magens Bay
VI-STT-11	Northwest St. Thomas HUC14, offshore	B	55.088	There are currently no monitoring stations within this assessment unit.
VI-STT-12	Lovenlund Bay	B	0.0228	There are currently no monitoring stations within this assessment unit.
VI-STT-13	Mandahl Bay (Marina)	B	0.0131	STT-16B Mandahl Bay Entrance, STT-16C Mandahl Point Entrance
VI-STT-14	Tutu Bay	B	0.0414	There are currently no monitoring stations within this assessment unit.
VI-STT-15	Sunsi Bay	B	0.0152	STT-17B Sunsi Bay
VI-STT-16	Spring Bay	B	0.0102	STT-17A Spring Bay
VI-STT-17	Mandahl Bay subwatershed, offshore	B	1.1379	STT-16A Mandahl Bay, STT-18 Coki Point Bay
VI-STT-18	Water Bay	B	0.0845	STT-19 Water Bay
VI-STT-19	Smith Bay	B	0.1187	STT-20 Smith Bay
VI-STT-20	Smith Bay subwatershed, offshore	B	0.4103	There are currently no monitoring stations within this assessment unit.
VI-STT-21	St. John Bay	B	0.0411	STT-21A St. John Bay
VI-STT-22	Red Bay	B	0.0078	STT-21B Red Bay
VI-STT-23	Vessup Bay	B	0.0619	STT-22B Vessup Bay, USGS-50263000 Vessup Bay West

VI-STT-24	Red Hook Bay	B	0.1772	STT-22A Red Hook Bay, USGS-50263500 Vessup Bay East
VI-STT-25	Great Bay	B	0.5593	STT-23 Great Bay
VI-STT-26	Red Hook Bay, offshore	B	0.4725	There are currently no monitoring stations within this assessment unit.
VI-STT-27	St. James Islands, offshore	B	0.6691	There are currently no monitoring stations within this assessment unit.
VI-STT-28	Cowpet Bay	B	0.0757	STT-24 Cowpet Bay, STT-24A Cowpet Bay West
VI-STT-29	St. James Bay	B	1.2439	There are currently no monitoring stations within this assessment unit.
VI-STT-30A	Northeast St. Thomas HUC14, offshore north	B	42.927	There are currently no monitoring stations within this assessment unit.
VI-STT-30B	Northeast St. Thomas HUC14, offshore south	B	24.908	There are currently no monitoring stations within this assessment unit.
VI-STT-31	Nazareth Bay	B	0.1793	STT-25B Secret Harbour, STT-26, STT-26A Benner Bay
VI-STT-32	Jersey Bay, offshore	B	1.2925	STT-25 Nazareth Bay
VI-STT-33	Benner Bay	B	0.4187	USGS-50265900 Benner Bay South
VI-STT-34	Benner Bay Lagoon Marina	B	0.0355	STT-27D Mangrove Lagoon, Near Lavida Marina, STT-27E Mangrove Lagoon, Near Compass Point, USGS-50265700 Benner Bay North
VI-STT-35	Mangrove Lagoon	B	0.2931	STT-27A Mangrove Lagoon, Near Treatment Plant, STT-27B Mangrove Lagoon, Off Sanitary Landfill (East of Ecotours), STT-27C Mangrove Lagoon, Near Tropical Marine Fuel Dock, USGS-50278800 Mangrove Lagoon West, USGS-50278500 Mangrove Lagoon East
VI-STT-36	Frenchman Bay subwatershed,	B	0.3532	STT-28A Bovoni Bay,STT-28B Bolongo Bay

	east			
VI-STT-37	Frenchman Bay	B	0.0195	STT-29A Frenchman Bay
VI-STT-38	Limetree Bay	B	0.0065	STT-29B Limetree Bay
VI-STT-39	Morningstar Bay	B	0.0215	STT-30 Morningstar Bay
VI-STT-40	Pacquereau Bay	B	0.0453	STT-31A Flamboyant Cove
VI-STT-41	Frenchman Bay subwatershed, offshore	B	2.9233	There are currently no monitoring stations within this assessment unit.
VI-STT-42	Southeast St. Thomas HUC14, offshore	B	50.939	There are currently no monitoring stations within this assessment unit.
VI-STT-43	St. Thomas Harbor, inner	C	0.7495	STT-31B Hassel Island, Off Navy Dock, STT-31C Hassel Island, Careening Cove, STT-32A Long Bay, Near South Dolphin, STT-32B Long Bay, Northeast Corner, STT-33A Long Bay, Off Outfall, STT-33B Long Bay, Off Outfall, STT-34 Long Bay, Off Pump Station, STT-35 Groden Bay, STT-36 St. Thomas Harbor, North of Coast Guard Dock, STT-37 St. Thomas Harbor, Cay Bay, STT-38 Haulover Cut
VI-STT-44	St. Thomas Harbor, outer	B	1.2128	There are currently no monitoring stations within this assessment unit.
VI-STT-45	Gregerie Channel	B	1.7072	STT-1 Crown Bay, Near Outfall, STT-39 Water Isle, East Gregorie Channel
VI-STT-46	Sprat Bay	B	0.3814	STT-42 Water Island Sprat Bay
VI-STT-47	Hassel Island at Haulover Cut to Regis Point	C	0.2074	STT-2 Crown Bay, Near Tamarind Outlet, STT-3 Subbase
VI-STT-48	Water Isle Hotel, Beach	B	0.0057	There are currently no monitoring stations within this assessment unit.
VI-STT-49	Druif Bay	B	0.0331	STT-40 Water Isle Hotel, Beach
VI-STT-50	Flamingo	B	0.061	STT-41 Water Island Flamingo Bay

VI-STT-51	Krum Bay	C	0.0754	STT-4 Krum Bay
VI-STT-52	Lindbergh Bay	B	0.2612	STT-5A Lindbergh Bay East, STT-5B Lindbergh Bay West, STT-5C WAPA Outfall
VI-STT-53	Cyril E. King Airport subwatershed, offshore	B	0.8499	STT-6C S.W. Road, Near Red Point Outfall
VI-STT-54	Perseverance Bay, offshore	B	0.4734	STT-6B College Cove
VI-STT-55	Brewers Bay	B	0.1076	STT-7A Brewers Bay
VI-STT-56	Perseverance Bay	B	0.2114	STT-7B Perseverance Bay
VI-STT-57	Fortuna Bay	B	0.0827	STT-8 Fortuna Bay
VI-STT-58	Fortuna Bay subwatershed, offshore	B	0.6553	There are currently no monitoring stations within this assessment unit.
VI-STT-59	Northwest St. Thomas HUC14, offshore	B	77.71	STT-6A Airport Runway
VI-STJ-01	Caneel Bay	B	0.2623	STJ-54 Caneel Bay, NPS-1 Caneel Bay
VI-STJ-02	Hawksnest Bay	B	0.2246	STJ-44B Hawksnest Bay, NPS-3 Hawksnest (middle beach), NPS-4 Hawksnest (Gibney Beach)
VI-STJ-03	Trunk Bay	A	0.0685	STJ-44A Trunk Bay, NPS-5 Trunk Bay
VI-STJ-04	Hawksnest Bay subwatershed, offshore	B	1.7287	NPS-2 Henley Cay
VI-STJ-05	Cinnamon Bay	B	0.1456	STJ-44C Cinnamon Bay, NPS-6 Peter Bay, NPS-7 Cinnamon Bay
VI-STJ-06	Maho Bay/Francis Bay	B	0.346	STJ-44D Francis Bay, NPS-8 Maho Bay, NPS-9 Francis Bay
VI-STJ-07	Maho Bay	B	1.6071	There are currently no monitoring

	subwatershed, offshore			stations within this assessment unit.
VI-STJ-08	Mary Point	B	0.4831	There are currently no monitoring stations within this assessment unit.
VI-STJ-09	Leinster Bay	B	0.6627	NPS-10 Leinster Bay
VI-STJ-10	Minnebeck Bay	B	1.4876	NPS-11 Haulover Bay, NPS-30 Newfoundland Bay, NPS-31 Haulover East
VI-STJ-11	Newfound Bay	B	0.0765	There are currently no monitoring stations within this assessment unit.
VI-STJ-12	North St. John HUC14, offshore	B	23.719	There are currently no monitoring stations within this assessment unit.
VI-STJ-13	Coral Harbor	B	0.6965	There are currently no monitoring stations within this assessment unit.
VI-STJ-14	Hurricane Hole	B	0.7689	NPS-13 Water Creek, NPS-14 Princess Bay
VI-STJ-15	Round Bay	B	0.6015	STJ-53 Coral Bay, NPS-15 Coral Bay Dock, NPS-16 Johnson Bay
VI-STJ-16	Coral Bay	B	2.2337	NPS-12 Long Point
VI-STJ-17	Salt Pond Bay	B	0.1978	STJ-52 Salt Pond Bay, NPS-17 Salt Pond Bay
VI-STJ-18	Grootman Bay	B	0.1046	There are currently no monitoring stations within this assessment unit.
VI-STJ-19	Great Lameshur Bay	B	0.359	STJ-51 Great Lameshur Bay, STJ-50 Little Lameshur Bay, NPS-18 Great Lameshur Bay, NPS-19 Yowsi Point, NPS-20 Little Lameshur Bay
VI-STJ-20	Southeast St. John HUC14, offshore	B	24.319	There are currently no monitoring stations within this assessment unit.
VI-STJ-21	Genti Bay, nearshore	B	0.0947	STJ-49 Genti Bay, NPS-21 Reef Bay
VI-STJ-22	Genti Bay, offshore	B	0.769	There are currently no monitoring stations within this assessment unit.

VI-STJ-23	Fish Bay	B	0.2103	STJ-48 Fish Bay, NPS-22 Fish Bay
VI-STJ-24	Fish Bay subwatershed, offshore	B	0.1824	There are currently no monitoring stations within this assessment unit.
VI-STJ-25	Rendezvous Bay	B	0.4677	STJ-47 Rendezvous Bay, NPS-23 Rendezvous Bay
VI-STJ-26	Chocolate Hole	B	0.1004	STJ-46 Chocolate Hole, NPS-24 Chocolate Hole
VI-STJ-27	Rendezvous Bay subwatershed, offshore	B	0.1863	There are currently no monitoring stations within this assessment unit.
VI-STJ-28	Great Cruz Bay	B	0.1396	STJ-45 Great Cruz Bay. NPS-25 Great Cruz Bay
VI-STJ-29	Turner Bay/Enighed Pond	B, TMDL	0.057	STJ-55 Turner Bay, NPS-26 Turner Bay
VI-STJ-30	Cruz Bay	B	0.0674	STJ-43A Cruz Bay, North, STJ-43B Cruz Bay, South, STJ-43C Cruz Bay, North of Seaplane Ramp, STJ-43D Cruz Bay Creek North, NPS-27 Cruz Bay (ferry dock), NPS-28 Cruz Bay (airplane ramp), NPS-29 Cruz Bay (NPS dock)
VI-STJ-31	Great Cruz Bay watershed, offshore	B	0.5775	There are currently no monitoring stations within this assessment unit.
VI-STJ-32	Southwest St. John HUC14, offshore	B	10.142	There are currently no monitoring stations within this assessment unit.
VI-STJ-33	Pillsbury Sound	B	6.9399	There are currently no monitoring stations within this assessment unit.
VI-STC-01	Frederiksted, south	B	0.0451	There are currently no monitoring stations within this assessment unit.
VI-STC-02	Frederiksted Harbor	C	0.035	STC-28 Frederiksted Pier, STC-29 Frederiksted Public Beach

VI-STC-03	Lagrange subwatershed, offshore	B	0.375	There are currently no monitoring stations within this assessment unit.
VI-STC-04	Prosperity, nearshore	B	0.1118	There are currently no monitoring stations within this assessment unit.
VI-STC-05	Prosperity subwatershed, offshore	B	0.5129	There are currently no monitoring stations within this assessment unit.
VI-STC-06	Sprat Hall Beach	B	0.0609	STC-30 Sprat Hall Beach
VI-STC-07	Creque Dam/Butler Bay	B	0.529	There are currently no monitoring stations within this assessment unit.
VI-STC-08	Hams Bay	B	0.3144	There are currently no monitoring stations within this assessment unit.
VI-STC-09	Davis Bay	B	0.0522	There are currently no monitoring stations within this assessment unit.
VI-STC-10	Hams Bluff	B	0.5506	There are currently no monitoring stations within this assessment unit.
VI-STC-11	Northwest St. Croix HUC14, offshore	B	33.302	There are currently no monitoring stations within this assessment unit.
VI-STC-12	Cane Bay	B	0.0613	STC-32 Cane Bay
VI-STC-13	Baron Bluff subwatershed	B	0.3498	STC-31 Davis Bay
VI-STC-14	Belvedere	B	0.0557	There are currently no monitoring stations within this assessment unit.
VI-STC-15	Northside subwatershed	B	0.6109	There are currently no monitoring stations within this assessment unit.
VI-STC-16	Salt River Lagoon, Marina	B	0.0194	STC-33A Salt River Marina, STC-33C Salt River Lagoon, Marina
VI-STC-17	Salt River Lagoon, Sugar Bay	B	0.3244	STC-33D Salt River Lagoon, Sugar Bay
VI-STC-18	Salt River Bay	B	0.3229	STC-33A,B,E-J Salt River (Columbus Landing Beach)
VI-STC-19	Judith Fancy	B	0.01	There are currently no monitoring

				stations within this assessment unit.
VI-STC-20	Salt River Bay subwatershed, west	B	0.2433	There are currently no monitoring stations within this assessment unit.
VI-STC-21	Salt River Bay subwatershed, east	B	0.8922	There are currently no monitoring stations within this assessment unit.
VI-STC-22	Northcentral St. Croix HUC14, offshore	B	23.61	There are currently no monitoring stations within this assessment unit.
VI-STC-23	St. Croix-By-the-Sea	B	0.0727	STC- 34 St. Croix-By-the-Sea
VI-STC-24	Long Reef Backreef, west	C	0.1153	STC-48 Long Reef Backreef, west
VI-STC-25	Princess subwatershed, offshore	B	0.4343	STC-35 Long Reef Forereef West
VI-STC-26	Christiansted Harbor	C	0.9601	STC-37 Christiansted Harbor Entrance West, STC-40 St. Croix Marine, STC-41 Gallows Bay, STC-42 Public Wharf, STC-43 Water Gut Storm Drain, STC-44 Protestant Cay Beach, STC-45 Christiansted Harbor, STC-46 WAPA Intake, STC-47 Mill Harbor Condominium Beach, STC-49 Long Reef Back Reef East
VI-STC-27	Long Reef Forereef, east	B	0.3149	STC-36 Long Reef Forereef East, STC-35A LBJ (Pump Station) Outfall
VI-STC-28	Altona Lagoon	B	0.2337	There are currently no monitoring stations within this assessment unit.
VI-STC-29	Christiansted Harbor, east	C	0.1089	STC-1 Lagoon Recreational Beach ,STC-39 Altona Lagoon Inlet
VI-STC-30	Beauregard Bay	B	0.2145	STC-2 Ft. Louise Augusta Beach, STC-38 Christiansted Harbour Entrance-East
VI-STC-31	Buccaneer Beach	B	0.0166	STC-3 Buccaneer Hotel
VI-STC-32	Altona Lagoon subwatershed, offshore	B	0.6812	There are currently no monitoring stations within this assessment unit.
VI-STC-33	Punnett Bay	B	0.0576	There are currently no monitoring

				stations within this assessment unit.
VI-STC-34	Punnett Point, east	B	0.0223	There are currently no monitoring stations within this assessment unit.
VI-STC-35	Tamarind Reef Lagoon (Southgate Lagoon)	B	0.0205	STC-4 Tamarind Reef Lagoon
VI-STC-36	Green Cay Beach	B	0.1017	There are currently no monitoring stations within this assessment unit.
VI-STC-37	Southgate subwatershed, offshore	B	2.2219	STC-5 Green Cay Beach
VI-STC-38	Solitude Backreef	B	0.9681	There are currently no monitoring stations within this assessment unit.
VI-STC-39	Teague Bay	B	0.1773	STC-8 Reef Club Beach, STC-9 St. Croix Yacht Club Beach
VI-STC-40	Teague Bay Backreef	B	0.8547	STC-10 Cramers Park
VI-STC-41	Buck Island Backreef	A	0.7675	STC-6 Buck Island Backreef, STC-7 Buck Island Anchorage
VI-STC-42	Buck Island Forereef	A	3.3497	There are currently no monitoring stations within this assessment unit.
VI-STC-43	Solitude and Teague Bay subwatersheds, offshore	B	18.822	There are currently no monitoring stations within this assessment unit.
VI-STC-44	Northeast St. Croix HUC14, offshore.	B	36.088	There are currently no monitoring stations within this assessment unit.
VI-STC-45	Isaac Bay	B	0.0853	There are currently no monitoring stations within this assessment unit.
VI-STC-46	Grapetree Bay	B	0.0425	STC-11B Isaacs Bay Forereef
VI-STC-47	Turner Hole Backreef	B	0.2772	STC-12 Grapetree Beach
VI-STC-48	Turner Hole subwatershed, offshore	B	16.949	There are currently no monitoring stations within this assessment unit.
VI-STC-49	Madam Carty Backreef	B	0.464	STC-13B Robin Bay

VI-STC-50	Madam Carty, offshore	B	3.5161	There are currently no monitoring stations within this assessment unit.
VI-STC-51	Great Pond	B	0.1578	There are currently no monitoring stations within this assessment unit.
VI-STC-52	Great Pond Bay	B	1.0184	STC-13A Great Pond Bay
VI-STC-53	Great Pond Bay subwatershed, offshore	B	3.0288	There are currently no monitoring stations within this assessment unit.
VI-STC-54	Leprey Valley Backreef	B	0.3712	There are currently no monitoring stations within this assessment unit.
VI-STC-55	Leprey Valley subwatershed, offshore	B	2.8455	There are currently no monitoring stations within this assessment unit.
VI-STC-56	Bugby Hole Backreef	B	0.7042	STC-14A Halfpenny Bay - Manchenil ,STC-14B Halfpenny Backreef
VI-STC-57	Bugby Hole subwatershed, offshore	B	3.9	There are currently no monitoring stations within this assessment unit.
VI-STC-58	Southeast St. Croix HUC14, offshore	B	24.146	There are currently no monitoring stations within this assessment unit.
VI-STC-59	Canegarden Bay	B	0.8542	STC-15 Canegarden Bay
VI-STC-60	Canegarden Bay, offshore	B	0.7933	There are currently no monitoring stations within this assessment unit.
VI-STC-61	Hess Oil Virgin Islands Harbor	C	0.671	STC-16 HOVENSA East Turning Basin, NW Corner, STC-17 HOVENSA West Turning Basin, NW Corner
VI-STC-62	Limetree Bay	B	0.7239	STC-18 Limetree Bay Container Port
VI-STC-63	Martin-Marietta Alumina Harbor	C	0.3228	STC-19 Krause Lagoon Channel, STC-20 Alumina Plant Dock
VI-STC-64	Manning Bay/Estate Anguilla Beach	B	0.0508	STC-23 Public Dump

VI-STC-65	Hovensa, west	B	1.2865	STC-22A Treatment Plant (POTW) Outfall STC-21 Spoils Island (Ruth Island)
VI-STC-66	Hovensa subwatershed, offshore	B	2.8305	There are currently no monitoring stations within this assessment unit.
VI-STC-67	Southports St. Croix HUC14, offshore	B	8.1966	There are currently no monitoring stations within this assessment unit.
VI-STC-68	Bethlehem subwatershed, inshore	B	0.2149	There are currently no monitoring stations within this assessment unit.
VI-STC-69	Bethlehem subwatershed, offshore	B	0.3971	There are currently no monitoring stations within this assessment unit.
VI-STC-70	Airport, nearshore	B	2.1943	There are currently no monitoring stations within this assessment unit.
VI-STC-71	Airport, offshore	B	4.263	There are currently no monitoring stations within this assessment unit.
VI-STC-72	Airport St. Croix HUC14, offshore	B	4.1803	There are currently no monitoring stations within this assessment unit.
VI-STC-73	Diamond, nearshore	B	0.1699	There are currently no monitoring stations within this assessment unit.
VI-STC-74	Enfield Green Beach/VIRIL Outfall	B	0.1376	There are currently no monitoring stations within this assessment unit.
VI-STC-75	Diamond subwatershed, offshore	B	2.8479	STC-24B Rum Plant (VI Rum) Outfall
VI-STC-76	Carlton Beach	B	0.2447	STC-25 Long Point
VI-STC-77	Long Point Bay	B	0.8376	There are currently no monitoring stations within this assessment unit.
VI-STC-78	Long Point Bay subwatershed, offshore	B	4.9231	There are currently no monitoring stations within this assessment unit.
VI-STC-79	Good Hope Beach	B	0.1876	STC-26 Good Hope Beach
VI-STC-80	Sandy Point,	B	2.0121	There are currently no monitoring

	nearshore south			stations within this assessment unit.
VI-STC-81	Sandy Point, offshore south	B	7.4306	There are currently no monitoring stations within this assessment unit.
VI-STC-82	Sandy Point, nearshore west	B	0.1158	STC-27 Sandy Point Public Beach
VI-STC-83	Sandy Point, offshore west	B	0.4875	There are currently no monitoring stations within this assessment unit.
VI-STC-84	Southwest St. Croix HUC14, offshore	B	18.347	There are currently no monitoring stations within this assessment unit.

Finally, these two systems are displayed with an indication of the associated with each assessment unit and the number of water quality monitoring sites [ix] established by the Virgin Islands Department of Planning and Natural Resources.

B. Classifications, Total Waters and Applicable Standards[x]

The information on Water Quality Criteria by Classification and pollutant are summarized in Table II. B.1, below, which closely follows the wording of Virgin Islands Rules and Regulations.

Boundaries of Class A Waters:
Preservation of natural phenomena requiring special conditions, such as the natural Barrier Reef at Buck Island, St. Croix (defined within 0.5 miles of the boundaries of Buck Island's National Barrier Reef) and the Under Water Trail at Trunk Bay, St. John. Existing natural conditions shall not be changed.

Boundaries of Class B Waters:

Propagation of desirable species of marine life and for primary contact recreation (swimming, water skiing, etc.) The Water Quality Criteria as defined by VIR&R Title 12, Chapter 7, Section 186-3(b)(1-11) are:

(1) Dissolved oxygen: Not less than 5.5 mg/l from other than natural conditions.

(2) pH: Normal range of pH must not be extended at any location by more than +/- 0.1 pH unit. At no time shall the pH be less than 7.0 or greater than 8.3.

(3) Temperature: Not to exceed 90 degrees Fahrenheit at any time, nor as a result of waste discharge to be greater than 1.5 degree Fahrenheit above natural. A Thermal Policy section (defined by VIR&R, T.12, Ch. 7, Section 186-5) shall also apply.

(4) Bacteria: Shall not exceed a geometric (log) mean of 70 fecal coliform per 100ml by MR or MPN count.

(5) Dissolved Gas: Total dissolved gas pressure shall not exceed 110 percent of existing atmospheric pressure.

(6) Phosphorus: Phosphorus as total P shall not exceed 50ug/l in any coastal waters.

(7) Suspended, colloidal, or settleable solids: None from wastewater sources that will cause deposition or be deleterious for the designated uses.

(8) Oil and floating substances: No residue attributable to waste water nor visible oil film nor globules of grease.

(9) Radioactivity:

(a) Gross Beta: 1000 picocuries per liter, in the absence of Sr 90 and alpha emitters
(b) Radium-226: 3 picocuries per liter
(c) Strontium-90: 10 picocuries per liter

(10) Taste and Odor Producing Substances: None in amounts that will interfere with the use for primary contact recreation, potable water supply or will render any undesirable taste or odor to edible aquatic life.

(11) Color and Turbidity:

(a) A secchi disc shall be visible at a minimum depth of one meter
(b) A maximum nephelometric turbidity unit reading of three (3) shall be permissible.

Boundaries of Class B waters defined as all other coastal waters not classified Class “A” or Class ”C”. In addition, those Class “B” waters covered by color and turbidity criteria in Section 186-3(b)(11) [T. 12, Ch. 7] include:

(i)St. Thomas coastal waters-Mandahl Bay (Marina), Vessup Bay, Water Bay, Benner Bay, and the Mangrove lagoon

(ii)St. Croix Coastal Waters-Carlton Beach, Good Hope Beach, Salt River Lagoon (Marina), Salt River Lagoon (Sugar Bay), Estate Anguilla Beach, Buccaneer Beach, Tamarind Reef lagoon, Green Cay Beach and Enfield Green Beach.

Boundaries of Class C Waters:

Propagation of desirable species of marine life and primary contact recreation (swimming, water skiing, etc.). The Water Quality Criteria as defined by VIR&R Title 12, Chapter 7, Section 186-4(b)(1-6) are:

(1) Dissolved Oxygen: Not less than 5.0 mg/l from other than natural conditions.

(2) pH: Normal range of pH must not be extended at any location by more than +/- 0.1

pH unit. At not time shall the pH be less than 6.7 or greater than 8.5.

(3) Bacteria: Shall not exceed a geometric (log) mean of 200 fecal coliforms per 100 ml by MF or MPN count.

(4) Taste and odor producing substances: None in amounts that will interfere with the use for potable water supply or will render any undesirable taste or odor to edible aquatic life.

(5) Color and Turbidity: A Secchi disc shall be visible at a minimum depth of one (1) meter.

(6) Other provisions for Class "B" waters shall apply.

Legal limits of Class C Waters defined as:

A. St. Thomas:

(a) St. Thomas Harbor beginning at Rupert Rock and extending to Haulover Cut.
(b) Crown Bay enclosed by a line from Hassel Island at Haulover Cut to Regis Point at West Gregerie Channel.
(c) Krum Bay

B. St. Croix:

(a) Christiansted Harbor from Fort Louise Augusta to Golden Rock.
(b) Frederiksted Harbor from La Grange to Fisher Street.
(c) Hess Oil Virgin Islands Harbor.
(d) Martin-Marietta Alumina Harbor.

Table II.B.1 Summary of Pollutant Levels of Virgin Islands Water Quality Standards

Pollutant	Class B	Class C
Dissolved Oxygen	Not less than 5.5 mg/l from other than natural sources	Not less than 5.0 mg/l
pH	<8.3 Tolerable Limit>7.0	<8.5 Tolerable Limit>6.7
Temperature	Less than 90° Fahrenheit	Same as Class B
Bacteria	Not to exceed 70 fecal coliforms per 100 ml by MF or MPN count	Not to exceed 200 fecal coliforms per 100 ml by MF or MPN count
Dissolved Gas	Not to exceed 110% of existing atmospheric pressure	Same as Class B
Phosphorus	Not to exceed 50 mg/l in any coastal waters	Same as Class B
Suspended, colloidal or settleable solids	None from waste water which would cause deposition or be otherwise deleterious.	Same as Class B
Oil and Floating substances	No residue attributable to waste water. No visible film; no globules of grease	Same as Class B
Radioactivity	**Gross Beta:** 1000 picocuries per liter, in the absence of Sr 90 and alpha emitters **Radium-226:** 3 picocuries per liter **Strontium-90:** 10 picocuries per liter	Same as Class B

Taste and Odor	None in amounts to interfere with use for primary contact recreation, potable water supply or to render undesirable taste or odor to edible aquatic life	Same as Class B
Color and Turbidity	A. A secchi disc shall be visible at a minimum depth of one meter B. A maximum nephelometric turbidity unit reading of three (3) shall be permissible	Same as Class B, but no NTU standard in Rules and Regulations

There have been no changes to these Water Quality Rules and Regulations in this reporting period. Draft changes to these standards have been completed, but are currently awaiting acceptance and promulgation.

Table II.B.2 Square Miles of Assessment Units by Class of Use and Island [xi]

	St. Croix	St. Thomas	St. John	Total
Class A	4.1172 sq. miles	---	0.0685 sq. miles	4.1857 sq. miles
Class B	244.89 sq. miles	272.95 sq. miles	79.958 sq. miles	597.8 sq. miles
Class C	2.2132 sq. miles	1.0323 sq. miles	---	3.2454 sq. miles
Total	251.2204 sq. miles	273.9823 sq. miles	80.0265 sq. miles	605.23 sq. miles

Figure II.B.2 St. Croix Coastal Waters Classified Class

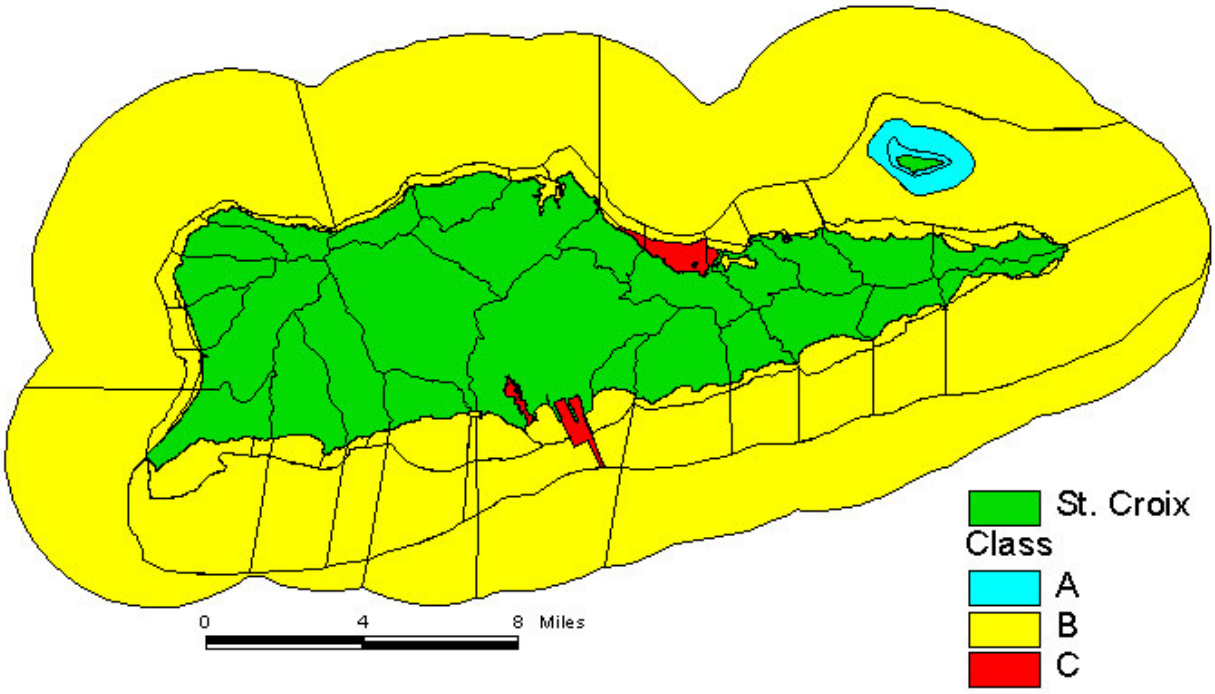
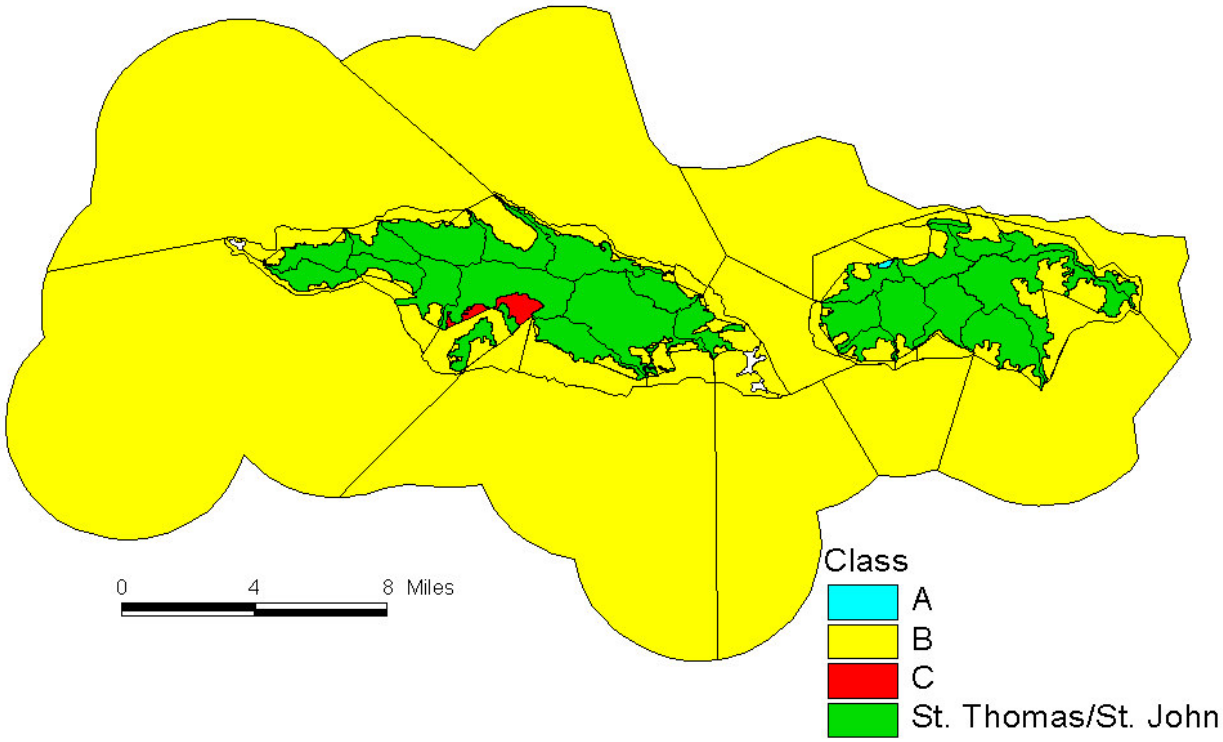


Figure II.B.3 St. Thomas/St. John Coastal Waters Classified by Class



Water quality standards for each class of designated use are provided in Table II.B.1.

1. Water Quality Standards to Address Drinking Water Use Attainment

The water quality standards do not address drinking water use attainment. As shown in Table II.B.1, the Water Pollution Control surface water monitoring program tests solely for the presence of total coliform bacteria [xii]..

Since most drinking water supply comes from the Virgin Islands reverse osmosis and flash desalinization plants or from traditional rainwater cisterns (still required for all new construction) most national drinking water issues directed at surface or groundwater resources are moot in the Virgin Islands. There are no water quality standards available for organic compounds (volatile, synthetic, herbicides, pesticides and PCB), inorganic compounds, unregulated chemicals, and radiological contaminants that apply to the ocean surrounding the US Virgin Islands as a drinking water **source** because ocean water does not fit the definition of surface water under the Safe Drinking Water Act. Standards do exist under the Virgin Islands Rules and Regulations that demand natural existing conditions for waters designated Class A remain unchanged. Waters designated Class B should not exceed 70 fecal coliform per 100mL and waters designated Class C should not exceed 200 fecal coliform per 100mL. The reason these standards are not developed in the US Virgin Islands is that drinking water is generally derived from cisterns holding rainwater at each house, or supplemented for public housing and in droughts and other emergencies by desalinization of seawater, as a co-generation by-product of the Virgin Islands Water and Power Authority. The Water and Power Authority in St. Croix maintain some public water supply wells.

No surface water is used directly for any drinking water supply, although questions have been raised about whether sea water intakes of contaminated water is capable of passing bacteria contamination through the relatively low temperature (60° C) flash desalinization processes used for most public desalinization. [xiii] .

C. Water Pollution Control Program

Under the provisions of the Virgin Islands Water Pollution Control Act of 1972 (Title 12, Chapter 7, Virgin Islands Code), the Virgin Islands Water Pollution Control (WPC) Program is mandated to conserve, protect, preserve, and improve the quality of water for public use, and for the propagation of wildlife, fish and aquatic life in the Virgin Islands. This includes the assurance that all development projects are in compliance with the Water Quality Standards as set forth in the Virgin Islands Environmental Laws and Regulations (specifically, *Virgin Islands Code, Title 12, Chapter 7, § 184*, as interpreted below).

The role of the WPC Program is to facilitate the preservation and—where necessary—make improvements to water quality conditions so as to ensure that water quality standards are met; to monitor the health of the marine environment; and to ensure that permitted discharges to waters of the VI meet effluent limitations. The DPNR/DEP is charged with the task of implementing and enforcing these provisions under the Water Pollution Control Grant (pursuant to Clean Water Act (CWA) §106), the Division of Environmental Protection has been entrusted with the task of monitoring the marine waters of the USVI and controlling discharges to those waters.

The WPC Program comprises two sub-programs:

1. The Territorial Pollutant Discharge Elimination System (TPDES) Program involves the permitting of wastes to be discharged from point sources into the waters of the VI, so as to ensure that those wastes meet the Water Quality Criteria in the VIC. The TPDES Program:
   - Consists of approximately 90 permitted industrial and municipal facilities.
   - Issues new and renewal TPDES permits.
   - Performs compliance inspections of permitted facilities.
   - Coordinates enforcement initiatives.
   - Coordinates the revision of VI TPDES Regulations and inclusion on new stormwater regulations.

2. The Ambient Monitoring Program involves the collection of samples to comprehensively evaluate coastal water quality. The Ambient Monitoring Program:
   - Performs water quality monitoring in a quarterly basis.
   - Develops/updates the US Virgin Islands Multi-Year Monitoring Strategy.
   - Implements the VI Beach Monitoring Program.
   - Reviews Coastal Zone Management permit applications and issues Water Quality Certifications.
   - Coordinates the development of the Total Maximum Daily Loads (TMDL) at the high priority 303(d) waterbodies in conjunction with EPA Region 2 and contractors.

- Assists in the development and updates of the US Virgin Islands Unified Watershed Assessment Report.
- Assists in developing watershed restoration action strategies.
- Develops monitoring and response strategies to episodic events, including natural disasters, oil spills, sewage spills and hazardous materials spills.

1. Point Source Control Program

The TPDES program or Point Source Control program determines who is allowed to discharge and at what concentration from a specific facility into the waters of the Virgin Islands. Title 12, Chapter 7 §184-11 of the Virgin Islands Rules and Regulations states, "no person shall discharge (means the addition of any pollution) to Virgin Islands waters from any point source."

A TPDES permit requires that all point source discharges of pollution be monitored by the permittee (facility), and the results submitted to DPNR/DEP and the United States Environmental Protection Agency (USEPA). DPNR/DEP conducts compliance inspections and compliance monitoring on all facilities that possesses a TPDES permit annually to ensure compliance. If a facility is found not to be in compliance with the TPDES permit, enforcement actions will be taken against the facility in the form of fines. The facility must demonstrate to the Department how it intends to come into compliance by the submittal of a corrective action plan.

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.

The point source program has developed a protocol for periods of noncompliance by the Department of Public Works. This entails the episodic monitoring of impacted coastal areas. This monitoring determines the level of bacteriological contamination in impacted areas, identifies trends (such as fish kills) and alerts the public of contaminated beaches based on sewage discharges affecting them.

The Department of Planning and Natural Resources supported the Environmental Protection Agency (EPA) and the US Department of Justice (DOJ) in addressing the sewage treatment infrastructure problems in the Territory by gathering information used by EPA and DOJ during Court hearings held in Federal Court. The information gathered and the support inspections conducted by the Division of Environmental Protection (DEP) staff have been of utmost importance in assisting EPA during federal court proceedings.

An illegal outfall discharge point that is utilized when the LBJ liftstation is not operational is of major concern because it is located in the same segment of the water body where the drinking water intake is located at for the major desalination units at the Water and Power Authority. There is some concern that occasional bacterial contamination and/or turbidity at the WAPA sea water intakes allows the intake of large volumes of bacteria that may pass through the relatively low temperature (60^{o} C) flash distillation units used for desalinization.

Several upgrades were made to POTWs in both the St. Thomas/St. John District and the St. Croix District. Such upgrades include new treatment plants at Cruz Bay, St. John and Mangrove Lagoon, St. Thomas. In addition, several pump station equipment were repaired or replaced.

Permit Issuance:

Territorial TPDES permits are issued with limits pertinent to Federal and Local Regulations. During this reporting period, four (4) TPDES permits were issued (or re-issued).

Table II.C.1 Virgin Islands Pollution Discharge Permits, 2002 and 2003

Permit Number	Facility Name	Island	Expiration Date
VI0002003	Department of Public Works – Mangrove Lagoon WWTP	St. Thomas	January 24, 2006
VI0000051	St. Croix Water & Power Authority	St. Croix	March 31, 2007
VI0000019	HOVENSA	St. Croix	July 31, 2007
VI002052	Virgin Islands Rum Industries, Ltd.	St. Croix	August 31, 2007

Compliance Inspections:

A schedule of compliance evaluation inspections (CEI) and compliance sampling inspections (CSI) is incorporated into the WPC program work-plan. In general, DEP staff conducts a CEI and CSI at major facilities and POTWs annually. Generally, facilities with minor permits receive only an annual CEI.

Table II.C.2 Summary of TPDES Activities, 2002 - 2003

FY-2002	**St. Thomas/St. John**	**St. Croix**
CEI	35 1 Affidavit of Exemption Received 4 facilities not operating	6 1 facility not discharging
CSI	8	3 1 facility not discharging
FY-2003	**St. Thomas/St. John**	**St. Croix**
CEI	30	10 1 facility not discharging
CSI	3	4 1 facility not discharging

Additional inspections are conducted at the Territory POTWs, including the major and minor pump stations. These inspections are scheduled quarterly.

Table II.C.3 Supplementary POTW Inspections:
TPDES Activities, 2002 - 2003

FY-2002	St. Thomas/St. John	St. Croix
Quarter 1	All inspections conducted	All inspections conducted
Quarter 2	All inspections conducted	All inspections conducted
Quarter 3	All inspections conducted	All inspections conducted
Quarter 4	All inspections conducted	All inspections conducted

FY-2003	St. Thomas/St. John	St. Croix
Quarter 1	All inspections conducted	All inspections conducted
Quarter 2	All inspections conducted	All inspections conducted
Quarter 3	All inspections conducted	All inspections conducted
Quarter 4	All inspections conducted	All inspections conducted

Enforcement Actions:
Violations within the TPDES program can come from non-compliance with permitted effluent limits, or failure to report monitoring as required by the permit. This includes any special conditions contained within the permit. For example, St. Croix POTW permit requires the permittee to take several specific actions in the event of a bypass. Violations issued by DEP during this reporting period are:

Table II.C.4 Summary of TPDES Enforcement Activities, FY 2002 - 2003

Enforcement Number	District	Infraction
T-02-001W	St.Thomas	Discharge of fecal coliform greater than thepermitted effluent level
T-02-002W	St. Thomas	Discharge of grey water into Iguana Swamp.
T-02-003W	St. Thomas	Expired TPDES Permit
T-02-004W	St. Thomas	Expired TPDES permit, DMR's for the months of February and March 2002 not submitted to DPNR/DEP and flow meter not operational.
T-02-005W	St. John	Discharge of wastewater into storm drains that empties into Cruz Bay Creek.
T-02-006W	St. John	Discharge of wastewater into storm drains that empties into Cruz Bay Creek.

T-02-007W	St. Thomas	No daily monitoring of facility, no submittal of DMR's to DPNR/DEP from January 1999 to January 2002 and no flow meter at WWTP
T-02-008W	St. Thomas	DMR's for the months of February And March 2002 were not submitted to DPNR/DEP, effluent is black, solids sludge and excessive foam being discharged in effluent
T-02-009W	St. Thomas	Daily monitoring activities were not recorded for the period of March 31st, 2001 thru September 17th, 2001
T-02-010W	St. Thomas	Expired TPDES permit, discharge of fecal coliform greater than the permitted effluent level and broken flow meter.
T-02-011W	St. Croix	Expired TPDES permit and the increase of intake and discharge without approval

2. Ambient Monitoring Activities

As part of the Ambient Monitoring Program, the DEP staff takes part in reviews of the Environmental Assessment Reports (EARs) submitted by individuals or groups seeking to acquire land development or earth change permits within the Coastal Zone. EARs are submitted to the DPNR-Division of Coastal Zone Management (CZM), which, in turn, distributes them to various divisions for review. If the CZM permittee' s application involves potential impacts to Waters of the Virgin Islands, a Water Quality Certificate is necessary as part of the CZM permit.

Water Quality Certification:

During this reporting period, Water Quality Certificates that were issued are as follows:

FY-2002

STT/STJ:

- Sapphire Beach Marina.
- Crown Bay.

STX:

- Seaborne Aviation
- Frederiksted Fisherman's Pier and boat ramps.
- VI Port Authority Frederiksted Pier RO/RO dock

FY-2003

STT/STJ:

- Virgin Islands Water and Power Authority - submarine utility line extending from Red Hook Bay to Little St. James.

- DPNR Division of Fish and Wildlife
- Compass Point Marina.
- Marriott Ownership Resorts, Inc.
- V.I. Water and Power Authority.

STX:

- Christiansted Board Walk.
- Virgin Islands Water and Power Authority

During episodic monitoring, the DEP staff may sample water as a result of citizen complaint, storm event or episodic need. During this reporting period, most of these samples test for fecal coliform as a result of a sewer line breaks, sewage pump station bypass or failure, or storm event such as a hurricane or large rainfall event. For example, the following facilities were inspected (and samples taken as necessary) as a result of citizen complaints:

Major Episodic Monitoring Events:
FY 2002

Christiansted Harbor-Oil Spill and sewage spills

St. Croix ALUMINA/St. Croix Renassaince Group-Acid Spill

Golden Rock Shopping Center-Private Sewage Spill

FY 2003

LBJ Pump Station-Major Sewage spills

Allied Rental Center [STT]

Both the public and business sectors report spills or events that threaten water quality. During this reporting period, 13 "spills" or releases of oil (to the water of the Virgin Islands) were reported to the St. Thomas DEP office. Three "spills" were reported to the St. Croix DEP office.

Discharges of sewage into waters of the territory are reported to DEP. The primary cause is failure of the POTW system, which is antiquated, and in need of repair and maintenance. Ruptures or clogs in the collector system lines also cause operators to bypass until repairs can be

made. During sewage bypassing the Division of Environmental Protection alerts the public via radio, television, and newspaper of the affected area.

Storage and Retrieval Program (STORET)

The Department of Planning and Natural Resources Division of Environmental Protection continues to maintain and update its STORET database with data collected from the Ambient Monitoring Program. Data is submitted regularly to EPA Headquarters for inclusion in the national STORET data warehouse. Currently, USVI data is available by querying the national warehouse through the EPA website. DEP has upgraded STORET to version 2.

Comprehensive Watershed Restoration Action Strategy

New guidelines request each state to develop a "comprehensive watershed assessment strategy." The Department of Planning and Natural Resources has plans to implement this assessment in the current multi-year monitoring strategy. Attachment I to this Report is excerpted from the Unified Watershed Assessment, which is preliminary to the Comprehensive Watershed Restoration Strategy.

D. Non-Point Source Program

Since 1994, the Virgin Islands Department of Planning and Natural Resources, Section 319 program has worked, via Memoranda of Agreement and cooperation with partner agencies such as the Virgin Islands Resource Conservation and Development Council (VIRC&D), Virgin Islands Conservation District (VICD), University of the Virgin Islands (UVI) United States Geological Survey (USGS) and Island Resources Foundation (IRF) through the mechanism of the Virgin Islands Non-point Source Committee, to implement an active program, including activities in the five priority areas of:

1. Erosion And Sediment Control
2. Urban Run-off
3. Vessel Waste Disposal
4. On-Site Disposal Systems (OSDSs) Upgrade
5. Oil and Hazardous Material Spills.

The Non-Point Source Committee has endorsed nine key objectives as described in the *May 1996 Non-point Source Program and Grants Guidance For Fiscal Year 1997 and Future Year*s. The nine objectives of the Program are:

1. Explicit short- and long-term goals, objectives, and strategies to protect surface and ground water.

2. Strong working partnerships and collaboration with appropriated state, interstate, tribal, regional and local entities including conservation districts, private sector groups, citizen groups, and federal agencies.

3. A balanced approach that emphasizes both statewide non-point source programs and on-the-ground management of individual watersheds where water is impaired or threatened.

4. The state program:

(a) Abates known water quality impairments resulting from non-point source pollution and,

(b) Prevents significant threats to water quality from present and future non-point source activities.

5. Identification of waters and watersheds impaired or threatened by non-point source pollution and a process to progressively address these waters.

6. The state reviews, upgrades and implements all program components required by Section 319 of the Clean Water Act, and establishes flexible targeted and iterative approaches to archive and maintain beneficial uses of water as expeditiously as practical.

7. An identification of federal lands and activities that are *not* managed consistent with state non-point source program objectives.

8. Efficient and effective management and implementation of the state' s non-point source program including necessary financial management.

9. A feedback loop whereby the state reviews, evaluates, and revises its non-point source assessment and its management program at least every five years.

Nonpoint Source pollution, in the form of polluted runoff, impairs more water bodies than any other source of pollution in the Virgin Islands. Nonpoint source pollution in the Virgin Islands is caused by rainfall moving over and through the ground. As runoff moves, it picks up and carries away both natural pollutants and pollutants resulting from human activities. These pollutants include sediments, nutrients, pesticides, and toxic substances such as hydrocarbons and heavy metals. Eventually these pollutants are deposited in wetlands, coastal waters and ground water.

There are numerous problems associated with nonpoint source pollution. Two of the major nonpoint source problems affecting the Virgin Islanders are sedimentation and bacterial contamination.

- Sedimentation occurs when soil is eroded from the land surface, such as at construction sites, and deposited onto the land surface or into coastal water bodies. Sedimentation results in problems such as habitat losses and marine life mortality.

- 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

Under the Clean Water Act, nonpoint source control is largely voluntary, not regulatory as is point source control. Nonpoint source pollution is diffuse and highly variable , depending on climate, soils, and land use practices. Special characteristics unique to the Virgin Islands such as, wet/humid tropical climate, steep slopes, short but heavy rainfall events, small insular watersheds, clayey impermeable soils, large coastline to land area ratio, profileration of septic

tanks, and large tracts of unpaved roads, etc. must be considered when addressing nonpoint source control. Effective control of nonpoint source pollution requires changes in land use practices and in personal behavior. While the impact from individual nonpoint sources may be small, the cumulative effects from numerous unregulated activities can significantly degrade water quality.

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. In June 2003, the Earth Change permitting process was transferred to the Division of Environmental Protection from the Div. of Building Permits. As a result, earth change applications now require the implementation of sediment control and erosion mitigation control measures.

Table II.D.1 Earth Change Summary

District	Earth Change Applications Reviewed	Earth Change Applications Approved	Earth Change Applications Denied
St. Croix	10/01-9/02: 402 10/02-9/03: 423	10/01-9/02: 388 10/02-9/03: 360	10/01-9/02: 14 10/02-9/03: 63
St. Thomas/St. John	10/01-9/02: 318 10/02-9/03: 326*	10/01-9/02: 252 10/02-9/03: 258*	10/01-9/02: 66 10/02-9/03: 68*

*: Estimated based on 2.5% increase from FY02

Each earth change permit location is surveyed using Global Positioning System using a hand-held Garmin GPS-V unit. This is done to accurately geolocate inspection sites and to enable the export of the data into a database. Geographic Information System (Arcview) software is used to spatially analyze locational data with respect to soil type, slope and drainage, watershed category, etc.

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. As 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 US Dept. of Agriculture – Natural Resources Conservation Service 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. An A 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. Under the Division of Environmental Protection, nonpoint source mitigation measures will be required and earth change plans reviewed following the technical principles described in 12 VIC § 532-2 (see Conservation Practices below)

Stormwater Control

The major flooding problems that occur in the Virgin Islands, due to increased runoff volumes associated with development and improper use and development of historic floodplains. The denuding/paving of a significant portion of urban areas has had an effect on the increased velocity and volume of stormwater runoff. 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.

Presently, the Division of Environmental Protection is finalizing the rules to achieve consistency with Federal Storm Water Regulations and the revised VI Water Pollution Control Law. The approved regulations will be adopted upon the satisfactory implementation of the revised Territorial Pollutant Discharge Elimination System (TPDES) regulations being performed this fiscal year. The Division of Environmental Protection intends to petition EPA for General Permit authority once the TPDES regulations are satisfactorily revised. The implementation of these new stormwater regulations should be streamlined with existing earth change requirements.

Conservation Practices

The Nonpoint Source Program of the Division of Environmental Protection has funded the development of the ENVIRONMENTAL PROTECTION HANDBOOK pursuant to 12 VIC § 532-3 *Conservation practices*. Standards and specifications for conservation practices that have been proven effective in lessening damage from sediment and runoff are included in the handbook.

Under the Nonpoint Source Program of the Division of Environmental Protection, Earth change plans are reviewed to determine if they meet the minimum standards required for the adequate protection and conservation of the soil and water, and for water disposal in and from the construction area.

Planned Development

All urban development in the second tier of the coastal zone begins with an earth change application process. Urban development is the largest cause of nonpoint source 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 comprise 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.

Table II.D.2 319 Funded Projects Involving Water Quality Monitoring

Organization	Project Title
U.S. Virgin Islands Resource Conservation and development Council, Inc. (VIRC&D) & US Dept. of Agriculture - Natural Resource Conservation Service (USDA-NRCS)	The Bethlehem Old Work Reservoir: Stabilize the largest active gully on the island, controlling non-point source pollution from further impacting the ecosystem and environmental, protect the largest water retention structure imminent danger, and protect this area from excessive soil loss from wind and water erosion
We Grow Food Inc.	We Grow Food Project: Rehabilate and maintain the four earthen dam / agricultural retention ponds in Estate Bordeaux Watershed– sediment trap, aquifer recharge.
Island Resources Foundation	Inventory of Wetlands and Riparian Areas: Update and correct the mapping of 636 wetlands in the Virgin Islands Rapid Environmental Assessment (REA) and design and test basic monitoring tools for wetland characterization
St. Croix Environmental Association	Control of Sedimentation via Mangrove Restoration in the Salt River Watershed: Replanting of mangroves to improve water quality in the estuary; and reestablishing the mangrove forest in Sugar Bay

University of the Virgin Islands (UVI)/Water Resources Research Institute	Water Quality Standards: Development of water quality standards that support the definition of "waters of the Virgin Islands" as defined in the Virgin Islands Rules and Regulations
Estate Fish Bay Owner' s Association	Fish Bay Sedimentation and Road Erosion Project: Identified and implemented Best Management Practices (BMPs) on Estate Fish Bay roadways to address the high erosion rates that are degrading the water quality of Fish Bay and the coral reefs located therein
UVI/Marine Advisory Services	Study of the Mangrove Lagoon Bener Bay Area: Address issues related to demographics, solid waste and land use of the area surrounding Mangrove lagoon and Benner Bay.
UVI/ Marine Advisory Services	Sediment Toxic Metals Analysis at Lindberg Bay Produce baseline information on non-point pollutants at one watershed in the island of St. Thomas for future development of management guidelines
UVI/ Eastern Caribbean Center	Sediment Deposition, Water Quality and Coral Assessment for Coral Bay, and Botany Bay: Use standard methodology established in previous sedimentation studies in the Territory, sediment traps will be installed in specific locations within the Coral Bay APC and Botany Bay APC. These sediment traps will be monitored after large rain events and on a quarterly basis.
VIRC&D & USDA-NRCS	Estate Bethlehem Demonstration Project: Construction of stormwater retention structures on the primary contributories, and small retention and sediment basins on the secondary contributories. A variety of aquatic plants will be planted at each sediment basin to create wetlands that will serve as filters for the removal of pollutants and sediment
VI. Dept. of Agriculture	Man-made Ponds and Crop Farming: Reduce non-point source pollution entering the sea by increasing retention of water in ponds, increasing biodegradation of bio pesticides and other pollutants in the holding ponds, reducing run off, controlling erosion of spillways and harvesting water for farming

Watershed Approach

The Virgin Islands submitted its Unified Watershed Assessment report pursuant to the Clean

Water Action Plan in September 1998. The report includes a detailed listing of the various watersheds with their Watershed Restoration Priorities (WRP). More detailed assessments of condition in the most critical watersheds requiring restoration will be developed as part of the Watershed Restoration Strategies program beginning in FY 1999 [xiv] . During FY 99, DPNR completed its draft Watershed Restoration Action Strategies Report.

As discussed above, a joint objective of the Unified Watershed Assessment program the Water Protection program is to design mutually re-enforcing reporting systems which integrate the watersheds of the Unified Watershed Assessment with the Waterbodies and Segments of the Water Quality Assessment and Assessment Database.

Coordination with Other Agencies

The Unified Watershed Assessment provides a comprehensive status assessment of Virgin Islands watersheds and evaluates whether the watersheds are increasing stresses on Territorial waters. The statements published in the Unified Watershed Assessment, relating to conditions in the watersheds can be used as a contributing factor to determine which assessment units will be on the 303(d) list of impaired water bodies [xv].

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 with a specified timeframe for compliance. This corrective action could also involve other interested agencies including the Department of Agriculture, the 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 receives EPA Region II input 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 the Virgin Islands National Park Service (VINPS) control in St. John, other sites adjacent to St. John, and around Buck Island, St. Croix.

Cost/Benefit Assessment

An assessment of the costs and benefits of the Water Pollution Control program for the reporting period would include:

Costs:	Administration of all Water Programs, FY 1998; approximately $900,000
	Administration of all Water Programs, FY 1999, approximately $955,000

Benefits:	Value of improvements in recreational fishing Value of improvements in commercial fishing Number of coastal waterbody miles improved to fully supporting designated uses. Reduced cost of drinking water treatment or purchases of bottled potable water due to cleaner intake water and greater security of WAPA-produced water. Recreational value of increased use of beaches Value of increases in recreational boating

Special Concerns and Recommendations

2004 Virgin Islands Water Quality Assessment Concerns [xvi]

- Timely Disbursement (or lack) of federal funding by VI Government for budgeted items (water quality study for adoption of toxic and bacteriological criteria; marine vessel for monitoring; personnel protective equipment; personnel training).
- Public Owned Treatment Works (POTW) sewage bypasses that are not repaired in a timely manner.
- Lack of public environmental awareness program.

2004 Virgin Islands Water Quality Assessment Recommendations:

- Federal funding to support the programs that affect water quality should be used solely for said purpose.
- POTW equipment regular maintenance and/or replacement, and privately owned treatment works require improved preventive maintenance and continual training for treatment operators as well as additional operators.
- Better public environmental awareness programs.

E. Oil and Hazardous Materials

1. Underground Storage Tank Program

The Underground Storage Tank Program has undergone management changes during fiscal year 2003-2004 and has undergone a considerable amount of progress during this time. Draft regulations are in development to support the Underground Storage Tank Act (12 V.I.C. §§ 651-684) that authorizes the Virgin Islands Department of Planning and Natural Resources to manage the underground storage tank program. A permitting program was implemented by 12 V.I.C. §§ 658-660 in order to better track UST systems and their compliance status. The program requires all UST facilities to apply for permits to use/operate, upgrade, and close their systems; in addition EPA notifications are required with each application.

Presently, compliance is the main ambition of the UST program. DPNR is working with each service station to promote compliance efforts in terms of financial responsibility and sufficient leak detection monitoring. To date without sufficient leak detection monitoring at service stations on St. Croix financial responsibility may pose to be a challenge. These issues are important to ensure the protection of the island's groundwater and DPNR in working to ensure that satisfactory leak detection monitoring will be conducted in the future. In doing so, DPNR intends to determine the full extent of leaking USTs within the territory.

The Leaking Underground Storage Tanks (LUST) program is an important issue to be addressed. The program is implemented, however, and the status list needs to be updated. DPNR has incomplete files and updated records regarding many aspects to the program, but is working hard to remedy this lack of information. Unfortunately,UST/LUST statistics are not updated for FY 2002-2003.

The LUST list to date is as follows:

St. Croix

1. Texaco-Midway s/s
2. Esso-Estate Glynn
3. Esso-WAPA
4. Esso-Farmingdale s/s
5. Esso-Estate Mint s/s
6. Esso-Hassan s/s
7. LaRaine s/s
8. VI Seaplane Shuttle
9. Green Cay Marina

St. Thomas

1. Esso-Devcon
2. Esso-Gottlieb s/s
3. Esso-One Stop Sugar Estate s/s
4. Esso-Nadir s/s
5. Esso-WICO
6. Texaco-Tutu s/s
7. Texaco-Pollyberg s/s
8. Ramada Yacht Haven

St. John

1. Texaco-Cruz Bay
2. Domino Oil-E.C. Gas

DPNR is investigating the status to date on each of these sites.

UST enforcement is in full force. A Civil Action Penalty Matrix was drafted for the program and an enforcement policy has been initiated. DPNR has issued Notices of Violation to eight (8) service stations on St. Croix due to the lack of permits (and little/no attempt to apply). On St.

Thomas and St. John a NOV is in draft for both ESSO and Texaco for failure to notify the department for a suspected/confirmed release at a few of their stations.

2. The Used Oil Program

Under Section 1553(g) of the Virgin Islands Code, the US Virgin Islands Government DPNR is authorized to enforce provisions related to environmental effects of waste disposal, resource recovery and hazardous wastes. Under Section 1560 of the Virgin Islands Code, the Commissioner of DPNR exercised his authority to promulgate rules and regulations for a Used Oil Collection Program under Title 19, Part VI, Chapter 56 of the Virgin Islands Rules and Regulations. This program was initiated under the Division of Environmental Protection during the beginning of this reporting cycle. To date, the Used Oil Program has already documented and issued used oil permits to 175 facilities territory wide.

Table II.E.1 List of Current Used Oil Permit Holders

001	12/31/2004	Allenton Auto Repairs	St. Thomas
003C	12/31/2006	HOVENSA	St. Croix
004T	12/31/2003	Nadir Esso Service Center	St. Thomas
006C	12/31/2007	V.I. Department of Public Works (Annas Hope) DIY	St. Croix
007C	12/31/2003	Public Works (Concordia)	St. Croix
007CT	12/31/2007	VI Regulated Waste Management	St. Croix
008CT	12/31/2005	Public Works (Annas Hope)	St. Croix
009C	12/30/2004	Western Auto (STX)	St. Croix
011CX	12/31/2003	Cruzan Environmental Services	St. Croix
018C	12/31/2005	Marine Spill Response Corporation	St. Croix
030C	12/31/2004	Bill Auto Repair & Maintenance	St. Croix
031C	12/31/2004	H.H. Tire Sales	St. Croix
032C	12/31/2004	Tropical Cars of St. Croix Inc.	St. Croix
033C	12/31/2003	Rodney's Auto Repair	St. Croix
035C	12/31/2003	St. Croix Foreign Auto Sales Corp	St. Criox
036C	12/31/2003	St. Croix Radiator	St. Croix
037R	12/31/2004	Caribbean Auto Mart, Inc (STT)	St.Thomas
037T	12/31/2004	Carribean Auto Mart	St. Thomas
038C	12/31/2004	St. Croix Dairy Products, Inc.	St. Croix
039T	12/31/2004	It's Black It's White	St. Thomas
041T	12/31/2004	East End Wreck Shop	St. Thomas
045C	12/31/2004	Sun Sea & Sand Car Dealer	St. Croix
046T	12/31/2004	Sun, Sea & Sand Leasing & Sales	St. Thomas
047T	12/31/2004	Diesel Dynamic Plus Inc.	St. Thomas
049T	12/31/2004	Tropical Marine Inc	ST. Thomas
051T	12/31/2004	HI Performance Auto Repair	St. Thomas
052T	12/31/2004	Gas Station Auto Repair	St. John
056T	12/31/2005	N & S Auto Services	St. Thomas
057T	12/31/2006	PM's Auto Inc.	St. Croix
058C	12/31/2007	VI Regulated Waste Management, Inc	St. Croix
061J	12/31/2005	Coral Bay Marina Services Inc.	St. John
062TT	12/31/2005	Puerto Rico Used Oil Collectors Inc	San Juan, PR

063T	12/31/2005	Crown Bay Marina	St. Thomas
064C	12/31/2005	A & G Tire & Auto Service	St. Croix
065T	12/31/2005	Community Motors Inc.	St. Thomas
066T	12/31/2005	John' s Auto Center Inc.	ST. Thomas
067T	12/31/2005	Yatch Haven (Long Bay Partners)	St. Thomas
068T	12/31/2005	Budget Car Rental	St. Thomas
069TT	12/31/2005	Green Hornet Environmental Management Inc	St. Thomas
071C	12/31/2005	Caribbean Auto Mart St. Croix, Inc	St. Croix
072TT	12/31/2005	VI Regulated Waste Management, Inc	St. Thomas
073T	12/31/2005	American Yacht Harbor Marina	St. Thomas
074C	12/31/2005	Metro Motors	St. Croix
075T	12/31/2005	A.J. System	St. Thomas
075T	12/31/2005	SK Cove	St. Thomas
076T	12/31/2005	Sapphire Beach Resort Marina	St. Thomas
077T	12/31/2005	Ressaissance Hotel aba St. Thomas Palace Resort	St. Thomas
077T	12/31/2005	CTF Hotel Management Corp	St. Thomas
078C	12/31/2005	Stanley & Stanley	St. Croix
079T	12/31/2005	Marriot Frenchman' s Reef & Morning Star Beach Reso	St. Thomas
080T	12/31/2006	V.I. Port Authority, Transportation (STT)	St. Thomas
081C	12/31/2005	V.I. Army National Guard (STX)	St. Croix
082T	12/31/2005	V.I. Army National Guard (STT)	St. Croix
083C	12/31/2005	St. Croix Marine	St. Croix
086C	12/31/2005	Gold Coast Yachts In.c	St. Croix
087J	12/31/2005	Westin St. John Hotel Company, Inc	St. John
088J	12/31/2005	E. C. Gas & Service Station, Inc.	St. John
089T	12/31/2005	Leonard' s Auto Repairs	St. Thomas
090T	12/31/2005	Contran Resorts, Inc. dba Mahogany Run Golf Course	St. Thomas
090T	12/31/2005	Mahagony Run	St. thomas
091J	12/31/2005	Barry' s Auto Service Center	St. John
092T	12/31/2006	School Busing, Inc	St. Thomas
093C	12/31/2005	Chitolie Trucking & Equipment	St. Croix
094T	12/31/2005	Tropical Automotive Repair	St. Croix
094T	12/31/2005	Hertz Rent A-Car	St. Thomas
096T	12/31/2006	Bussue Auto & Repair	St. Thomas
097C	12/31/2006	Buccaneer Hotel	St. Thomas
098J	12/31/2006	Caneel Bay Resort	St. John
098T	12/31/2006	Western Auto Supply Co (STT)	St. Thomas
099T	12/31/2006	St. Thomas Concrete	St. Thomas
100C		Peters Rest Texaco Svc Station	St. Croix
100T	12/31/2005	Ge-Tech Auto Repair	St. Thomas
101T	12/31/2006	Patrick Charles Enterprises Inc.	St. Thomas
101T	12/31/2005	Valrick Charles Enterprises, Inc.	St. Thomas
102T	12/31/2006	La Vida Marine Center L.P/B.J. Management	St. Thomas
103C	12/31/2005	Budget Car Rental	St. Croix
103T	12/31/2006	The Auto Clinic	St. Thomas

104T	12/31/2006	Public Works (#8 Subbase)	St. Thomas
104T	12/31/2006	V.I. Department of Public Works (Sub Base)	St. Thomas
104TT	12/31/2006	V.I. Departemnet of Public Works (Subbase) Trans	St. Tjomas
105J	12/31/2006	Public Works (susanaberg)	St. John
105J	12/31/2006	V.I. Department of Public Works (St. John)	St. Thomas
106T	12/31/2006	Public Works (Bovoni)	St. Thomas
106T	12/31/2006	V.I. Department of Public Works (Bovoni)	St. Thomas
108T	12/31/2006	American Eagle dba Exceutive Airleines	St. Thomas
109T	12/31/2006	U.S. Postal Service	St. Thomas
110T	12/31/2006	Domino Oil Co. Inc.	St. Thomas
111T	12/31/2006	Auto Excellence	St. Thomas
112T	12/31/2006	VI Enterprises, Inc. (Avis)	St. Thomas
113J	12/31/2006	Boyson Inc	St. John
114T	12/31/2006	Florida Coca Cola Bottling Comp.-St. Thomas	St. Thomoas
115C	12/31/2006	Bohlke International Airways	St. Croix
116T	12/31/2006	Dependable Car Rental	St. Thomas
117T	12/31/2006	Four Star Aviation, Inc.	St. Thomas
118J	12/31/2006	P&S Trucking & Water Delivery	St. John
119T	12/31/2006	Metro Motors	St. Thomas
120T	12/31/2006	Automotive Enterprises Inc. dba Midas	St. Thomas
120T	12/31/2006	Midas	St. Thomas
121T	12/31/2006	Wyndham Sugar Bay Resort	St. Thomas
122T	12/31/2006	V.I. Housing Authority	St. Thomas
123T	12/31/2006	Compass Ponit Marina, Inc.	St. Thomas
124T	12/31/2006	Amco Auto Sales & Service Inc.	St. Thomas
125J	12/31/2006	Varlack Ventures, Inc	St. John
125T	12/31/2006	Motor Trend	St. Thomas
126C	12/31/2006	Bates Trucking & Trash Removal	St. Croix
126T	12/31/2006	Crowley Liner Services (STT)	St. Thomas
127C	12/31/2006	Better Engine Svc & Tire Inc	St. Croix
128C	12/31/2006	Zenon Construction Corp.	St. Croix
129C	12/31/2006	Thrifty Car Rental	St. Croix
129T	12/31/2006	St. John Develpoment dba Texaco	St. John
129T	12/31/2006	O' Connor Car Rental*	St. John
130C	12/31/2006	Hendricks International Inc.	St. Croix
130T	12/31/2006	United Brothers Trucking	St. Thomas
131C	12/31/2006	Centerline Car Rental	St. Croix
131T	12/31/2006	University of the Virgin Islands (STT)	ST. Croix
132C	12/31/2006	Karim Service Station	
132T	12/31/2006	Ritz-Carlton Resort	St. Thomas
133C	12/31/2006	WAPA Maintenance	St. Croix
133C	12/31/2006	V.I. Water & Power Authority	St. Croix
133T	12/31/2006	Air Center Helicopters	St. Thomas
134C	12/31/2006	Ambramson Enterprises	
134T	12/31/2006	Air St. Thomas	St. Thomas
135C	12/31/2006	Virgin Islands Rum	St. Croix

135T	12/31/2006	Bohlke International Airway, Inc.	St. Thomas
136C	12/31/2006	Flemings Transport Company, Inc	St. Croix
136T	12/31/2006	Pueblo Supermarket	St. Thomas
137C	12/31/2006	VI Paving, Inc	St. Croix
137T	12/31/2006	Tutu Texaco Service Station Inc	St. Thomas
138T	12/31/2006	Discount Water Deliveries and Trucking Services	St. Thomas
139T	12/31/2006	Challenger' s Transport	St. Thomas
140C	12/31/2006	Caribout aka Florida Coca-Cola Bottling Company	St. Croix
140T	12/31/2006	Chuck Kline Water	St. Thomas
141C	12/31/2006	Seaborne Airlines	St. Croix
142C	12/31/2006	Europa Motorworks	St. Croix
142T	12/31/2006	Cowpet Bay West	
143C	12/31/2006	Anthony Auto Repairs & Maint.*	St. Croix
143C	12/31/2006	Anthony Auto Repair & Maintenance	St. Croix
143T	12/31/2006	Sanitary Trashmoval Services Inc.	
144C	12/31/2006	Antilles Gas (STX)	
145C	12/31/2006	Human Services mainteneane	St. Croix
145T	12/31/2006	Antilles Gas (STT)	St. Thomas
146C	12/31/2006	Olympic Rent-A-Car	St. Croix
146T	12/31/2006	Innovative Telephone	St. Thomas
148C	12/31/2006	A+ Auto Repair	St. Croix
149C	12/31/2006	P.M. Auto	St. Croix
149T	12/31/2007	Castillo Auto Repair	St. Thomas
150C	12/31/2006	Champion Auto Part	
150T	12/31/2007	VI Recycling Company	St. Thomas
151C	12/31/2006	MARCO St. Croix, Inc. Water and Trcuking Services	St. Croix
151T	12/31/2007	Matthews Auto Repairs	St. Thomas
152C	12/31/2006	David' s Auto Repair	St. Croix
153C	12/31/2006	Paradise Waste Systems, Inc.	St. Croix
154C	12/31/2006	Tonges Concrete	
155C	12/31/2006	Frank' s Garage	St. Croix
156C	12/31/2006	V.I. Housing Authority (STX)	St. Croix
157C	12/31/2006	VI Cement & Building Products Inc.	St. Croix
157C	12/31/2006	M &T Trucking Services	St. Croix
159C	12/31/2006	H & H Avionics	
160C	12/31/2006	Bunkers of St.Croix, Inc.	St. Croix
161C	12/31/2006	Welco Gas Station	St. Croix
162C	12/31/2006	Roach Auto Service Inc.	St. Croix
163C	12/31/2006	Department of Public Works (Maintenance)	St. Croix
164C	12/31/2006	Innovative Telephone Company	St. Croix
165C	12/31/2006	Divi Carina Bay Resort	St. Croix
166C	12/31/2006	Monarch Heavy Equipment Rental	St. Croix
168C	12/31/2007	Unique Auto Repair	St. Croix
169C	12/31/2007	University of the Virgin Islands)STX)	St. Thomas
170C	12/31/2007	Francis Water Services	St. Croix
171C	12/31/2007	Ramco Transmission Repair	St. Croix

172C	12/31/2007	Old Time Auto Repair Shop	St. Croix
173C	12/31/2007	Tonn Motor Corp.	St. Criox
174CT	12/31/2007	Chitolie Trucking Equipment	St. Croix
175CT	12/31/2007	M & T Trucking	St. Croix

Waste Oil Collection by DPW

- Managed by Virgin Islands Department of Public Works
- Six collection sites for small waste oil generators on three islands
- Collect about 300 gal/6 weeks on St. Thomas and 150 on St. John, St. Croix
- PWD bought 2 oil collection trucks in 1997 which are used to collect the waste oil

The program is run on an as-needed basis; no dedicated staff is assigned on a full-time basis.

F. Wetlands Inventory Project

The inventory of the USVI wetlands and associated riparian areas is a joint project between Conservation Data Center, Island Resource Foundation and Eastern Caribbean Center of the University of the Virgin Islands, under supervision of the Virgin Islands Department of Planning and Natural Resources (DPNR). It was created as a response to questions from Region 2 Coastal Zone Management Program, the Division of Coastal Zone Management (CZM) and the Division of Environmental Protection (DEP) of the Virgin Islands Department of Planning and Natural Resources (DPNR).

The inventory is meant to serve the medium and long-term management needs of the Territory's unified watershed management strategies and processes.

The overall project is divided two phases: Phase 1is the design and testing of indicators suitable for the general description and characterization of wetlands in the US Virgin Island and Phase 2 is the compilation of the overall territorial database for wetlands.

The inventory project begins with a database of 636 wetlands as mapped in the Conservation Data Center's Rapid Environm ental Assessment (REA) of the US Virgin Islands.

The objectives of the project are to update and correct the mapping of 636 wetlands in the Virgin Islands Rapid Environmental Assessment (REA) and design and test basic monitoring tools for wetland characterization in the US Virgin Islands. The monitoring tools should be applied to eighteen reference watershed distributed in three broad classes for each island (undisturbed, highly disturbed and intermediate disturbed). The level of disturbance is based on the interpretation of the data produced by the Territory's Unified Watershed Assessment, the Watershed Priority Action Strategies and recent 305(b) Integrated Water Quality Assessment Reports. The monitoring tools will provide the inventory indicators based on the following measures:

A. Instrument measurement of wetland water characteristics (temperature, conductivity, salinity, pH, dissolved oxygen and turbidity);
B. Laboratory analysis of water quality for fecal and TKN measurement of nutrients;

C. Indicator of the functioning wetland of wetland vegetative classes;
D. Index of the Biological Integrity as wetlands and watershed scale;
E. Wetland sediment core measures.

The sampling will occur during the autumn season when wetlands are presumed wet during a full daylight periods (between two hours or more after sunrise and two hours or more before sunset). The field tests are going to be performed for 5 months from October 2003 to February 2004.

G. Water Quality Management Planning Program

The Water Quality Management Planning (WQMP) Program was created in 2000. Under the WQMP Grant (pursuant to CWA §604(b)), the V.I. Department of Planning and Natural Resources (DPNR), Division of Environmental Protection (DEP) is entrusted with the task of planning and implementing Water Quality Management Projects to ensure the protection of the marine waters of the USVI. Several duties that were formerly under the auspices of the Water Pollution Control Program were placed under WQMP.

Data storage, management, information sharing

The Storage and Retrieval of Water-Related Data (STORET) program is managed and updated by the Water Quality Management Planning Program and has been operating successfully for some time now. Data is easily extracted whenever necessary and data dumps are sent regularly to EPA Headquarters to be uploaded to the national STORET data warehouse. STORET plays a vital role in water quality assessment and reporting.

The Assessment Database (ADB) was fully implemented once the Virgin Islands defined assessment units for more comprehensive water quality assessments. ADB is a valuable tool for storing assessment information and retrieving it for reporting purposes. Research Triangle Institute released ADB version 2 for 2002. The data stored in ADB v. 2 is more accurate thanks to the VI Standard Waterbody Delination project completed last cycle. The VI has been steadily upgrading ADB v. 2 as necessary.

H. Coral Reef Monitoring

A number of agencies, including the United States Virgin Islands Government, have done sparse monitoring of coral reefs in the waters of the Virgin Islands for some time. Recently, the US Virgin Islands has identified a need to implement an intensive, long-term monitoring system. Coastal Zones Management, a division of the VI Department of Planning and Natural Resources, is in the process of preparing a proposal to the National Oceanic and Atmospheric Administration in hopes of receiving grant money to implement a long-term monitoring system.

According to the last available Coastal Zones Management Coral Reef Management report (obtained from their website at http://www.viczmp.com) a grant in the amount of $88,000 was prepared for the task of filling gaps in monitoring coverage of U.S. Coral Reef Ecosystems. Information to be obtained include:

1. Quantitative data on the amount of living coral, algae and other organisms on the reef;
2. Information on the condition of coral colonies such as the presence of disease or bleaching;
3. Survey of macro invertebrates (Sea Urchin, Diadena antillarum) and;
4. Census of reef fishes, particularly commercially important groupers and snappers.

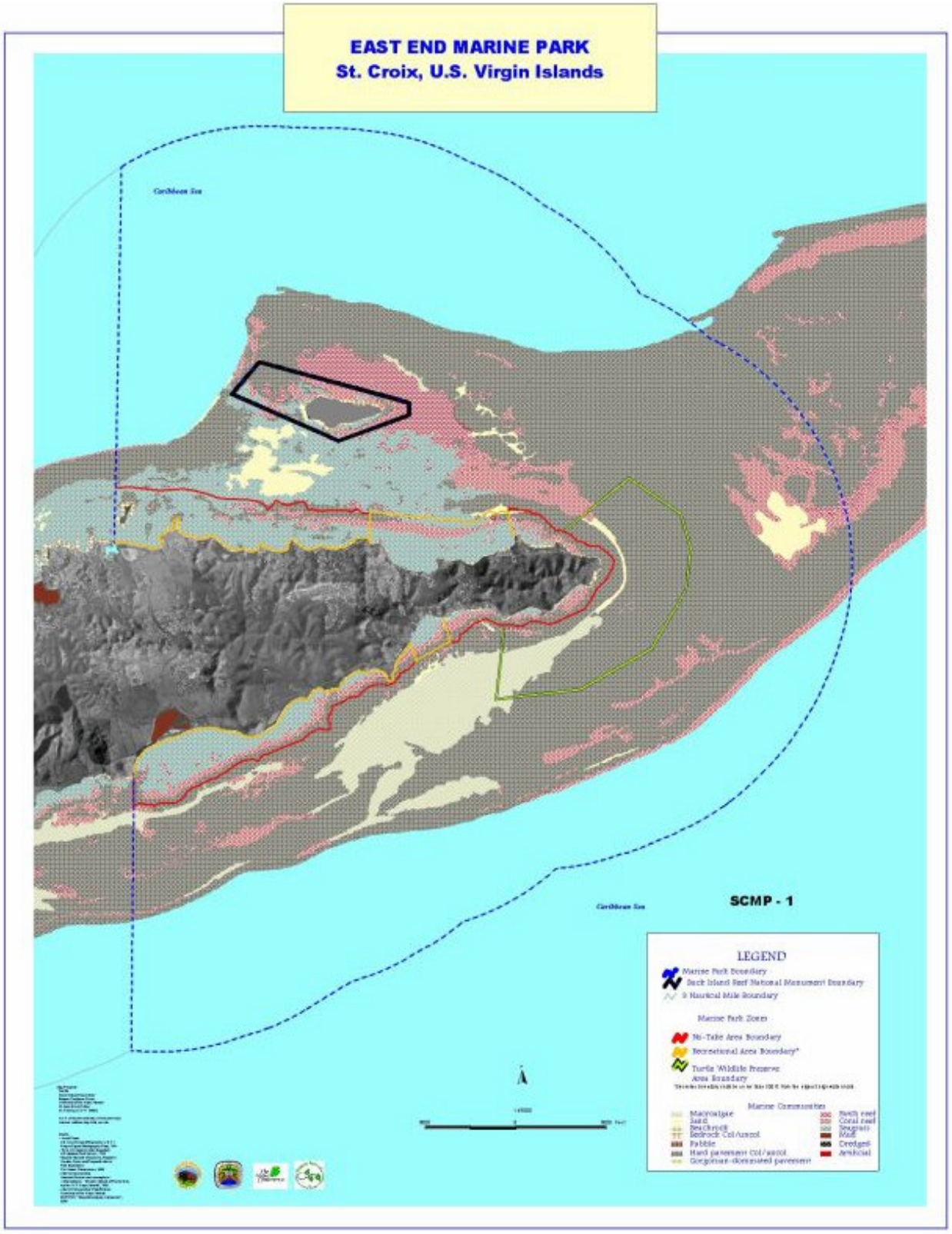
The Coral Reef Monitoring project is conducted under a memorandum of agreement between DPNR and the University of the Virgin Islands. Data collected from this project was used in a report to the National Oceanographic and Atmospheric Administration (NOAA) entitled 'Status of Coral Reefs in the U.S. Virgin Islands". The project is still in it's planning phase, but it is anticipated that once monitoring begins the project will steadily produce biological data.

The Government of the Virgin Islands embarked on a project to develop a Marine Park System Plan for the territory. This project had five main components:

1. Preparation of a Marine Park System Plan for the USVI;
2. Preparation of a Resource Description Report for the marine environment in the USVI;
3. A Socio-economic Assessment of the uses and users of the marine resources in the USVI;
4. Preparation of a Management Plan for the proposed marine park for the east end of St. Croix; and
5. Preparation of an information brochure about the marine parks.

A Marine Park Management Plan was completed on July 18, 2002. While the Marine Park is not specifically for the monitoring of coral reefs, the overall goal of the Marine Park Project is to establish the objectives, policies, and procedures for management of marine resources within the territorial waters of the U.S.V.I., through the development of marine protected areas. The Marine Park celebrated it's grand opening in October 23, 2003. The Department of Planning and Natural Resources must still promulgate a set of rules and regulations governing the use of the park, devise enforcement mechanisms and secure funding to run the park.

Figure II.H.4 The St. Croix East End Marine Park


EAST END MARINE PARK
St. Croix, U.S. Virgin Islands
Caribbean Sea
Caribbean Sea
SCMP - 1
LEGEND
Marine Park Boundary
Buck Island Reef National Monument Boundary
3 Nautical Mile Boundary
Marine Park Zones
No-Take Area Boundary
Recreational Area Boundary*
Turtle Wildlife Preserve Area Boundary
Marine Communities
Macroalgae
Sand
Seagrass
Bedrock Col/Azoic
Mud
Pebble
Dredged
Hard pavement Col/azoic
Artificial
Gorgonian-dominated pavement

I. Other Non-Point Source Activities

1. Education Outreach/ Non-point Source Newsletter

In order to increase the awareness of non point source pollution among school children, presentations were made reaching a majority of students. University of the Virgin Islands staff working with VI Education Department staff developed presentations on non-point source pollution and ways to prevent it. DPNR-DEP will continue to guide the activities of the NPS Committee to address NPS issues in the Territory and participate in various educational and environmental events to promote NPS awareness within the community and schools.

2. Public information dissemination/outreach

The Division of Environmental Protection added an Environmental Education and Outreach program during this cycle. The Environmental Education program has since been involved in numerous outreach projects (in most cases in conjunction with other DEP programs) including: used oil drives, elementary and high school presentations, environmental public service announcements, and the Non Point Source Conference. DEP has also been actively utilizing their website located at http://www.dpnr.gov.vi in order to disseminate information to the public, solicit comments on public documents, and inform the public of happenings within the Division.

Funded by Section 319 grant money, the quarterly publication of the *Non-point Source Newsletter* was published since December 1997. Its purpose is to educate and inform the public about the programs of the Non-point Source Committee and to increase the awareness of the different aspects of non-point source pollution. The newsletter was published regularly throughout this reporting period.

3. 8th Annual NPS Conference

The 8th Annual Non Point Source Conference was held on December 4-5, 2003 at the Westin St. John Resort and Villas. The conference brought together individuals involved in pollution prevention, resource conservation, research, and economic development in the Virgin Islands to examine environmental issues in the territory and throughout the Caribbean. Community groups, farmers, government personnel, members of the construction and boating industries, non-governmental organizations, researchers, students and vendors were all invited to participate.

PART III: SURFACE WATER ASSESSMENT

A. Current Surface Water Monitoring Program

EPA work plans require quarterly monitoring of sixty-four (64) stations around St. Croix, fifty-seven (57) stations around St. Thomas, and nineteen (19) around St. John. These sites are located offshore and are sampled by WPC staff using a vessel (thus these sites are commonly referred to as "boat" sites). DPNR acquired new boats f or St. Thomas/St. John and St. Croix during this reporting period that resulted in more regular site visits.

1. Monitoring Sites

Table III.A.1 142 Virgin Islands "Boat" Monitoring Sites

St. Croix 65 Sites Basic Water Quality Monitoring Stations (Boat)					
Stations	Class	Location	Stations	Class	Location
STC-1	B	Lagoon Recreational Beach	STC-29	B	Magic Isles Beach Resort
STC-2	B	Ft. Louise Augusta Beach	STC-30	B	Sprat hall Beach
STC-3	B	Buccaneer Hotel	STC-31	B	Davis Bay
STC-4	B	Tamarind Reef Lagoon	STC-32	B	Cane Bay
STC-5	B	Green Cay Beach	STC-33a	B	Columbus Landing (Salt River)
STC-6	A	Buck Island Beach	STC-33b	B	Shallow Grass bed (Salt River)
STC-7	A	Buck Island Anchorage	STC-33c	B	Salt River Marina (Salt River)
STC-8	B	Reef Club Beach	STC-33d	B	Sugar Bay (Salt River)
STC-9	B	St. Croix Yacht Club Beach	STC-33e	B	Deep Grass Bed (Salt River)
STC-10	B	Cramer's Park	STC-33f	B	Beach (Salt River)
STC-11b	B	Isaac Forereef	STC-33g	B	NOAA Dock (Salt River)
STC-12	B	Grapetree Beach/Turner Hole	STC-33h	B	Bird Sanctuary (Salt River)
STC-13a	B	Great Pond	STC-33i	B	Steeple (Salt River)
STC-13b	B	Robin Bay Backreef	STC-33j	B	Cove (Salt River)
STC-14a	B	Halfpenny Bay-Manchinel	STC-34	B	St. Croix By the Sea
STC-14b	B	Halfpenny Backreef	STC-35	B	Long Reef, Forereef W
STC-15	B	Canegarden Bay	STC-36	B	Long Reef, Forereef E
STC-16	C	Northwest End, Hess E Channel	STC-37	B	Christiansted Harbor Entrance W
STC-17	C	Northeast End, Hess W Channel	STC-38	B	Christiansted Harbor Entrance E
STC-18	C	Limetree Bay	STC-39	C	Altoona Lagoon Inlet
STC-19	C	Krause Lagoon Channel	STC-40	C	St. Croix Marine Marina
STC-20	C	Martin Marietta	STC-41	C	Gallows Bay
STC-21	B	Spoils Island Channel	STC-42	C	Public Wharf
STC-22a	B	Treatment Plant Outfall	STC-43	C	Water Gut
STC-22b	B	Outfall Break	STC-44	C	Protestant Cay Beach
STC-23	B	Public Dump	STC-45	C	Christiansted Harbor
STC-24a	B	Texaco Buoys	STC-46	C	V. I Water and Power

STC-24b	B	Rum Plant Outfall	STC-47	B	Mill Harbor Condominiums
STC-25	B	Carlton Beach	STC-48	B	Long Reef Backreef W
STC-26	B	Good Hope Beach	STC-49	B	Long Reef, Old Outfall
STC-27	B	Sandy Point Public Beach Resort	STC-50	B	Long Reef, Old Outfall
STC-28	C	Frederiksted Public Dock	STC-51	C	King Cross Street, Storm Drain

St. Thomas—58 Sites
Basic Water Quality Monitoring Stations (Boat)

Stations	Class	Location	Stations	Class	Location
STT-1	C	Crown Bay, near outfall	STT-21b	B	Red Bay
STT-2	C	Crown Bay, tamarind outlet	STT-22a	B	Red Hook Bay
STT-3	C	Sub-Base	STT-22B	B	Vessup Bay
STT-4	B	Krum Bay	STT-23	B	Great Bay
STT-5a	B	Lindbergh Bay, E	STT-24	B	Cowpet Bay
STT-5b	B	Lindbergh Bay	STT-25	B	Nazareth Bay
STT-6a	B	Dump (Station Eliminated)	STT-26	B	Benner Bay
STT-6b	B	Airport/College Cove	STT-27a	B	Mangrove Lagoon
STT-6c	B	SW Roads near Red Point Out	STT-27b	B	Mangrove Lagoon
STT-6d	B	Flat Cay, NE corner	STT-28a	B	Bovoni Bay
STT-7a	B	Brewers Bay	STT-28b	B	Bolongo Bay
STT-7b	B	Perserverance Bay	STT-29a	B	Frenchman's Bay
STT-8	B	Fortuna Bay	STT-29b	B	Limetree
STT-9	B	Botany Bay	STT-30	B	Morning Star Bay
STT-10	B	Stumpy Bay	STT-31a	B	Flamboyant Cove
STT-11	B	Santa Maria Bay	STT-31b	B	Hassel Island, of Navy dock
STT-12	B	Caret Bay	STT-31c	B	Hassel Island, Careening Cove
STT-13	B	Dorothea	STT-32a	C	Long Bay, S Dolphin
STT-14	B	Hull Bay	STT-32b	C	Long Bay, NE Corner
STT-15a	B	Magens Bay, NE	STT-33	C	Long Bay, off Outfall
STT-15b	B	Magens Bay, NW	STT-34	C	Long Bay, off Pump Stations
STT-16a	B	Mandahl Bay	STT-35	C	Garden Bay
STT-16b	B	Mandahl Bay Marina	STT-36	C	STT Harbor, Coast Guard
STT-17a	B	Springs Bay	STT-37	C	St. Thomas Harbor, Cay Bay

STT-17b	B	Sunsi Bay	STT-38	C	Haulover Cut
STT-18	B	Coki Bay	STT-39	B	Water Isle, E Gregerie Channel
STT-19	B	Water Bay	STT-40	B	Water Isles, Hotel Beach
STT-20	B	Smith Bay	STT-41	B	Water Isles, Flamingo Bay
STT-21a	B	St. John Bay	STT-42	B	Water Isles, Sprat Bay

St. John—19 Sites
Basic Water Quality Monitoring Stations (Boat)

Stations	Class	Location	Stations	Class	Location
STJ-43a	B	Cruz Bay, North of Pier	STJ-47	B	Rendezvous Bay
STJ-43b	B	Cruz Bay, South of Pier	STJ-48	B	Fish Bay
STJ-43c	B	Cruz Bay, Creek, Seaplane	STJ-49	B	Genti Bay
STJ-43d	B	Cruz Bay, Creek, North	STJ-50	B	Little Lameshur Bay
STJ-44a	A	Trunk Bay	STJ-51	B	Great Lameshur Bay
STJ-44b	B	Hawksnest Bay	STJ-52	B	Salt Pond Bay
STJ-44c	B	Cinnamon Bay	STJ-53	B	Coral Bay
STJ-44d	B	Francis Bay	STJ-54	B	Caneel Bay
STJ-45	B	Great Cruz Bay	STJ-55	B	Turner Bay
STJ-46	B	Chocolate Bay			

2. Monitoring Measurements

At each station, field measurements are made of the following:

Turbidity: expressed in Nephelometric Turbidity Units (NTU's) using an EPA recommended meter.

Dissolved Oxygen: expressed in mg/l saturation and measured with an EPA recommended meter.

Temperature: expressed in degrees Centigrade measured with a thermometer or collected from the Dissolved Oxygen Meter.

Salinity: expressed in parts per thousand and measured with an optical salinometer.

Secchi Depth: expressed in meters by a secchi depth recording light transparency.

Water samples are collected at each station and taken to a DPNR certified laboratory for **Fecal Coliform** analysis. Results are expressed as number of colonies per 100 milliliters. Multiple Tube Fermentation (MTF) procedure is generally used.

2002 and 2003 Monitoring Frequency

During this reporting period Ambient Monitoring was conducted with the following frequency:

FY-2002	**St. Thomas/St. John**	**St. Croix**
Quarter 1	No sampling	Boat sampling
Quarter 2	No sampling	Boat sampling
Quarter 3	Hurricane response sampling	Boat sampling
Quarter 4	No sampling	Boat sampling
FY-2003		
Quarter 1	No sampling	Boat sampling
Quarter 2	Routine sampling	Boat sampling
Quarter 3	Routine sampling	Boat sampling
Quarter 4	Routine sampling	Boat sampling

Figure III.A.1: St. Croix Waters Boat Monitoring Network

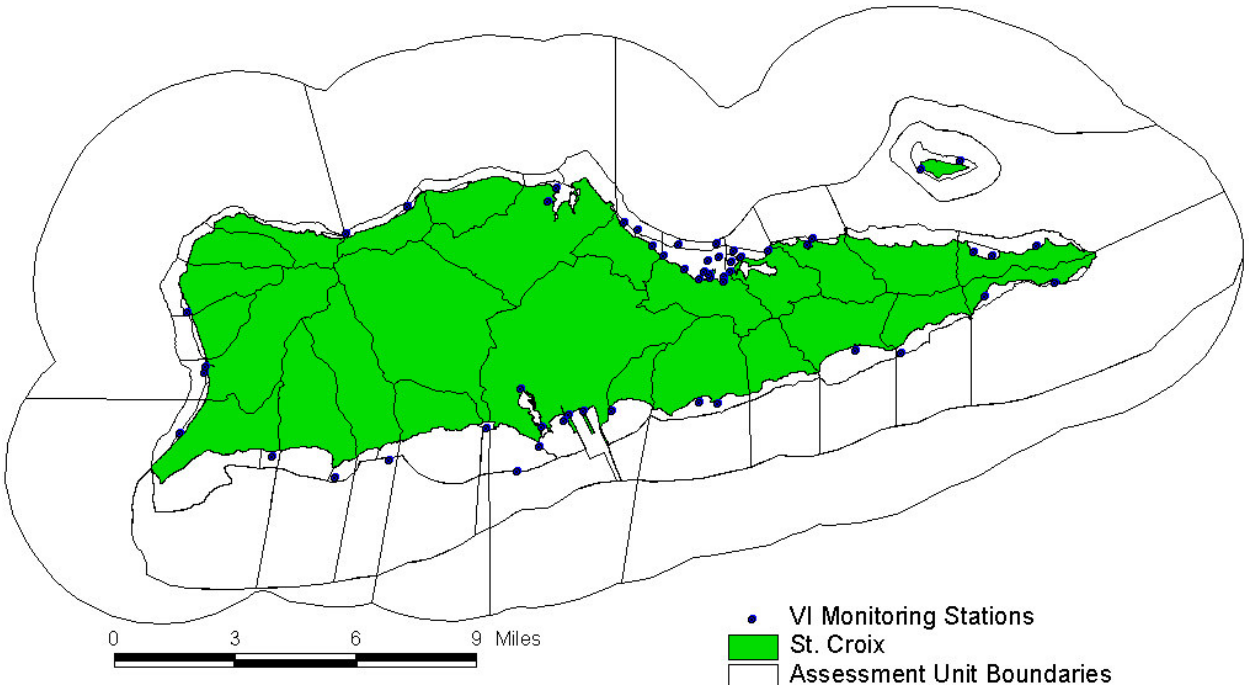
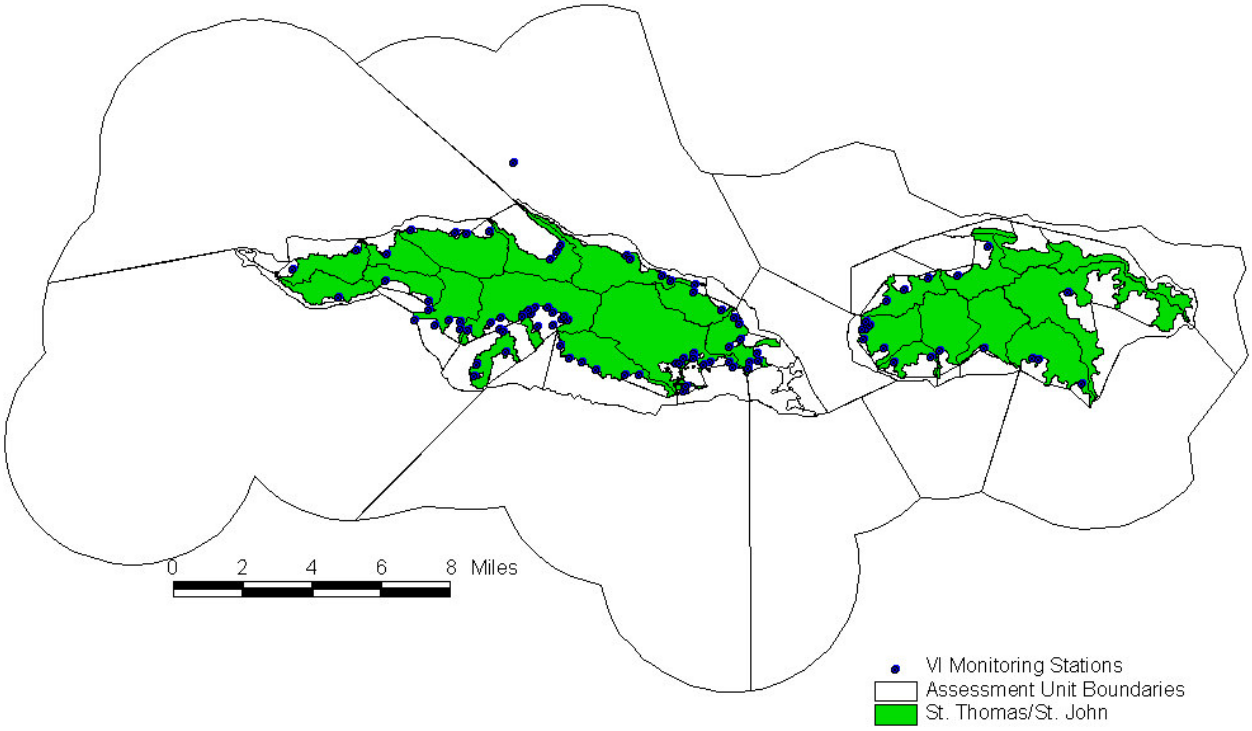


Figure III.A.2: St. Thomas/St. John Waters Boat Monitoring Network



Toxics/biological monitoring

No monitoring for toxics or biological effects is conducted in the Virgin Islands for lack of baseline standards for Virgin Islands conditions. According to the Virgin Islands multi-year monitoring strategy, DPNR will explore options for implementing a biological component of the Ambient Monitoring Program. This may include developing a partnership with NOAA or another agency with similar monitoring objectives.

Fish tissue, sediment, shellfish monitoring:

The Virgin Islands Water Pollution Control program does not include toxic chemicals or biological monitoring. The program also does not monitor fish tissue, sediment or shellfish for toxicity. A background analysis of ambient water quality has not yet been performed to support the adoption criteria for toxic chemicals (1996 VI 305(b)).

Quality assurance/quality control program

The Virgin Islands Department of Planning and Natural Resources Quality Assurance (QA) Program is committed to assuring and improving the quality of all environmental measurements performed by and for the Department. The goal of the QA program is for the acquisition of reliable and defensible environmental data. It is the policy of DPNR that adequate QA activities are conducted within the agency to ensure that all environmental data generated and processed be

scientifically valid, of known precision and accuracy, of acceptable completeness, representative, comparability and where appropriate, legally defensibly. During Fiscal Years 2002 and 2003 QA activities such as program technical audits, file audits, revision of the Quality Assurance Management Plan, Management System Reviews, review of program and contractual Quality Assurance Project Plans, review of all program Standard Operating Procedures, and Laboratory Certifications were performed. DPNR has a full-time QA/QC Officer who also acts the Laboratory Certification Officer for the Department.

Volunteer monitoring

DPNR had no monitoring volunteers during the reporting period. Volunteer monitoring, however, is being planned for implementation in future water program activities.

Program evaluation

- A background analysis of ambient water quality is needed to support the adoption of criteria for toxic pollutants (1998 305(b) Report);
- New equipment and staff training is needed to assess water quality for the development of toxic and biological criteria (1998 305(b) Report);
- Revisions of the existing Local Water Pollution Control Act and regulation are needed to enhance to program's ability to enforce its laws and statutes;
- Revisions to the Water Quality Standards and criteria to include numeric values instead of narrative description of desired water quality;
- Developing stormwater regulations to be implemented within the TPDES permitting program.

B. Assessment Methodology and Summary Data

1. Assessment Methodology for Use Support Determination

The Clean Water Act requires each state, territory and tribe to conduct water quality surveys to determine if its waters are healthy and of sufficient quality to meet their designated uses and attain water quality standards. A report is submitted every two years. It incorporates physical, chemical, and microbiological data from the STORET database, habitat assessments, and beach monitoring data (fish kills/advisories, oil spills, beach closings, etc.). Use of data is subject to availability.

The U.S. Environmental Protection Agency encourages states, territories and tribes to adopt the Integrated Reporting format which blends elements of the 305(b) Water Quality Assessment

Report and the 303(d) Impaired Waterbody List. The United States Virgin Islands intends to use this format to more accurately and completely assess our waterbodies.

Complete assessments include:

- **Identification of waterbody type.**
  The US Virgin Islands has not identified any freshwater with designated uses nor has established water quality standards for freshwaters. Therefore, only coastal waterbodies are included in the U.S. Virgin Islands 2004 Integrated Report. All available groundwater data will be reviewed for possible inclusion in the report and Division of Environmental Protection's Groundwater Program will provide groundwater the groundwater discussion in the 2004 Integrated Report. Wetlands data and information will also be included in the 2004 Integrated Report. At the very least, the Integrated Report should include an overview of groundwater and wetlands resources.

- **Identification of waterbody classification and designated use.**
  According to the US Virgin Islands water quality standards, the waters of the Virgin Islands exists in one of three classes: A, B and C. The following describes the geographical extent of the three waterbody classes, the associated designated uses, and the applicable water quality standards.

  Class A waters are designated for the preservation of natural phenomena requiring special conditions. Class B criteria will be applied towards an assessment Class A waters. Areas classified as Class A include:
    - The area within 0.5 miles of the boundaries of Buck Island's Natural Barrier Reef, St. Croix
    - Trunk Bay, St. John.

  Class B waters are designated for Primary Contact Recreation and Aquatic Life Use Support. Any coastal waterbody not classified as Class A or Class C are considered Class B waterbodies. The legal limits of Class B waterbodies as stated in the US Virgin Islands water quality standards include:

St. Thomas Class B Waters	St. Croix Class B Waters
• Mandahl Bay (Marina), • Vessup Bay, • Water Bay, and • Benner Bay	• Carlton Beach, • Good Hope Beach, • Salt River Lagoon (Marina), • Salt River Lagoon (Sugar Bay), • Estate Anguilla Beach, • Buccaneer Beach, • Tamarind Reef Lagoon, • Green Cay Beach, and • Enfield Green Beach

Class C waterbodies are designated for Primary Contact Recreation and Aquatic Life Use Support. The legal limits of Class C waterbodies as stated in the US Virgin Islands water quality standards include:

St. Thomas Class C Waters	St. Croix Class C Waters
• St. Thomas Harbor from Rupert Rock to Haulover Cut, • Crown Bay enclosed by a line from Hassel Island at Haulover Cut to Regis Point at West Gregerie Channel • Krum Bay	• Christiansted Harbor from Fort Louise Augusta to Golden Rock • Frederiksted Harbor from La Grange to Fisher Street • Hess Oil Virgin Islands Harbor • Marin-Marietta Alumina Harbor

Table III.B.1 Summary of Criterion Levels of Virgin Islands Water Quality Standards:

Criterion	Class B	Class C
Dissolved Oxygen	Not less than 5.5 mg/l from other than natural sources	Not less than 5.0 mg/l
pH	<8.3 Tolerable Limit>7.0	<8.5 Tolerable Limit>6.7
Temperature	Less than 90° Fahrenheit	Same as Class B
Bacteria	Not to exceed 70 fecal coliforms per 100 ml by MF or MPN count	Not to exceed 200 fecal coliforms per 100 ml by MF or MPN count
Dissolved Gas	Not to exceed 110% of existing atmospheric pressure	Same as Class B
Phosphorus	Not to exceed 50 mg/l in any coastal waters	Same as Class B
Suspended , colloidal or settleable solids	None from waste water which would cause deposition or be otherwise deleterious.	Same as Class B
Oil and Floating substances	No residue attributable to waste water. No visible film; no globules of grease	Same as Class B
Radioactivity	**Gross Beta:** 1000 picocuries per liter, in the absence of Sr 90 and alpha emitters **Radium-226:** 3 picocuries per liter **Strontium-90:** 10 picocuries per liter	Same as Class B
Taste and Odor	None in amounts to interfere with use for primary contact recreation, potable water supply or to render undesirable taste or odor to edible aquatic life	Same as Class B
Color and Turbidity	• A secchi disc shall be visible at a minimum depth of one meter • A maximum nephelometric turbidity unit reading of three (3) shall be permissible	Same as Class B, but no NTU standard in Rules and Regulations

- **Inventory of physical, chemical and microbiological data**
  The US Virgin Islands has been actively using STORET and has entered physical, chemical and microbiological data for fiscal years 1998-2003 with plans to enter data as far back as the early 1970' s. STORET data extracts from fiscal years 2002-2003 will be considered for the 2004 water quality assessment. The source of STORET's data is the result of the Division of Environmental Protection's Ambient Monitoring Program. The Water Pollution Control Program manages this program. Through the Ambient Monitoring Program, ambient water quality is monitored on a quarterly basis.

  The 2004 report will also consider data taken from other entities that monitor water quality in the US Virgin Islands. National Park Service and EPA have been identified as possible data sources. Every effort will be made to locate as many data sources as possible.

  The Assessment Database (ADB) will be a valuable tool in storing information regarding designated uses for waterbodies. ADB will also be useful in storing pollutant and stessor data pertinent to making accurate assessments. ADB will also store cause and source data.

- **Habitat assessment data inventory**
  The US Virgin Islands Division of Fish and Wildlife has been identified as a possible data source for habitat assessments. Data provided by Fish and Wildlife will be reviewed to determine possible use in the 2004 water quality assessment report.

- **Visual Data Sources**
  The Department of Planning and Natural Resources Division of Environmental Protection keeps a log of all incidents of oil spills, fish kills and other events that affect water quality in the US Virgin Islands. This log will be reviewed for all incidents that could have had a negative impact on US Virgin Islands water quality.

- **Identify exceedances of water quality standards**
  The US Virgin Islands water quality standards sets limits for various criteria. All readily available data that meet quality assurance / quality control requirements will be compared to the limits set by the USVI water quality standards to determine which waterbodies exceed these limits.

- **Use determination status**
  Use support determination is dependant upon the guidelines set by the United States Environmental Protection Agency's "Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates: Report Contents", "Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates: Supplement", and "2004 Integrated Water Quality Monitoring and Assessment Report Guidance".

- **Data gaps and error control**
  The US Virgin Islands will make every effort to control errors that may have been reported in data. Data determined to be erroneous or flawed will be discarded.

  It is understood that the US Virgin Islands has a number of data gaps. These gaps are not limited to existing data sets, but it can also refer to the lack of certain types of data. The Integrated Report will make mention of US Virgin Islands data gaps.

  The Integrated Report describes US Virgin Islands data gaps. Potential data gaps include beach closure data, habitat assessment data, toxicity and toxicant data, wetland assessment data, and intermittent streams data. Any data gaps that are identified will be included in the multi-year monitoring strategy for resolution.

- **Natural Disasters**
  Hurricane season in the US Virgin Islands lasts from June through November each year. As part of the Territory's post hurricane Emergency Response Plan (ERP) the Water Pollution Control program conducts ambient beach monitoring at each of the beach monitoring stations until the water quality is determined to meet water quality standards. There was no sampling this cycle related to natural disasters.

- **Data From Other Sources**
  DPNR will consider data received up to one week prior to the submission of the draft 303(d) Total Maximum Daily Load List. Last-minute data, while pertinent, delays the reporting process significantly. All data received past the deadline will reviewed for credibility and if determined to be of high quality and of great significance it may be added as an appendix. Otherwise, the data will be considered during the next cycle. Other data sources refer to any data that was collected outside of the US Virgin Islands Department of Planning & Natural Resources.

Monitored Waters

The coastal waters of the Virgin Islands are evaluated for the following uses: Primary Contact Recreation and Aquatic Life Use Support. All existing and readily available data and information will be assembled and used in the assessment

Use Support Determination

Waterbody delineations used for determining use support are derived from global information system (GIS) coverages. The Division of Environmental Protection is currently in the process of contracting professional services to develop a standard waterbody delineation based on a number of prevailing factors.

Presently, use support will be determined using the most current version of the US Virgin Islands water quality standards. Water quality standard revision was initiated and was estimated to be completed by June 2002. The revision is complete, but the revised standards have not yet been

adopted into the Virgin Islands Rules and Regulations. The revised standards include criteria accepting enterococci as a microbiological standard and the federal priority pollutants. Presently, the US Virgin Islands can only base use support on the current standards.

2. Ground Water Assessment

Ground Water Monitoring Program

Specific groundwater monitoring tasks

- Collect continuous ground-water level records at selected sites in the major well fields in the U.S. Virgin Islands; St. Croix. St. Thomas, and St. John.
- Conduct monthly measurement of ground water level at selected sites in the U.S. Virgin Islands.
- Collect meteorological data (instantaneous point measurements) at one consistent station at each island to document climatic variations and seasonal patterns and to consider long term trends.
- Collect ground-water samples once a year at selected well fields to monitor ground-water quality for possible effects of degradation (changes in water quality as measured since 1960) from saltwater encroachment. This includes testing for sulfates, anions, cations, alkalinity, and conductivity.

3. Surface Water Assessment

As part of the assessment process, each assessment is rated as being supporting, partially supporting, not supporting or not applicable (not applicable is usually the result of a data gap). Under the integrated reporting format, partially supporting and not supporting **are both considered impaired and will be listed under category 5 provided water quality standards are exceeded.** The VI uses partially supporting only as a measure of impairment severity. Severity is important in helping the VI design a schedule for total maximum daily loads. While partially supporting waters are listed as impaired, not supporting waters are listed as impaired and threatened.

In order to assess an assessment unit, data must be available from at least one assessment type in each designated use. Impairment of any single indicator will result in the waterbody being listed as impaired (for that parameter), even if the other indicators do not exceed the standards.

a. Primary Contact Recreation

Microbiological Assessment

The use support is based on single sample maximum allowable density of fecal coliforms, beach closing data and reported oil spills. The class of the water body determines allowable limits. Class A and B water bodies should not exceed 70 colonies/100mL in a single sample. Class C water bodies should not exceed 200 colonies/100mL in a single sample. The percent of total violations is evaluated as follows:

a. Fully Supporting: Less than 10% of the Samples exceed 70 or 200 colonies/100 mL respectively

b. Partially Supporting: 11%-25% of the Samples exceed 70 or 200 colonies/100 mL respectively

c. Not supporting: Greater than 25% of the Samples exceed 70 or 200 colonies/100 mL respectively

Beach Closing Assessment

In addition to pathogens, beach-closing data will be used to determine primary contact recreation use support. The matrix of allowable violations is as follows:

a. Supporting: No bathing area closures or restrictions in effect during reporting period.

b. Partially Supporting: On average, one bathing area closure per year of less that 1 week's duration

c. Not Supporting: On average, one bathing area closure per year of greater than 1 week's duration, or more than one bathing area closure per year.

The Department of Planning and Natural Resources only issues administrative advisories. Beach closures would only be enforced for very serious threats to human health. DEP is in the process of implementing a more formal beach-monitoring program. This program was originally designed for draft water quality standards that are currently awaiting promulgation. The initiation of this program is pending the development of a QAPP for current water quality standards. Implementation should occur by the end of 2004.

Toxicant Assessment (Human Health)

Considerations will be made for toxicants data (based on availability). The US Virgin Islands currently has no water quality standards for toxicants. The US Virgin Islands

does intend to, however, use the federally recommended limits (see *National Recommended Water Quality Criteria - Correction* dated April 1999). The conditions for use support is as follows:

a. Fully Supporting: No toxicants noted in either acute or chronic tests compared to controls or reference conditions.

b. Partially Supporting: No toxicants noted in acute tests, but may be present in chronic tests in either slight amounts and/or infrequently within an annual cycle.

c. Not Supporting: Toxicants noted in many tests and occurs frequently.

Other Parameters

Throughout the course of collecting data for this report, data that does not fit within the auspices of the other assessment categories of Primary Contact Recreation Use Support (e.g. aesthetics, pH, turbidity, algae, odor, etc.) will be considered under Other Parameters. The following guidelines apply where appropriate:

a. Fully Supporting: For any one pollutant or stessor, criteria exceeded in less than 10% of measurements.

b. Partially Supporting: For any one pollutant or stessor, criteria exceeded in 11% to 25% of measurements

c. Not Supporting: For any one pollutant, criteria exceeded in greater than 25% of measurements.

b. Aquatic Life Use Support

Habitat Assessment

Determination of Aquatic Life Use Support will consider habitat assessment data (based on availability) in relation to propagation of desired species of marine life. Habitat assessment data is considered as follows:

a. Fully Supporting: Reliable data indicate natural channel morphology, substrate composition, bank/riparian structure, and flow regime of region. Riparian vegetation of natural types and of relatively full standing crop biomass (i.e., minimal grazing or disruptive pressure).

b. Partially Supporting: Modification of habitat slight to moderate usually due to road crossings, limited riparian zones because of encroaching land use patterns, and some watershed erosion. Channel modification slight to moderate.

c. Not Supporting: Moderate to severe habitat alteration by channelization and dredging activities, removal of riparian vegetation, bank failure, heavy watershed erosion or alteration of flow regime.

DEP received no habitat assessment data for the 2002-2003 reporting cycle.

Toxicity Assessment

Considerations will be made for aquatic and/or sediment toxicity data (based on availability). Toxicity assessments relate to whole effluent toxicity. The US Virgin Islands currently has no water quality standards for toxicity. The US Virgin Islands does intend to, however, use the federally recommended limits. The conditions for use support is as follows:

a. Fully Supporting: No toxicity noted in either acute or chronic tests compared to controls or reference conditions.

b. Partially Supporting: No toxicity noted in acute tests, but may be present in chronic tests in either slight amounts and/or infrequently within an annual cycle.

c. Not Supporting: Toxicity noted in many tests and occurs frequently.

Conventional Assessment

Significant violations are determined for conventional parameters. Conventional parameters are evaluated using the frequency of violations.

The conventional parameters are:

Dissolved Oxygen, Temperature, Turbidity, and pH

The conditions for use support for the conventionals are as follows:

a. Fully Supporting: For any one pollutant or stessor, criteria exceeded in less than 10% of measurements.

b. Partially Supporting: For any one pollutant or stessor, criteria exceeded in 11% to 25% of measurements

c. Not Supporting: For any one pollutant, criteria exceeded in greater than 25% of measurements.

Toxicant Assessment (Aquatic Life)

Considerations will be made for toxicants data (based on availability). Toxicant assessments relate to ambient concentrations of toxics and corresponding water quality standards. The US Virgin Islands currently has no water quality standards for toxicants. The US Virgin Islands does intend to, however, use the federally recommended limits (see *National Recommended Water Quality Criteria - Correction* dated April 1999). The conditions for use support is as follows:

a. Fully Supporting: No toxicants noted in either acute or chronic tests compared to controls or reference conditions.

b. Partially Supporting: No toxicants noted in acute tests, but may be present in chronic tests in either slight amounts and/or infrequently within an annual cycle.

c. Not Supporting: Toxicants noted in many tests and occurs frequently.

Biological Assessment

Upon identifying a source of data to apply towards a biological assessment, the conditions for use support is as follows:

a. Fully Supporting: Reliable data indicate functioning, sustainable biological assemblages (e.g., fish, macroinvertebrates, or algae) none of which has been modified significantly beyond the natural range of the reference condition.

b. Partially Supporting: At least one assemblage (e.g., fish, macroinvertebrates, or algae) indicates moderate modification of the biological community compared to the reference condition.

c. Not Supporting: At least one assemblage indicates nonsupport. Data clearly indicates severe modification of the biological community compared to the reference condition.

DEP received no biological data for the 2002-2003 reporting cycle.

Listing Rules

This methodology groups assessments as follows:

Primary Contact Recreation (PCR) Indicators	**Aquatic Life Use Support (ALUS) Indicators**
Microbiological Assessment Beach Closing Assessment Toxicant Assessment (Human Health) Other Parameters	Habitat Assessment Toxicity Assessment Conventional Assessment Toxicant Assessment (Aquatic Life) Biological Assessment

Category 1
The assessment unit is placed in this category if it meets the water quality standards for the parameters that define support for both Primary Contact Recreation (PCR) & Aquatic Life Use Support (ALUS).

Category 2
The assessment unit is placed in this category if it attains water quality standards for the parameters that define support for either PCR or ALUS but data is insufficient to determine support for the other use. In addition, there is no data to indicate that the uses are threatened under the US EPA definition of threatened. Waters with insufficient data will be scheduled for more extensive monitoring in the USVI's multi-year monitoring schedule.

Category 3
The assessment unit is placed it this category if insufficient or no data is available to determine if water quality standards are attained and any designated uses are supported. The Virgin Islands considers insufficient data as anything less than four quarters of monitoring data. However, waters with less than four quarters of monitoring data may be reviewed on a case-by-case basis if the limited data strongly suggests that water quality standards are exceeded and the designated uses are impaired. Such waters may be eligible for inclusion on the 303(d) List. Remaining waters with insufficient data will be scheduled for more extensive monitoring in the USVI's multi-year monitoring schedule.

For the 2004 Integrated Report, DEP proposes the following Category 3 subcategories:

Category 3A
No data is available from any of the identified data sources for the assessment unit in question.

Category 3B
Insufficient Data is available from any of the identified data sources for the assessment unit in question. Insufficient data is defined as less than four quarters of monitoring data. This category differs from Category 2 in that this condition must apply to all designated uses.

Category 3C
Inconclusive Data is available from any of the identified data sources for the assessment unit in question. This might include information from studies that do not directly provide information related to water quality standards.

Category 3D
Unreliable or low quality data is available from any of the identified data sources for the assessment unit in question. Unreliable or low quality data is defined as data sets that have significant gaps, obvious anomalies, etc.

Category 4
Assessment units that are found to be partially or not supporting for one or both designated uses are place in category 4 under the appropriate subcategory (4A, 4B, 4C).

Category 4A
The assessment unit is placed in this category if it was previously listed on the 303(d) list and a total maximum daily load has been established and approved by EPA.

Category 4B
The assessment unit is placed into this category only if other pollution control requirements are expected to address all water-pollutant combinations and attain all water quality standards within a reasonable period of time. The Virgin Islands considers a reasonable period of time as being the time between reporting cycles. If the impairment is the result of a point source discharge, is expected that the Territorial Pollution Discharge Elimination System (TPDES) program will take appropriate measures to control point source pollution. If the impairment is the result of non-point source pollution, DPNR will provide evidence that a pollution control measure is in place.

Category 4C
The assessment unit is placed into this category if the impairment was not caused by a pollutant. Assessment units place into this category must show improvement by the next reporting cycle. If the impairment persists because of current conditions it will be moved into Category 5. If the assessment unit shows improvement since the last cycle it will be moved into either Category 1 or 2. If the data available is insufficient to make an assessment, the assessment unit will be moved to Category 3 (see Category 3 for more detail).

Category 5
The assessment unit is placed into this category if water quality standards are exceeded in which case a total maximum daily load must be established. Assessment units that are placed into Category 5 will be placed on the 2004 303(d) Total Maximum Daily Load List.

De-listing

Assessment Units (AU) that were listed as impaired on the 2002 303(d) list will be listed in Category 5 unless any of the following occur:

- AUs that, after the evaluation of the existing and readily available data meet the applicable water quality standards. Such a waterbody may be moved to Category 1 or 2 after 2 cycles (4 years) of more recent data demonstrates attainment. This type of de-listing action requires the data to be complete, reproducible, and defensible.

- AUs for which the original basis for listing is determined to be inaccurate may be

moved to Category 1 or 2 if a re-examination of the data shows that the segments meet water quality standards, or to Category 3 if there is insufficient data to make a determination.

- The AU in question already has an EPA approved TMDL, in which case it will be placed in Category 4A.

4C Waters

The 2002 Integrated Report listed a large amount of 4C waters. Waters that were previously listed in Category 4C were included in Category 1, Category 2, or Category 5, which constitutes the 303(d) List.

Table III.B.2 2002 4C Waters

St. Thomas Cat 4C Waters	St. John Cat 4C Waters	St. Croix Cat 4C Waters
Botany Bay (01)	Caneel Bay (01)	Fredericksted Harbor (02)
Stumpy Bay (02)	Hawksnest Bay (02)	Christiansted Harbor (26)
Santa Maria Bay (04)	Trunk Bay (03)	Long Reef Forereef, east (27)
Caret Bay (05)	Cinnamon Bay (05)	Beauregard Bay (30)
Dorothea (07)	Maho Bay/Francis Bay (06)	Altona Lagoon, subwatershed offshore (32)
Hull Bay (08)	Minnebeck Bay (10)	Tamarind Reef Lagoon (Southgate Lagoon) (35)
Water Bay (18)	Round Bay (15)	Teague Bay (37)
Smith Bay (19)	Salt Pond Bay (17)	Canegarden Bay (59)
St. John Bay (21)	Genti Bay, nearshore (21)	Limetree Bay (62)
Nazareth Bay (31)	Fish Bay (23)	Hovensa, subwatershed offshore (66)
Frenchman Bay, subwatershed East (36)	Cruz Bay (30)	Good Hope Beach (79)
Frenchman Bay (37)		
Morningstar Bay (39)		
Gregerie Channel (45)		
Flamingo (50)		
Lindbergh Bay (52)		

Cyril E. King Airport, subwatershed offshore (53)		
Brewers Bay (55)		
Perseverance Bay (56)		
Fortuna Bay (57)		

Monitoring Strategy

The Water Pollution Control Program develops the Division of Environmental Protection's monitoring strategy. The current monitoring strategy addresses the integrated five categories and the assessment units delineated before the 2002 report. The monitoring strategy is available for inclusion in this methodology and is attached as an appendix.

The Water Pollution Control Program developed the following Multi-Year Monitoring Strategy (attachment to this methodology) in which a monitoring plan was detailed for 9 years from the point of its creation:

FY 2004

- Develop a comprehensive monitoring and assessment program
- Documentation and mapping of the USVI wetlands
- Database design
- Analysis of all wetlands and riparian areas
- Land ownership records
- Review of Quality Assurance Project Plan for monitoring and data analysis
- Establish monitoring priorities and targets
- Definition of field survey protocols
- Preliminary field data collection on water quality
- Characterization of plant communities and plant species
- DPNR training on data collection and GIS application
- Training on Clean Water Act, Oil Pollution Act and SPCC Wetlands and Regulation
- Develop mangrove restoration plan for Salt River
- Reassessment of the 13 category I watersheds

FY 2005

- Develop a comprehensive monitoring and assessment program
- Documentation and mapping of the USVI wetlands
- Database design
- Review of Quality Assurance Project Plan for new monitoring and data analysis
- Establish monitoring priorities and targets
- Definition of field survey protocols
- Preliminary field data collection on water quality
- Characterization of plant communities and plant species

- Characterization of aquatic life
- Start mangrove restoration for Salt River
- Develop Watershed Restoration Strategies for Salt River
- Training on wetland mitigation and delineation
- Training on watershed assessment
- Develop Watershed Restoration Strategies for Salt River and Benner Bay
- BASINS training

FY 2006

- Implement a comprehensive monitoring and assessment program
- Input data on the database
- Review of Quality Assurance Project Plan for new monitoring and data analysis
- Field data collection on water quality
- Data collection on biological assemblages
- Develop standards for wetland health based on water quality and biological assemblages
- Characterization of plant communities and plant species
- Start mangrove restoration for Salt River
- Implement Watershed Restoration Strategies for Salt River and Benner Bay

FY 2007

- Implement a comprehensive monitoring and assessment program
- Input data on the database
- Review of Quality Assurance Project Plan for new monitoring and data analysis
- Field data collection on water quality
- Data collection on biological assemblages
- Develop standards for wetland health based on water quality and biological assemblages
- Characterization of plant communities and plant species
- Continue mangrove restoration for Salt River
- Implement Watershed Restoration Strategies for Salt River and Benner Bay

FY 2008

- Implement a comprehensive monitoring and assessment program
- Input data on the database
- Aggregate wetlands by similar types of stressors
- Input information from database on GIS
- Field data collection on water quality
- Data collection on biological assemblages
- Develop standards for wetland health based on water quality and biological assemblages
- Characterization of plant communities and plant species
- Start mangrove restoration for Salt River
- Implement Watershed Restoration Strategies for Salt River and Benner Bay

FY 2009

- Review the wetlands monitoring and assessment program
- Input data on the database
- Field data collection on water quality
- Data collection on biological assemblages
- Develop standards for wetland health based on water quality and biological assemblages
- Characterization of plant communities and plant species
- Continue mangrove restoration for Salt River
- Implement Watershed Restoration Strategies for Salt River and Benner Bay
- Training on wetland restoration

FY 2010

- Review the wetlands monitoring and assessment program
- Input data on the database
- Review of Quality Assurance Project Plan for new monitoring and data analysis
- Field data collection on water quality
- Data collection on biological assemblages
- Test and evaluate standards for wetland health based on water quality and biological assemblages
- Characterization of plant communities and plant species
- Continue mangrove restoration for Salt River
- Implement Watershed Restoration Strategies for Salt River and Benner Bay
- Develop Great Pond Enhancement Plan

FY 2011

- Make appropriate changes to the wetlands monitoring and assessment program
- Input data on the database
- Review of Quality Assurance Project Plan for new monitoring and data analysis
- Review procedures for field data collection on water quality
- Review procedures for data collection on biological assemblages
- Present a complete assessment report on USVI wetlands health and water quality
- Evaluate results from mangrove restoration project in Salt River
- Implement Watershed Restoration Strategies for Salt River and Benner Bay
- Implement Great Pond enhancement plan

FY 2012

- Continue with wetlands monitoring and assessment program
- Input data on the database
- Field data collection on water quality
- Data collection on biological assemblages
- Review of assessment report on USVI wetlands health and water quality
- Establish a mangrove restoration plan for critical areas based on the Salt River experience
- Implement Watershed Restoration Strategies for Salt River and Benner Bay
- Implement Great Pond enhancement plan

FY 2013

- Prepare a management plan for the USVI wetlands
- Establish regulations for USVI wetlands
- Identify new areas for wetland restoration
- Implement Watershed Restoration Strategies for Salt River and Benner Bay
- Implement Great Pond enhancement plan

Section 303(d) Waters

Section 303(d) of the Clean Water Act requires States and Territories to develop a list of impaired waters needing TMDLs every even-numbered calendar year. An impaired waterbody is one for which technology-based pollution controls are not stringent enough to attain or maintain compliance with applicable State and Territory water quality standards. In order for a water quality-limited waterbody to attain water quality standards, a Total Maximum Daily Load (TMDL) must be developed and implemented specifically for that waterbody and pollutant(s) of concern. A TMDL is a quantitative assessment of the amount of pollution that a certain waterbody can assimilate while still meeting water quality standards.

In February 2004, and subsequently in April 2004, the Virgin Islands Department of Planning and Natural Resources released the 2004 TMDL list for public comment. The final list consists of 49 assessment units listed for a variety of impairments. A total of 33 assessment units have been added since the 2002 TMDL list. The reason for such a large number of additions is accredited to revisions in the assessment methodology and the interpretation of that methodology. The 2004 Total Maximum Daily Load List is attached to this report as Attachment.

C. Estuary and Coastal Assessment

Designated Use Support Summary

Assessment of the Virgin Islands' coastal waters is presented in (estimated) square miles of assessment unit boundaries. Some 650 square miles are assessed in this report. A summary of use support assessments for coastal waters is shown in Table III.C.2. It is important to remember that the Virgin Islands only uses the fully, partially and non-supporting categories to determine severity of impairments. Partially and non-supporting are both considered impaired. The mileage presented is based on Global Information Systems (GIS) approximations.

Table III.C.1 Waterbodies, Segments, and Categories

AU ID	AU Name	AU Size (sq. mi.)	305(b) Category	Integrated Category
VI-STT-01	Botany Bay	0.1576	Fully Supporting	1
VI-STT-02	Stumpy Bay	0.0597	Fully Supporting	1
VI-STT-03	Botany Bay subwatershed, offshore	1.309	Insufficient Information	3A

VI-STT-04	Santa Maria Bay	0.3617	Partially Supporting	5
VI-STT-05	Caret Bay	0.0266	Partially Supporting	5
VI-STT-06	Neltjeberg Bay	0.0562	Insufficient Information	3B
VI-STT-07	Dorothea	0.0254	Partially Supporting	5
VI-STT-08	Hull Bay	0.2049	Partially Supporting	5
VI-STT-09	Dorothea Bay subwatershed, offshore	0.7673	Insufficient Information	3A
VI-STT-10	Magens Bay	1.6208	Partially Supporting	5
VI-STT-11	Northwest St. Thomas HUC14, offshore	55.088	Insufficient Information	3A
VI-STT-12	Lovenlund Bay	0.0228	Insufficient Information	3A
VI-STT-13	Mandahl Bay (Marina)	0.0131	Partially Supporting	5
VI-STT-14	Tutu Bay	0.0414	Insufficient Information	3A
VI-STT-15	Sunsi Bay	0.0152	Partially Supporting	5
VI-STT-16	Spring Bay	0.0102	Partially Supporting	5
VI-STT-17	Mandahl Bay subwatershed, offshore	1.1379	Partially Supporting	5
VI-STT-18	Water Bay	0.0845	Not Supporting	5
VI-STT-19	Smith Bay	0.1187	Not Supporting	5
VI-STT-20	Smith Bay subwatershed, offshore	0.4103	Insufficient Information	3A
VI-STT-21	St. John Bay	0.0411	Partially Supporting	5
VI-STT-22	Red Bay	0.0078	Partially Supporting	5
VI-STT-23	Vessup Bay	0.0619	Not Supporting	5
VI-STT-24	Red Hook Bay	0.1772	Fully Supporting	1
VI-STT-25	Great Bay	0.5593	Partially Supporting	5
VI-STT-26	Red Hook Bay, offshore	0.4725	Insufficient Information	3A
VI-STT-27	St. James Islands, offshore	0.6691	Insufficient Information	3A
VI-STT-28	Cowpet Bay	0.0757	Fully Supporting	1
VI-STT-29	St. James Bay	1.2439	Insufficient Information	3A
VI-STT-30A	Northeast St. Thomas HUC14, offshore north	42.927	Insufficient Information	3A
VI-STT-30B	Northeast St. Thomas HUC14, offshore south	24.908	Insufficient Information	3A
VI-STT-31	Nazareth Bay	0.1793	Insufficient Information	3B
VI-STT-32	Jersey Bay, offshore	1.2925	Fully Supporting	1
VI-STT-33	Benner Bay	0.4187	Not Supporting	4A
VI-STT-34	Benner Bay Lagoon Marina	0.0355	Not Supporting	5
VI-STT-35	Mangrove Lagoon	0.2931	Not Supporting	5
VI-STT-36	Frenchman Bay subwatershed, east	0.3532	Fully Supporting	1
VI-STT-37	Frenchman Bay	0.0195	Partially Supporting	5
VI-STT-38	Limetree Bay	0.0065	Partially Supporting	5
VI-STT-39	Morningstar Bay	0.0215	Partially Supporting	5
VI-STT-40	Pacquereau Bay	0.0453	Fully Supporting	1
VI-STT-41	Frenchman Bay subwatershed, offshore	2.9233	Insufficient Information	3A
VI-STT-42	Southeast St. Thomas HUC14, offshore	50.939	Insufficient Information	3A
VI-STT-43	St. Thomas Harbor, inner	0.7495	Fully Supporting	1
VI-STT-44	St. Thomas Harbor, outer	1.2128	Insufficient Information	3A
VI-STT-45	Gregerie Channel	1.7072	Not Supporting	5
VI-STT-46	Sprat Bay	0.3814	Insufficient Information	2
VI-STT-47	Hassel Island at Haulover Cut to Regis Point	0.2074	Partially Supporting	5
VI-STT-48	Water Isle Hotel, Beach	0.0057	Insufficient Information	3A
VI-STT-49	Druif Bay	0.0331	Insufficient Information	2
VI-STT-50	Flamingo	0.061	Not Supporting	5
VI-STT-51	Krum Bay	0.0754	Fully Supporting	1
VI-STT-52	Lindbergh Bay	0.2612	Insufficient Information	2

VI-STT-53	Cyril E. King Airport subwatershed, offshore	0.8499	Insufficient Information	2
VI-STT-54	Perseverance Bay, offshore	0.4734	Insufficient Information	2
VI-STT-55	Brewers Bay	0.1076	Insufficient Information	2
VI-STT-56	Perseverance Bay	0.2114	Insufficient Information	2
VI-STT-57	Fortuna Bay	0.0827	Insufficient Information	2
VI-STT-58	Fortuna Bay subwatershed, offshore	0.6553	Insufficient Information	3A
VI-STT-59	Northwest St. Thomas HUC14, offshore	77.71	Insufficient Information	3B
VI-STJ-01	Caneel Bay	0.2623	Not Supporting	5
VI-STJ-02	Hawksnest Bay	0.2246	Not Supporting	5
VI-STJ-03	Trunk Bay	0.0685	Not Supporting	5
VI-STJ-04	Hawksnest Bay subwatershed, offshore	1.7287	Insufficient Information	3D
VI-STJ-05	Cinnamon Bay	0.1456	Not Supporting	5
VI-STJ-06	Maho Bay/Francis Bay	0.346	Not Supporting	5
VI-STJ-07	Maho Bay subwatershed, offshore	1.6071	Insufficient Information	3A
VI-STJ-08	Mary Point	0.4831	Insufficient Information	3A
VI-STJ-09	Leinster Bay	0.6627	Insufficient Information	3D
VI-STJ-10	Minnebeck Bay	1.4876	Insufficient Information	3D
VI-STJ-11	Newfound Bay	0.0765	Insufficient Information	3A
VI-STJ-12	North St. John HUC14, offshore	23.719	Insufficient Information	3A
VI-STJ-13	Coral Harbor	0.6965	Insufficient Information	3A
VI-STJ-14	Hurricane Hole	0.7689	Insufficient Information	3D
VI-STJ-15	Round Bay	0.6015	Insufficient Information	3B
VI-STJ-16	Coral Bay	2.2337	Insufficient Information	3D
VI-STJ-17	Salt Pond Bay	0.1978	Insufficient Information	3B
VI-STJ-18	Grootman Bay	0.1046	Insufficient Information	3A
VI-STJ-19	Great Lameshur Bay	0.359	Insufficient Information	3B
VI-STJ-20	Southeast St. John HUC14, offshore	24.319	Insufficient Information	3A
VI-STJ-21	Genti Bay, nearshore	0.0947	Insufficient Information	3B
VI-STJ-22	Genti Bay, offshore	0.769	Insufficient Information	3A
VI-STJ-23	Fish Bay	0.2103	Insufficient Information	2
VI-STJ-24	Fish Bay subwatershed, offshore	0.1824	Insufficient Information	3A
VI-STJ-25	Rendezvous Bay	0.4677	Insufficient Information	2
VI-STJ-26	Chocolate Hole	0.1004	Not Supporting	5
VI-STJ-27	Rendezvous Bay subwatershed, offshore	0.1863	Insufficient Information	3A
VI-STJ-28	Great Cruz Bay	0.1396	Not Supporting	5
VI-STJ-29	Turner Bay/Enighed Pond	0.057	Insufficient Information	3B
VI-STJ-30	Cruz Bay	0.0674	Not Supporting	5
VI-STJ-31	Great Cruz Bay watershed, offshore	0.5775	Insufficient Information	3A
VI-STJ-32	Southwest St. John HUC14, offshore	10.142	Insufficient Information	3A
VI-STJ-33	Pillsbury Sound	6.9399	Insufficient Information	3A
VI-STC-01	Frederiksted, south	0.0451	Insufficient Information	3A
VI-STC-02	Frederiksted Harbor	0.035	Fully Supporting	1
VI-STC-03	Lagrange subwatershed, offshore	0.375	Insufficient Information	3A
VI-STC-04	Prosperity, nearshore	0.1118	Insufficient Information	3A
VI-STC-05	Prosperity subwatershed, offshore	0.5129	Insufficient Information	3A
VI-STC-06	Sprat Hall Beach	0.0609	Fully Supporting	1
VI-STC-07	Creque Dam/Butler Bay	0.529	Insufficient Information	3A
VI-STC-08	Hams Bay	0.3144	Insufficient Information	3A
VI-STC-09	Davis Bay	0.0522	Insufficient Information	3A
VI-STC-10	Hams Bluff	0.5506	Insufficient Information	3A
VI-STC-11	Northwest St. Croix HUC14, offshore	33.302	Insufficient Information	3A

VI-STC-12	Cane Bay	0.0613	Fully Supporting	1
VI-STC-13	Baron Bluff subwatershed	0.3498	Fully Supporting	1
VI-STC-14	Belvedere	0.0557	Insufficient Information	3A
VI-STC-15	Northside subwatershed	0.6109	Insufficient Information	3A
VI-STC-16	Salt River Lagoon, Marina	0.0194	Not Supporting	5
VI-STC-17	Salt River Lagoon, Sugar Bay	0.3244	Insufficient Information	3A
VI-STC-18	Salt River Bay	0.3229	Fully Supporting	1
VI-STC-19	Judith Fancy	0.01	Insufficient Information	3A
VI-STC-20	Salt River Bay subwatershed, west	0.2433	Insufficient Information	3A
VI-STC-21	Salt River Bay subwatershed, east	0.8922	Insufficient Information	3A
VI-STC-22	Northcentral St. Croix HUC14, offshore	23.61	Insufficient Information	3A
VI-STC-23	St. Croix-By-the-Sea	0.0727	Not Supporting	5
VI-STC-24	Long Reef Backreef, west	0.1153	Partially Supporting	5
VI-STC-25	Princess subwatershed, offshore	0.4343	Fully Supporting	1
VI-STC-26	Christiansted Harbor	0.9601	Not Supporting	5
VI-STC-27	Long Reef Forereef, east	0.3149	Not Supporting	5
VI-STC-28	Altona Lagoon	0.2337	Insufficient Information	3A
VI-STC-29	Christiansted Harbor, east	0.1089	Fully Supporting	1
VI-STC-30	Beauregard Bay	0.2145	Fully Supporting	1
VI-STC-31	Buccaneer Beach	0.0166	Partially Supporting	5
VI-STC-32	Altona Lagoon subwatershed, offshore	0.6812	Insufficient Information	3A
VI-STC-33	Punnett Bay	0.0576	Insufficient Information	3A
VI-STC-34	Punnett Point, east	0.0223	Insufficient Information	3A
VI-STC-35	Tamarind Reef Lagoon (Southgate Lagoon)	0.0205	Not Supporting	5
VI-STC-36	Green Cay Beach	0.1017	Insufficient Information	3A
VI-STC-37	Southgate subwatershed, offshore	2.2219	Partially Supporting	5
VI-STC-38	Solitude Backreef	0.9681	Insufficient Information	3A
VI-STC-39	Teague Bay	0.1773	Not Supporting	5
VI-STC-40	Teague Bay Backreef	0.8547	Partially Supporting	5
VI-STC-41	Buck Island Backreef	0.7675	Fully Supporting	1
VI-STC-42	Buck Island Forereef	3.3497	Insufficient Information	3A
VI-STC-43	Solitude and Teague Bay subwatersheds, offshore	18.822	Insufficient Information	3A
VI-STC-44	Northeast St. Croix HUC14, offshore.	36.088	Insufficient Information	3A
VI-STC-45	Isaac Bay	0.0853	Insufficient Information	3A
VI-STC-46	Grapetree Bay	0.0425	Fully Supporting	1
VI-STC-47	Turner Hole Backreef	0.2772	Fully Supporting	1
VI-STC-48	Turner Hole subwatershed, offshore	16.949	Insufficient Information	3A
VI-STC-49	Madam Carty Backreef	0.464	Fully Supporting	1
VI-STC-50	Madam Carty, offshore	3.5161	Insufficient Information	3A
VI-STC-51	Great Pond	0.1578	Insufficient Information	3A
VI-STC-52	Great Pond Bay	1.0184	Fully Supporting	1
VI-STC-53	Great Pond Bay subwatershed, offshore	3.0288	Insufficient Information	3A
VI-STC-54	Leprey Valley Backreef	0.3712	Insufficient Information	3A
VI-STC-55	Leprey Valley subwatershed, offshore	2.8455	Insufficient Information	3A
VI-STC-56	Bugby Hole Backreef	0.7042	Partially Supporting	5
VI-STC-57	Bugby Hole subwatershed, offshore	3.9	Insufficient Information	3A
VI-STC-58	Southeast St. Croix HUC14, offshore	24.146	Insufficient Information	3A
VI-STC-59	Canegarden Bay	0.8542	Fully Supporting	1
VI-STC-60	Canegarden Bay, offshore	0.7933	Insufficient Information	3A
VI-STC-61	Hess Oil Virgin Islands Harbor	0.671	Not Supporting	5
VI-STC-62	Limetree Bay	0.7239	Fully Supporting	1

VI-STC-63	Martin-Marietta Alumina Harbor	0.3228	Fully Supporting	1
VI-STC-64	Manning Bay/Estate Anguilla Beach	0.0508	Partially Supporting	5
VI-STC-65	Hovensa, west	1.2865	Fully Supporting	1
VI-STC-66	Hovensa subwatershed, offshore	2.8305	Insufficient Information	3A
VI-STC-67	Southports St. Croix HUC14, offshore	8.1966	Insufficient Information	3A
VI-STC-68	Bethlehem subwatershed, inshore	0.2149	Insufficient Information	3A
VI-STC-69	Bethlehem subwatershed, offshore	0.3971	Insufficient Information	3A
VI-STC-70	Airport, nearshore	2.1943	Insufficient Information	3A
VI-STC-71	Airport, offshore	4.263	Insufficient Information	3A
VI-STC-72	Airport St. Croix HUC14, offshore	4.1803	Insufficient Information	3A
VI-STC-73	Diamond, nearshore	0.1699	Insufficient Information	3A
VI-STC-74	Enfield Green Beach/VIRIL Outfall	0.1376	Insufficient Information	3A
VI-STC-75	Diamond subwatershed, offshore	2.8479	Partially Supporting	5
VI-STC-76	Carlton Beach	0.2447	Not Supporting	5
VI-STC-77	Long Point Bay	0.8376	Insufficient Information	3A
VI-STC-78	Long Point Bay subwatershed, offshore	4.9231	Insufficient Information	3A
VI-STC-79	Good Hope Beach	0.1876	Fully Supporting	1
VI-STC-80	Sandy Point, nearshore south	2.0121	Insufficient Information	3A
VI-STC-81	Sandy Point, offshore south	7.4306	Insufficient Information	3A
VI-STC-82	Sandy Point, nearshore west	0.1158	Fully Supporting	1
VI-STC-83	Sandy Point, offshore west	0.4875	Insufficient Information	3A
VI-STC-84	Southwest St. Croix HUC14, offshore	18.347	Insufficient Information	3A

2. Individual Use Support Summary

Assessment of the Virgin Islands' coastal waters is presented in (estimated) square miles of assessment unit boundaries. Some 650 square miles are assessed in this report. A summary of use support assessments for coastal waters is shown in Table III.C.2. It is important to remember that the Virgin Islands only uses the fully, partially and non-supporting categories to determine severity of impairments. **Partially and non-supporting are both considered impaired.**

Figure III.C.2.a St. Croix: Fully, Partially and Non-supporting Coastal Waters

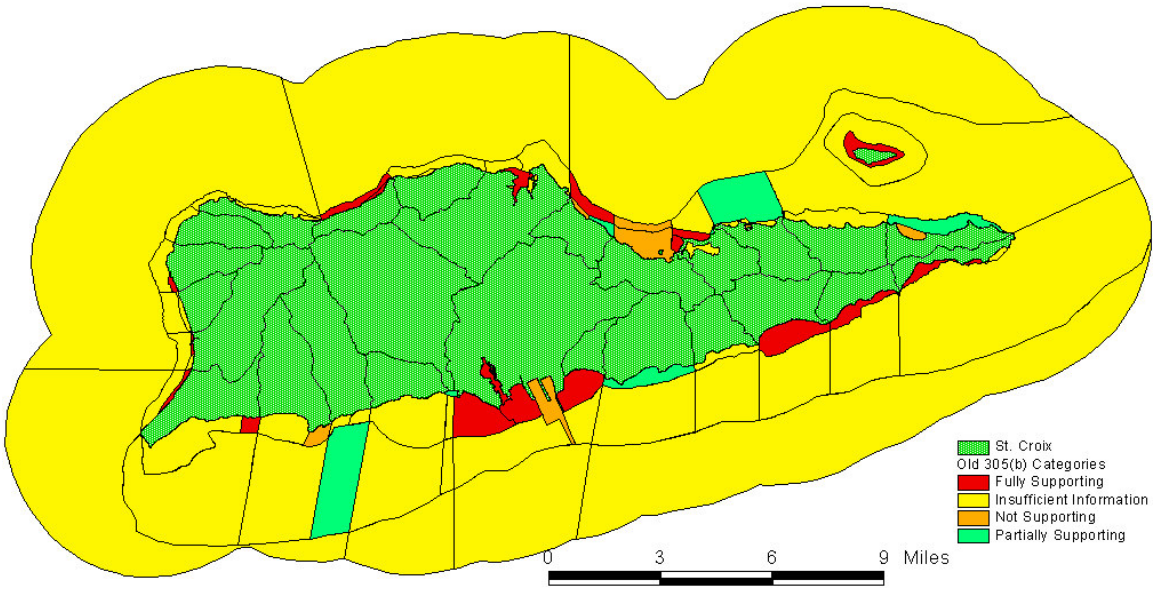


Figure III.C.2.b St. Thomas/St. John: Fully, Partially and Non-supporting Coastal Waters

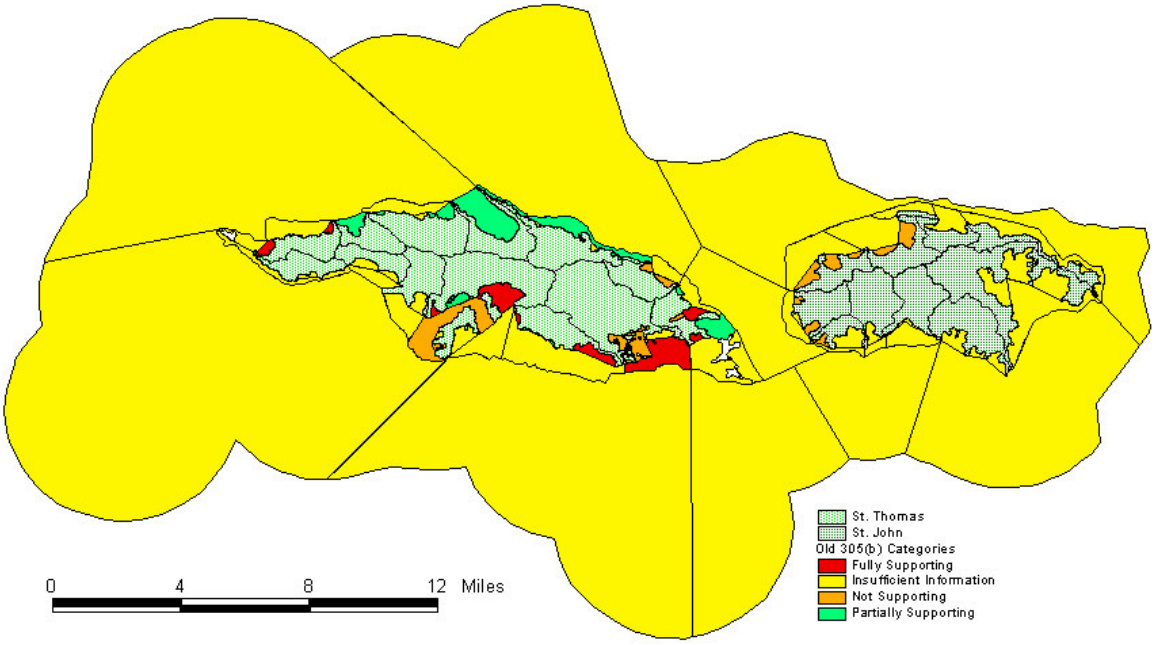


Figure III.C.2.c St. Croix Integrated Categories

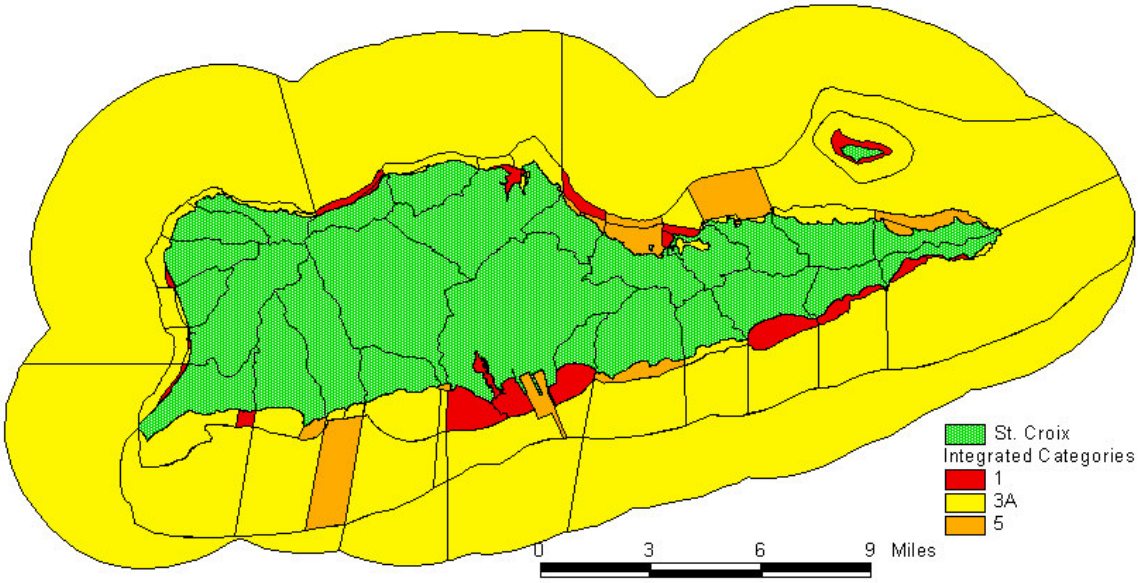
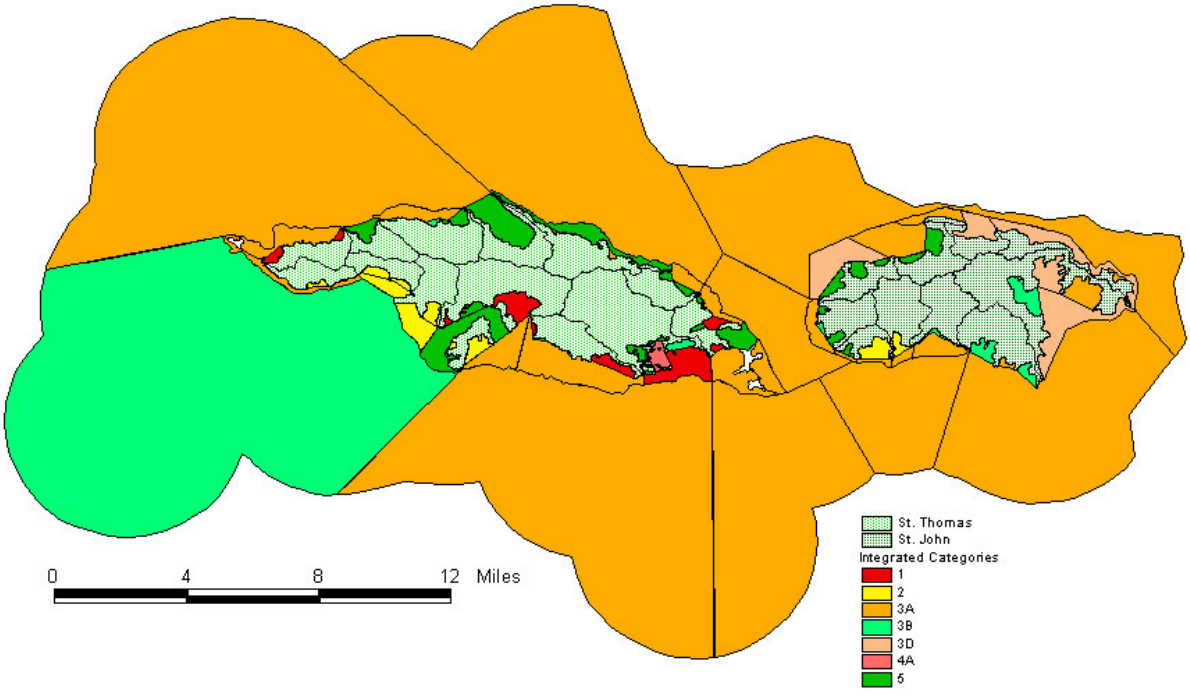


Figure III.C.2.d St. Thomas/St. John Integrated Categories



3. Causes and Sources of Designated Use Impairment

1) Eutrophication

Eutrophication is rarely observed in the Virgin Islands because of tidal flushing and currents driven by the Caribbean current and steady tradewind patterns.[11]

2) Case Studies

The Unified Watershed Assessment includes a detailed summary of current conditions for the 18 Coastal Zone Management Areas of Particular Concern (This summary is Attachment 5 of the Unified Watershed Assessment, which is included in this Water Quality
Assessment as Attachment II.) These APC reports contain water quality reports for each APC.

D. Wetlands Assessment

1. Introduction

Prior to October 31, 1978, the US Army Corps of Engineers, as delegated by 404 of the Clean Water Act, performed protection of wetlands in the Virgin Islands. After that date, all coastal wetland protection was mandated to the Department of Planning and Natural Resources, Division of Coastal Zone Management. Guidelines are found in VIC Title 12, Chapter 21, §.903(b)(8), which states that the Division's responsibility is *"to conserve ecologically significant resource areas for their contribution to marine productivity and value as wildlife habitats, and preserve the function and integrity of reefs, marine meadows, salt ponds, mangroves and other significant areas"*.

2. Classification of Wetlands

Classification of wetlands is based on the US Fish and Wildlife Wetland and Deepwater Habitat System (Cowardin *et a*l., 1979). Wetlands are grouped into four categories: tidal, seep, landlocked ponds, and spring tidal wetlands.

Tidal ponds or lagoons have narrow inlets connecting to the sea and have a salinity level that is slightly higher than seawater.

Seep ponds and **landlocked ponds** are not open to the sea, and have fluctuating water and salinity levels depending on rainfall.

Spring tidal wetlands fringe bays, but standing water only occurs during spring tides, when strong onshore winds push water into the wetlands, or during times of heavy rainfall and consequent flooding.

The primary source of wetland impairment is non-point source pollution, construction intrusions, and sedimentation from upland run-off.

Table III.D.1 Wetlands Classification[12]

[Classification of wetlands is based on the US Fish and Wildlife Wetland and Deepwater Habitat System (Cowardin et al., 1979).]

St. Croix	Classification
Great Pond	Estuarine, Intertidal, Forested
Billy French Pond	Estuarine, Intertidal, Forested, Scrub-Shrub, Basin
West End Salt Pond	Estuarine, Intertidal, Unconsolidated sanded shore, Scrub-shrub, Basin

Altoona Lagoon	Estuarine, Intertidal, Forested
Coakley Bay	Marine (Coastal), Intertidal, Unconsolidated sanded shore
Long Point Bay	Estuarine, Unconsolidated sanded shore, Intertidal
Mt. Fancy	Estuarine, Intertidal, Scrub- shrub, Unconsolidated shore, cobble-gravel
Robin Bay	Marine (Coastal), Intertidal, Unconsolidated cobble gravel
Southgate Pond	Estuarine, Intertidal, Scrub-shrub basin
Salt River/Sugar Bay	Estuarine, Intertidal, Unconsolidated sanded shore and bottom
Half Penny	Estuarine, Intertidal, Unconsolidated sanded shore, Scrub-shrub
Krause Lagoon	Estuarine, Intertidal, Scrub-shrub,
Manchenil	Marine (Coastal), Intertidal, Unconsolidated sanded shore
St Thomas	**Classification**
Mandahl Bay	Estuarine, Intertidal, Unconsolidated bottom, Scrub-shrub
Fortuna Bay	Estuarine, Intertidal, Unconsolidated sanded shore, Forested,
Magens Bay	Marine (Coastal), Sub-tidal, Coral Reef,
Perseverance Bay	Estuarine, Intertidal, Forested, Unconsolidated sanded shore
Frenchman' s Bay	Estuarine, Intertidal, Unconsolidated sanded shore
Little Conculus Bay	Estuarine, Intertidal, Unconsolidated sanded shore, Scrub-shrub
Benner Bay	Estuarine, Intertidal, Forested, Unconsolidated Sanded shore, Scrub-shrub
Mangrove Lagoon	Estuarine, Intertidal, Forested, Unconsolidated Sanded shore, Scrub-shrub
Smith Bay	Estuarine, Intertidal, Unconsolidated sanded shore
St. John Bay	Estuarine, Intertidal, Unconsolidated sanded shore
Great Bay	Estuarine, Intertidal, Forested, Unconsolidated Sanded shore, Scrub-shrub
Cabrita Peninsula	Estuarine, Intertidal, Unconsolidated sanded shore
Cowpet Bay	Estuarine, Intertidal, Forested, Unconsolidated Sanded shore, Scrub-shrub
Vessup Bay	Estuarine, Intertidal, Forested,
Bolongo Bay	Estuarine, Intertidal, Forested, Unconsolidated Sanded shore, Scrub-shrub
Cabes Point	Estuarine, Intertidal, Scrub-shrub
Little St. James	Estuarine, Intertidal, Unconsolidated Sanded shore, Scrub-shrub
Salt Cay	Estuarine, Intertidal, Unconsolidated Mud,
Patricia Bay	Estuarine, Intertidal, Scrub-shrub

Muller Bay	Estuarine, Intertidal, Unconsolidated Sanded shore, Scrub-shrub
Water Island	**Classification**
Limestone Bay	Marine (Coastal), Intertidal, Unconsolidated Cobble gravel
Sprat Bay	Marine (Coastal), Intertidal, Unconsolidated sanded bottom
Sprat Point	Estuarine, Intertidal, Unconsolidated sanded shore, Scrub-shrub
St. John	**Classification**
Brown Bay	Estuarine, Intertidal, Forested, Unconsolidated Sanded shore, Scrub-shrub
Leinster Bay	Estuarine, Intertidal, Unconsolidated sanded shore
Kiddel Bay	Estuarine, Intertidal, Unconsolidated sanded shore, Scrub-shrub
Little Lameshur	Estuarine, Intertidal, Scrub-shrub
Great Lameshur	Estuarine, Intertidal, Scrub-shrub
Fish Bay	Estuarine, Intertidal, Unconsolidated sanded shore,
Frank Bay	Estuarine, Intertidal, Unconsolidated sanded shore, Scrub-shrub
Enighed Bay	Estuarine, Intertidal, Scrub-shrub
Francis Bay	Estuarine, Intertidal, Forested, Unconsolidated Sanded shore, Scrub-shrub
Salt Pond Bay	Marine (Coastal), Subtidal, Coral Reef, 2, Estuarine, Intertidal, Scrub-shrub
Privateer Bay	Estuarine, Intertidal, Unconsolidated sanded shore, Scrub-shrub
South side Pond	Estuarine, Intertidal, Unconsolidated sanded shore, Scrub-shrub
Elk Bay	Estuarine, Intertidal, Unconsolidated, sanded shore, Scrub-shrub
Water Creek	Estuarine, Sub-tidal, Unconsolidated bottom
Otter Creek	Estuarine, Sub-tidal, Unconsolidated bottom
Princess Bay	Estuarine, Intertidal, Forested, Unconsolidated Sanded shore, Scrub-shrub
Coral Bay	Estuarine, Intertidal, Forested, Unconsolidated cobble gravel, Forested
Chocolate Hole	Estuarine, Intertidal, Forested, Unconsolidated Sanded shore, Scrub-shrub
Peter Bay	Estuarine, Intertidal, Forested,
Turner Point	Estuarine, Intertidal, Forested, Unconsolidated Sanded shore, Scrub-shrub
Newfound Bay	Estuarine, Intertidal, Unconsolidated Sanded shore,
Reef Bay	Estuarine, Intertidal, Forested,
Calabash Boom	Estuarine, Intertidal, Forested, Unconsolidated Sanded shore

Annaberg	Annaberg Estuarine,
Europa Bay	1. Estuarine, Intertidal, Scrub-shrub 2. Estuarine, Sub-tidal, Unconsolidated sanded bottom
Grooto Pain Bay	Estuarine, Intertidal, Forested, Unconsolidated Sanded shore, Scrub-shrub
Hart Bay	Estuarine, Intertidal, Forested, Unconsolidated Sanded shore, Scrub-shrub
Mary Point	Estuarine, Intertidal, Forested, Unconsolidated Sanded shore, Scrub-shrub

3. Wetlands Protection Activities

The Department of Planning and Natural Resources very recently instituted a Wetlands Program.

E. Public Health/Aquatic Life Concerns

Pollution-caused fish kills, *ciguatera* or other abnormalities

The Department of Planning and Natural Resources keeps no log of fish kill incidents within the territory. DPNR will from time to time, however, issue public advisories when such incidents do occur.

Restrictions on swimming areas

- No sampling related to natural disasters (e.g. hurricanes) was conducted this cycle.

- Public advisories regarding beach water quality is broadcast over the available radio stations thorough the Virgin Islands Territory Emergency Management Agency (VITEMA) during the hurricane recovery period (interview with Officer Brad Thomas on March 16, 2000). Restrictions are also invoked when a sewage bypasses occurs that may be impacting a waterbody. The water quality sampling is performed by DPNR and a copy of the final results is forwarded to DPW and to the Department of Health's Division of Environmental Health.

The continual monitoring for beach contamination caused by a bypass is performed by DPNR-DEP Under DPW's TPDES permit requirements the Department of Public Works broadcast over the airwaves and publish in the local newspapers a public advisory regarding the bypass; however, this action does not negate the fact that the Commissioner of DPNR may broadcast or publish a public advisory if it deemed necessary.

One public health advisory was issued by the Department of Planning and Natural Resources on March 5, 2003 in response to a raw sewage discharge at the Figtree Pump Station. DPNR advises the public to refrain from using the water in Cane Garden Bay and Billy French Pond and the waters near Christiansted Wharf.

PART IV: GROUND WATER ASSESSMENT

A. Overview

The Ground Water program manages the installation of groundwater wells and groundwater withdrawals through a permitting system under Virgin Islands Code (VIC) Title 12, Chapter 5, Section 151 *et seq*. New wells can only be sited at locations providing adequate yield and a minimum risk of groundwater contamination from past, existing or future sources and activities.

Existing wells are regulated via groundwater appropriation permits that set groundwater withdrawal limits for the approved use, and are valid for a period of two years,.

Table IV.A.1 Number of permitted wells in the USVI

District	No. of Wells	Estimated Total Pumping Rate (million gallons per day)
St. Croix*	634	2.1
St. Thomas	367	0.4
St. John	83	0.1

* Excluding HOVENSA (see discussion under HOVENSA Hydrocarbon Recovery Project)

Table IV.A.2 Number of applications reviewed this reporting period

Period	**New/Renewal appropriation permit applications**	**Drilling permit applications**	**Soil Boring permit applications**	**Drillers license issued**
October 2001 through September 2002	Approved: 73 Rejected: 3 Total: 76	Approved: 78 Rejected: 3 Total: 81	Approved: 103 Rejected: 1 Total: 104	Approved: 5 Rejected: 0 Total: 5
October 2002 through September 2003	Approved: 96 Rejected: 4 Total: 100	Approved: 66 Rejected: 3 Total: 69	Approved: 61 Rejected: 0 Total: 61	Approved: 7 Rejected: 0 Total: 7

WAPA

The "major" water supplier in the VI is the Virgin Islands Water and Power Authority (WAPA). Ground water contributes up to 30% (up to about 1 million gallons per day (MGD)) of the WAPA potable water supply on the island of St. Croix (when the well fields are operating at or near capacity) and a small percentage of WAPA potable water distribution on the island of St. John. No ground water is used in the WAPA distribution system on St. Thomas at the present time; however, the authority has previously investigated the use of ground water in the Sugar Estate area to augment the current desalinated water supply.

<u>WAPA : St. Croix</u>

On St. Croix, WAPA' s principal water supply comes from desalination units, which are capable of producing about 3 MGD. Additionally, WAPA can potentially extract up to 1 MGD of ground water from seven (7) well fields. The principal aquifer in St. Croix is the Kingshill aquifer, predominantly a limestone aquifer that underlies the central portion of the island. The Estates Concordia, Adventure, Fairplains, Negro Bay and Barren Spot well fields tap this aquifer. The western Mahogany Road and La Grange well fields tap an alluvial and fractured bedrock aquifer. Two low-producing wells tap an alluvial and fractured bedrock aquifer in the Estates Clairmont and Rust-up-Twist area on the North side of St. Croix. WAPA pumps the well water into storage tanks at each wellfield, the water is chlorinated and blended with the desalinated water where for distribution. At the Estate Clairmont wells, water, after chlorination, is distributed directly to the small village of La Vallee. WAPA does not have a potable water distribution line connected to the main line in this area.

WAPA : St. Thomas

On St. Thomas, WAPA provides desalinated water for distribution (approximately 4 million gallons per day (MGD)). Although WAPA used several wells in the vicinity of the St. Thomas Hospital in Sugar Estate the late 1960s to the early 1980s, they are no longer used. As part of a recent ground water source exploration program designed for WAPA, the Emergency Ground Water Supply (EGWS) Program, the US Geological Survey (USGS) drilled several test wells in various locations on St. Thomas. USGS performed pumping tests on new wells in the Sugar Estate area, but to date, the new wells have not been put into production.

WAPA : St. John

On St. John, WAPA's principal potable water source is a 500,000 GPD vapor vacuum compression unit. WAPA also operates two well fields on St. John - the Estate Adrian wellfield along centerline road and the Estate Carolina (Coral Bay) wellfield, at the east end of the island. Additionally, several wells were drilled on St. John under the EGWS program described above.

The Adrian wellfield consists of five low-producing (4-5 g.p.m.) wells drilled into fractured bedrock, which feed into a common cistern. The water can be gravity-fed to the residents of Cruz Bay, on the western end of the island, but this distribution system has not been in use for several years. In 1994, WAPA contracted a local company to rehabilitate the wells to attempt to increase yields. The 1994 effort was unsuccessful in significantly improving the yield of the Estate Adrian wellfield.

The Estate Carolina WAPA wells were put on line in the spring of 1994 as supplemental water supply for the eastern portion of St. John. Two wells provide mineral-rich water (TDS of approximately 2500 ppm) from a shallow, unconsolidated material aquifer which is pumped into two bladder tanks for storage. Distribution is by truck only as there is no water distribution piping in the Coral Bay area. This water is chlorinated only.

Public Water Systems that utilize groundwater

In addition to WAPA, water-hauling companies utilize wells as a secondary water supply source. Several water-hauling companies treat the ground water by reverse osmosis (RO), and then distribute the water via trucks to individual residences and businesses. Several water-bottling companies also do the same prior to bottling and distribution. These public water systems also include apartment complexes, schools, condominiums, hotels, bars and restaurants. These public water systems must monitor their processed or treated water for a suite of parameters in accordance with the requirements of the drinking water program as follows:

Table IV.A.3 Drinking Water Monitoring Matrix

Contaminant	Initial Monitoring Frequency
Microbiological	Monthly
Nitrate	Annually
Nitrite	Onceeverythree(3)years
InorganicChemicals(IOCs)	Annually
Asbestos	Onceduringanine(9)yearperiod
VolatileOrganicChemicals(VOCs)	Quarterlyforone(1)year
SyntheticOrganicChemicals(SOCs)	ContactDPNR
Radionuclides	Quarterlyforone(1)year

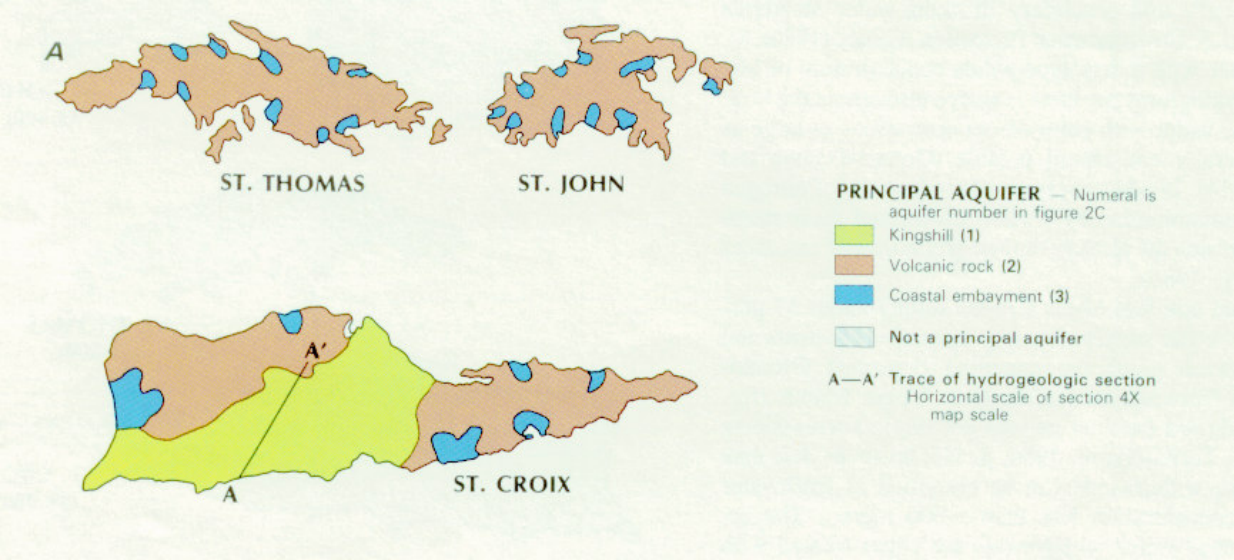
Additionally, these systems must also monitor their source water (i.e. untreated groundwater for total dissolved solids. This is the only parameter required presently, in order to assess the potential for saltwater encroachment due to overpumping, by these heavy users.

Table IV.A.4 Overview of VI Public Water Systems Utilizing Groundwater

St. Croix 49 Systems	1. Apartment/Condo/Hotel: 33
	2. Water Source/Bottled Water: 8
	3. Bar/Restaurant: 1
	4. Other – Marina/Govt/Corp/School: 7
St. Thomas 23 systems	1. Apartment/Condo/Hotel: 7
	2. Water Source/Bottled Water: 8
	3. Bar/Restaurant: 2
	4. Other – Marina/Govt/Corp/School: 6
St. John 4 systems	1. Apartment/Condo/Hotel: 1
	2. Water Source/Bottled Water: 1
	3. Bar/Restaurant: 0
	4. Other – Marina/Govt/Corp/School: 2

TYPES OF AQUIFER

Figure IV.A.1 Virgin Islands Aquifers



In the Virgin Islands, ground water is held primarily in three types of aquifers, principally under water table or semi-confined conditions:

1) Carbonate rock system in St. Croix, known as the Kingshill aquifer system. The Kingshill aquifer system is comprised of Miocene-aged limestone rock. It

overlies the Jealousy Formation, which is markedly different in color (often called the "blue clay"), but is mineralogically and paleontologically very similar to the Kingshill. Both are thought to have been deposited in deep water, possibly greater than 1000 meters in depth (Gill & Hubbard, 1987). The Kingshill is overlain by the post-Kingshill carbonates, generally representing reef and shallow-water facies. This formation is less extensive than the Kingshill, but generally more permeable. In areas, this is overlain by Quaternary alluvium derived from the surrounding hillsides - primarily volcanoclastic debris.

2) Fractured bedrock aquifers in the Tutu Valley and Sugar Estate areas of St. Thomas and in the Estate Adrian area on St. John, for example. The Tutu aquifer of St. Thomas has the highest potential yield of any aquifer on the island - estimated to be in the order of 300,000 gallons per day (Jordan and Cosner, 1973). This type of aquifer is comprised of preferentially fractured bedrock overlain by a veneer of unconsolidated alluvial material varying from a few feet to tens of feet thick. As much as six (6) feet of the upper surface of the bedrock is commonly weathered (saphrolite) (Geraghty & Miller, 1994), depending upon location. Less weathering is evident on the steep slopes; more in the valley floor.

   Ground water is held principally within the fractures in this bedrock with lesser amounts held in the upper weathered saphrolite and overlying unconsolidated deposits. The degree of saturation of the upper portions of the aquifer is dependent upon the intensity of pumping in the area and the overall climatic conditions.

3) Bedrock and alluvial deposit aquifers, in the La Grange area of St. Croix, the Long Bay area of St. Thomas and the Coral Bay area of St. John for example, are at the base of watersheds adjacent to the sea on all the islands. The deposited alluvial material was eroded from the surrounding hillsides. The parent rocks are primarily volcanic in origin with the resultant weathered material having a high clay content. The ground water is found in the interstitial spaces within the alluvium and in fractures in the underlying bedrock.

B. Groundwater Quality

The USGS maintained a cooperative agreement with the Government of the Virgin Islands from 1958 to 2003. The agreement was mutually terminated in June 2003. During those years, a data collection network to monitor stream flow, groundwater levels and selected meteorological parameters was maintained. The data collected at the monitored sites provides an insight into the groundwater withdrawals and recharge at principal aquifers, the degradation of groundwater quality due to saltwater encroachment or contamination, land use changes, groundwater and surface water use estimates, and stream flow regimes which are important in infrastructure planning.

The USGS surface water monitoring consisted of four continuous recording stream flow gaging stations (2STT: Bonne Resolution gut at Bonne Resolution, Turpentine Run at

Mount Zion; 1STX: Jolly Hill gut at Jolly Hill; 1STJ: Guinea gut at Bethany). The groundwater monitoring consisted of six continuous reading water level stations (2 STT: Grade school #3, VIEO#6; 3 STX: Fairplains #2, Golden Grove #6, WAPA #17; 1 STJ: Guinea gut well). In addition, three meteorological stations obtained continuous data on rainfall, wind speed and direction, air temperature, solar radiation, relative humidity, and barometric pressure (one per island).

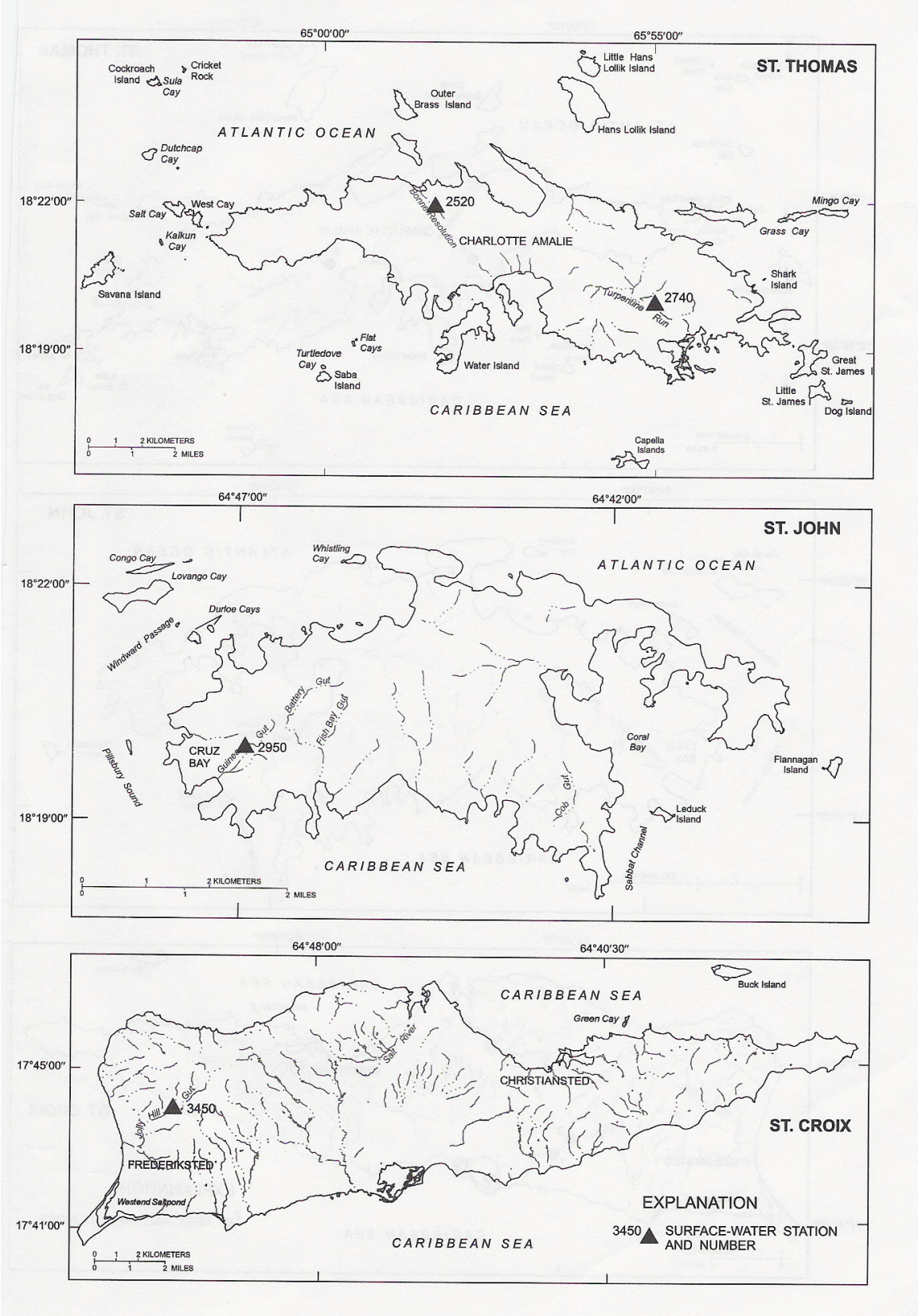


Figure IV.B.1 Location of surface-water stations in the U.S. Virgin Islands.

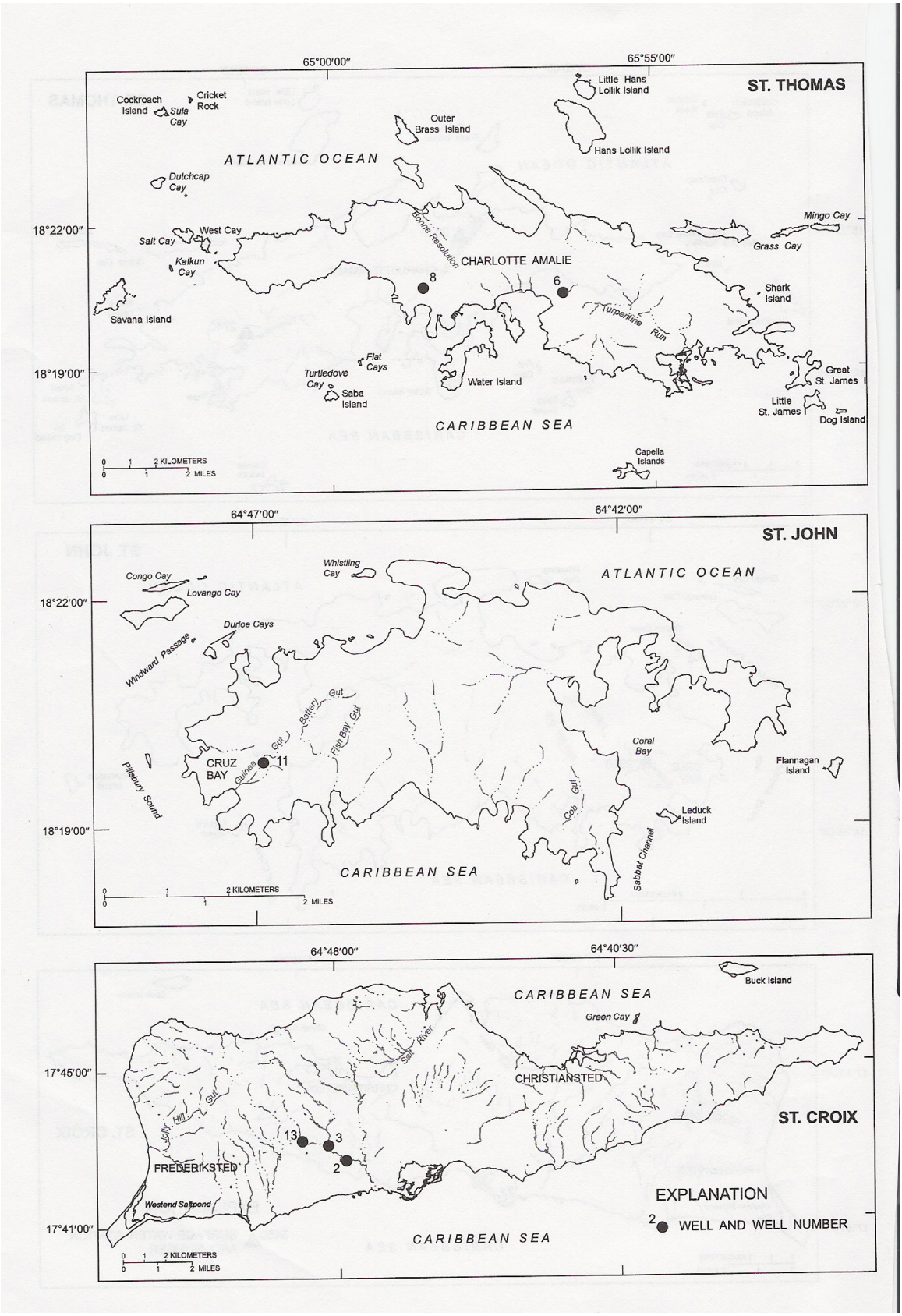


Figure IV.B.2 Location of ground-water stations in the U.S. Virgin Islands

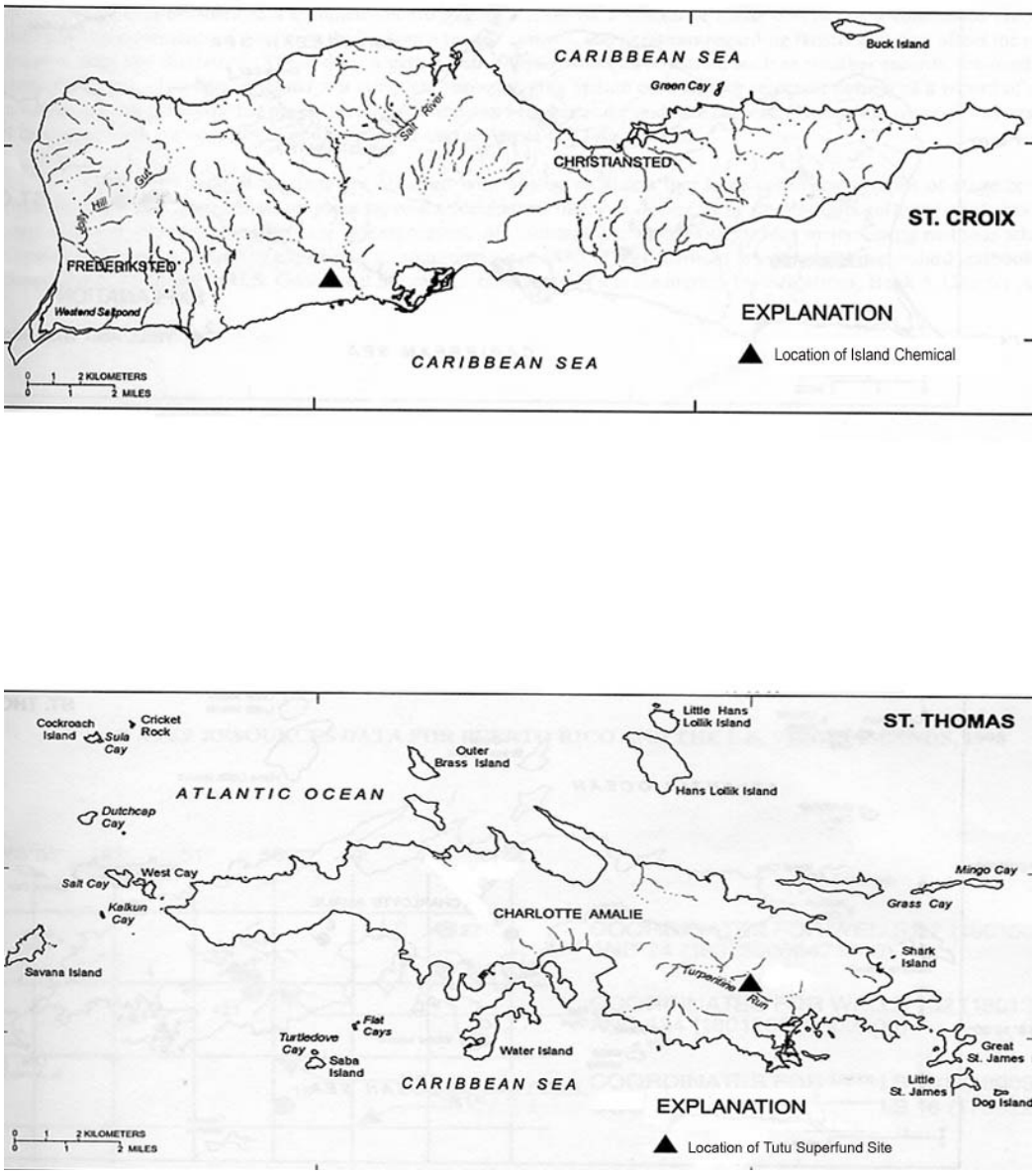


Figure IV.B.3 Superfund Site Locations

Ambient groundwater samples were also collected on a yearly basis at eight well fields (STX: LaGrange, Concordia, Barren Spot, Fairplains, Golden Grove, Bethlehem, Adventure, Negro Bay) and analyzed for chlorides, sulfates, alkalinity, specific conductance, and temperature. Results show that the concentrations in the sampled wells range as follows: chlorides, 144 to 900 milligrams per liter (mg/L), alkalinity from 249 to 578 mg/L, sulfates from 58 to 135 mg/L, and specific conductance from 1025 to 3300 microsiemens per centimeter at 25 °C. The concentrations described in this narrative refer to the range of concentrations in WAPA wells (in the Kingshill aquifer), while the

graphics in Figure IV.B.4 show range of concentrations from three different aquifer types from a larger sampling population, and did not include WAPA wells in the sampling sites for Kingshill aquifer. The large variation in Aquifer 3 is due to proximity to coastal waters, where overpumping of wells in these limited aquifers (based on extent and yield) can result in saltwater encroachment. For a complete discussion of the monitoring results visit http://vi.water.usgs.gov or the annual report "Water Resources Data for Puerto Rico and the United States Virgin Islands Water Year 2001".

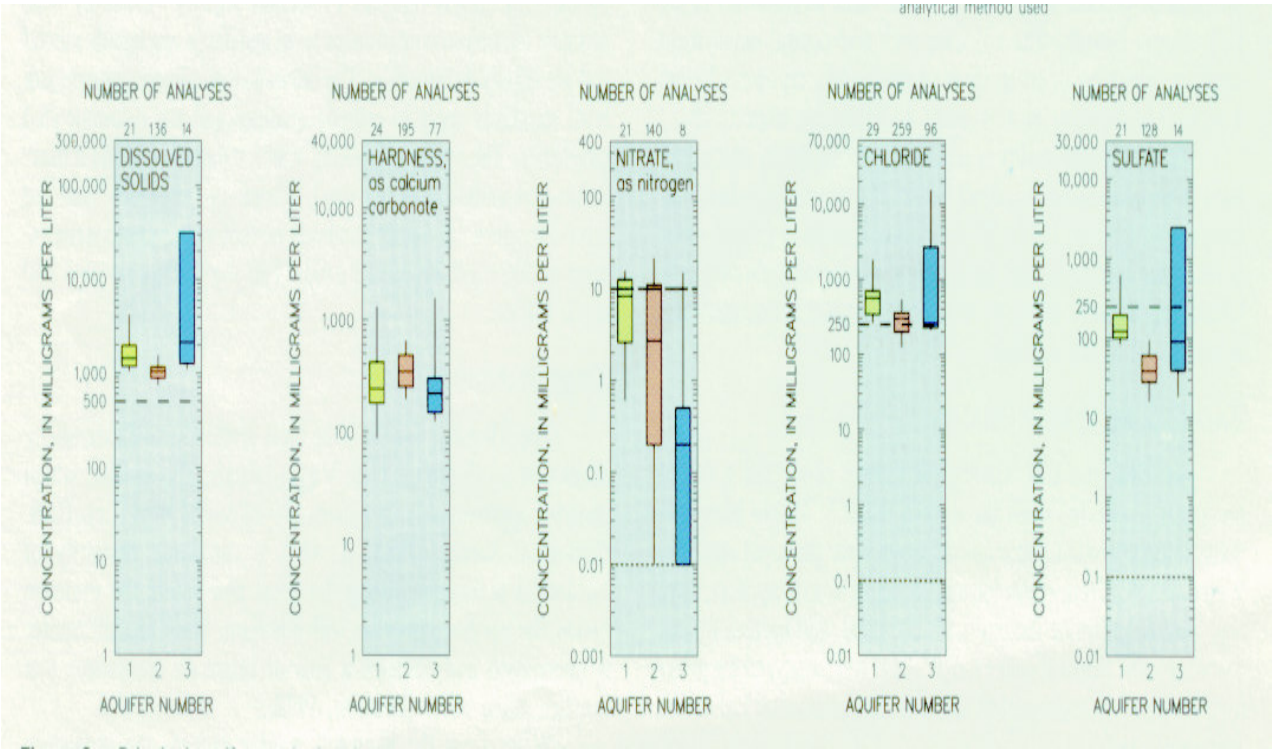


Figure IV.B.4 VI Aquifer Analyses

The ground water in the Virgin Islands is highly mineralized, often containing total dissolved solids (TDS) in excess of 1000 parts per million (ppm). Sodium, magnesium and calcium are the primary constituents, rendering continued consumption of untreated ground water unhealthy for those on a restricted sodium diet. Additionally, elevated nitrate levels and coliform bacteria have been found in some wells near the main sewer conveyance lines.

With the termination of the USGS contract, DPNR will gather the available information and analyze it in order to:

- Update wellhead protection areas
- Identify boundaries of aquifer recharge areas
- Establish water budgets (aquifer recharge versus groundwater withdrawal rates) by watersheds

- Evaluate well field safe yields and maximum withdrawal rates to limit the potential for sea-water encroachment in coastal aquifers
- Identify areas where recharge can be improve through construction of designed facilities
- Prepare and submit documentation to establish the Kingshill aquifer as a "sole - source" aquifer
- Use local human resources to provide education opportunities in the natural science

Failing Onsite Sewage Disposal Systems
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. Failing OSDS are a major source of groundwater pollution (high fecal coliform levels, nitrate levels especially in the LaGrange area of St. Croix).

Presently, there are thousands of onsite sewage disposal systems, better known as "septic" systems in operation in areas t hat 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 groundwater and surface water pollution. 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. Excessive development densities have been permitted without proper wastewater treatment facilities required. This situation is being addressed with the adoption of new onsite sewage disposal system (OSDS) regulations in November 2001. The effects of these regulations, if any, has not been realized or quantified to date.

C. Wellhead Protection: Delineation And Management Standards

Wellhead protection is vital to the long-term quality of life in the VI as the population increases. The meager but important ground water resources are valuable supplements to the expensive, highly energy-consumptive desalinated water which is so heavily relied upon by the much of the population of the VI. Existing untainted ground water resources must be protected. The resources that have already been subjected to contamination by leaking underground storage tanks (USTs), leaking sewer lines and improper storage and disposal of chemicals must be managed to protect adjacent uncontaminated sources and restore damaged resources for future use.

During 2001/2002, DPNR in conjunction with the University of the Virgin Islands delineated wellhead protection areas (WHPA) for each of the seven WAPA wellfields on

St. Croix. The WHPA represented the actual contributing area for the well field, taking into account the average time required for the ground water to flow to the well (Time of travel = TOT); and the effects of hydrologic boundaries (e.g., faults, guts and ridge lines, etc.), because risks to the well diminish as the time of travel and distance from the well increase

It was evident that various surrounding land uses (agricultural versus industrial) constitute varying risks to the quality of the ground water received at the well. In order to assure an effective pollution mitigation response to a known pollution source, a 20-year TOT was delineated for each well field using the following methods developed by the USGS:.

- Calculated Fixed Radii Method, the data required: the time of travel, well pumping rate, porosity of the aquifer and open screen interval.
- Simplified Variable Shapes Method, in addition to the data specified above, hydraulic gradient, hydraulic conductivity, saturated thickness and hydrologic divides.

Table IV.C.1 WAPA wellfields surveyed:

Wellfield	**No. of wells**	**20-year TOT WHPA**	**Surrounding Land use**
Negro Bay	6	201 acres	Industrial
LaGrange	6	173 acres	Residential
Golden Grove	9	121 acres	Agricultural and industrial
Concordia	5	173.3 acres	Residential and agricultural
Bethlehem	2	191.5 acres	Agricultural and industrial
Barren Spot	9	212 acres	Industrial and residential
Adventure	9	177 acres	Agricultural

Each delineated WHPA was then surveyed for potential sources of contaminated using the following categories:

Table IV.C.2 Inventory Of Potential Sources Of Ground Water Contamination

CATEGORY 1 - Sources designed to discharge substances:
Subsurface percolation (e.g. Septic tanks and cesspools)
Injection wells
Hazardous waste
Non-hazardous waste (e.g. brine disposal and Drainage)
Non-waste (e.g. enhanced recovery, artificial Recharge solution mining and in-situ mining)
Land application

Waste water (e.g. spray irrigation)
Waste water byproducts (e.g. sludge)
Hazardous waste
Non-hazardous waste

CATEGORY II - Sources designed to store, treat, and/or dispose of substances; discharge through unplanned release:

Landfills
Industrial hazardous waste
Industrial non-hazardous waste
Municipal sanitary
Open dumps including illegal dumping waste)
Residential (or local) disposal (waste)
Surface impoundments
Hazardous waste
Non-hazardous waste
Materials stockpiles (non waste)
Graveyards
Animal burial
Above ground storage tanks
Hazardous waste
Non-hazardous waste
Non-waste
Underground storage tanks
Hazardous waste
Non-hazardous waste
Non-waste
Containers
Hazardous waste
Non-hazardous waste
Non-waste
Open burning sites
Detonation sites
Radioactive disposal sites

CATEGORY III - Sources designed to retain substances during transport or transmission
Pipelines
Hazardous waste
Non-Hazardous waste
Non-waste
Materials transport and transfer operations
Hazardous waste
Non-Hazardous waste
Non-waste

CATEGORY IV - Sources discharging substances as a consequence of other

planned activities

Irrigation practices (e.g. return flow)
Pesticide applications
Fertilizer applications
Animal feeding operations
De-icing salts applications
Urban Runoff
Percolation of atmospheric pollutants
Mining and mine drainage
  Surface mine-related
  Underground mine-related

CATEGORY V - Sources providing conduit of inducing discharge through altered flow patterns

Production wells
  Oil (and gas) wells
  Geothermal and heat recovery wells
  Water supply wells
Other wells (non-waste)
  Monitoring wells
  Exploration wells
Construction excavation
Improperly abandoned wells

CATEGORY VI - Naturally occurring sources whose discharge is created and/ or exacerbated by human activity

Ground water-surface water interactions
Natural leaching
Salt water intrusion/brackish water upconing (or intrusion of other poor- quality natural water)

Table IV.C.3 The distribution of potential source of contaminations:

Wellfield Name	Number of sources	Category 1	Category 2	Category 3	Category 4	Category 5
Negro Bay	71	0%	68%	20%	1%	11%
LaGrange	58	0%	85%	0%	5%	10%
Golden Grove	24	0%	50%	13%	8%	29%
Concordia	116	1%	74%	3%	9%	13%
Bethlehem	38	0%	89%	3%	5%	3%
Barren Spot	94	1%	65%	13%	6%	15%
Adventure	35	0%	57%	17%	0%	26%

As was evident in all the wellfields, the largest single category of potential sources of contamination was Category 2, which included illegally dumped materials, municipal trash containers, above ground storage of materials, and underground storage.

Figure IV.C.1 20-Year TOT WHPA for Barren Spot wellfield, showing location of wells.

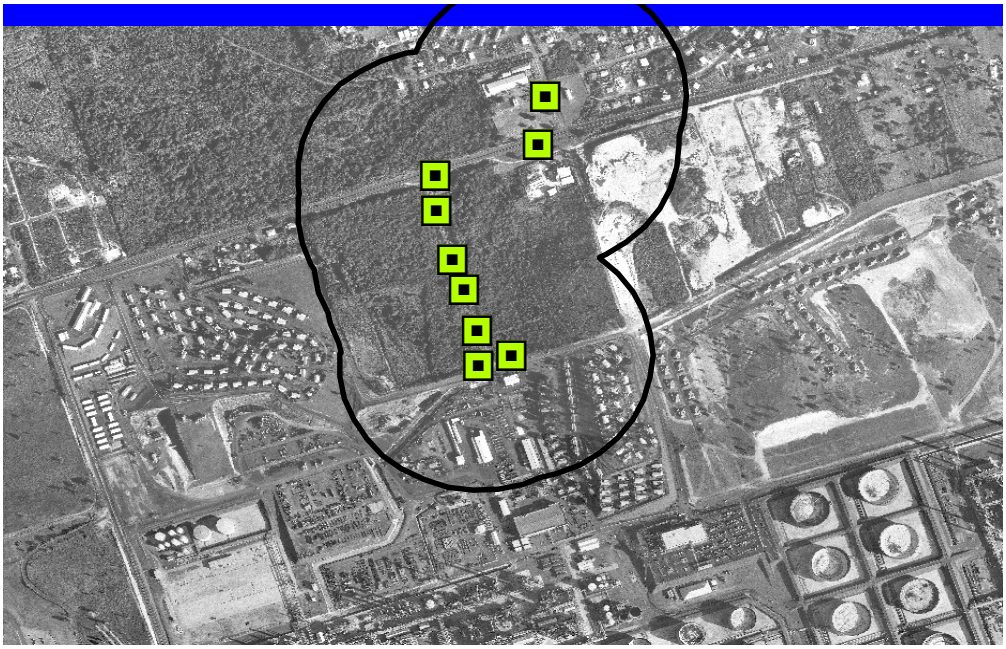
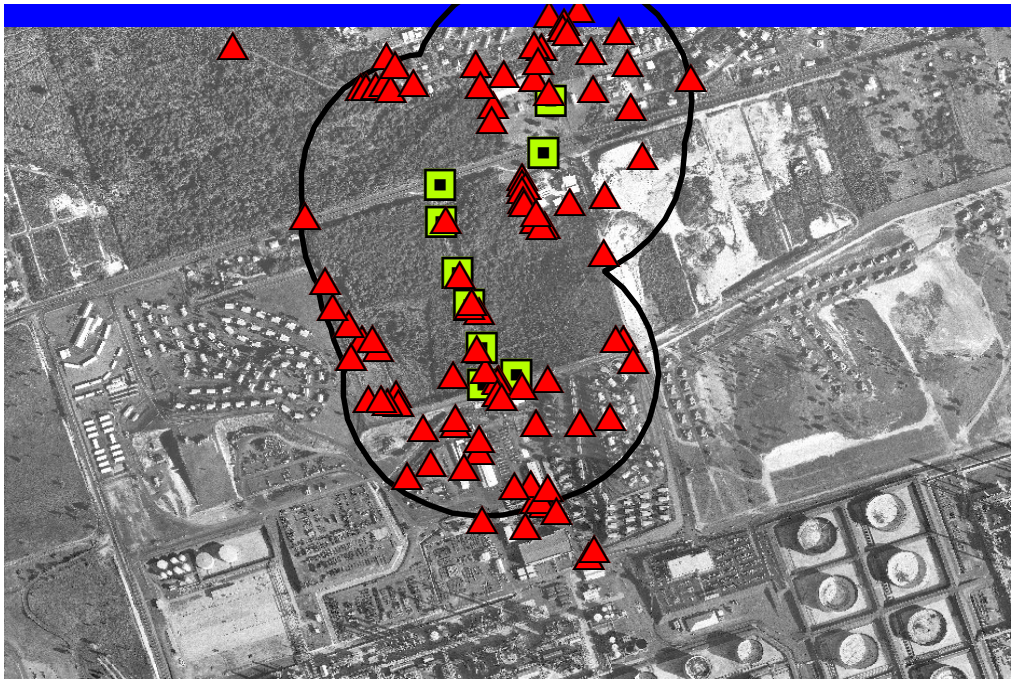


Figure IV.C.2 Location of potential sources of contamination for Barren Spot WHPA



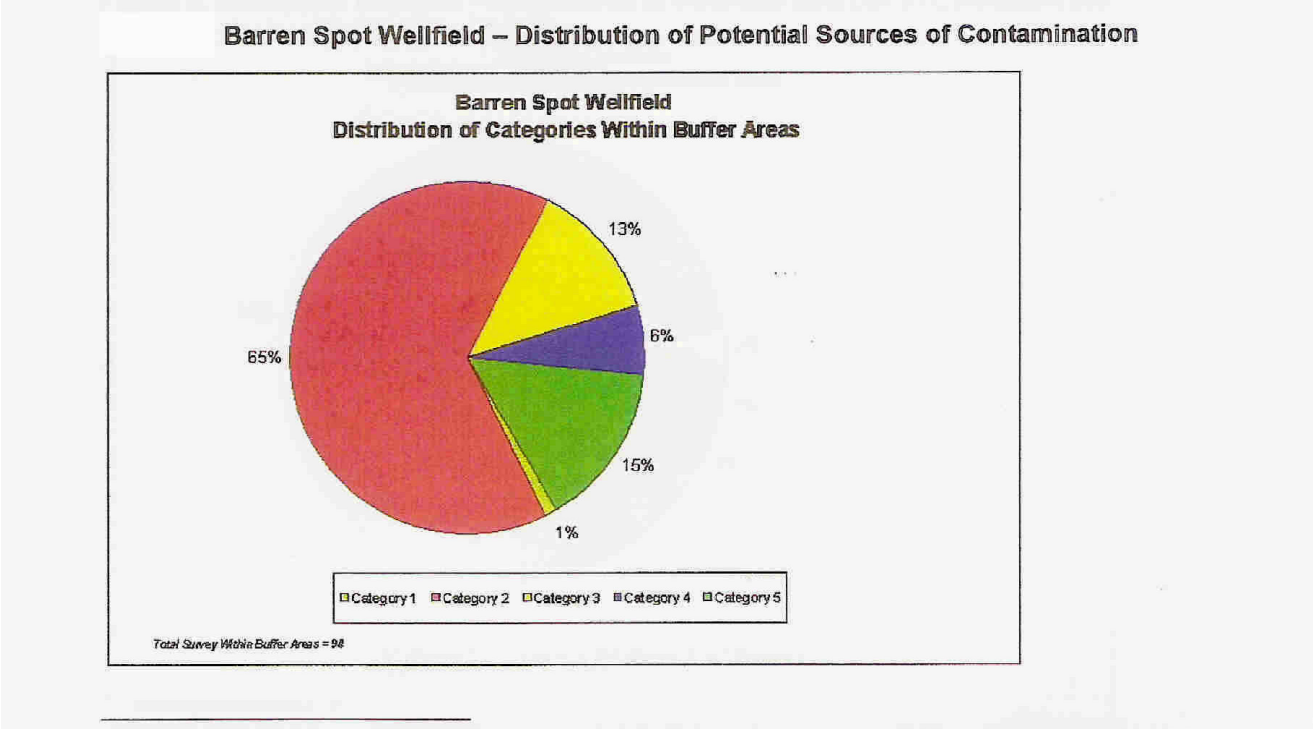
Based on the study, WHPA management standards have been drafted to

1. Protect the public drinking water supply from those land use activities that could contaminate groundwater, and
2. Protect aquifer recharge areas from land use activities that could inhibit their recharge capabilities

Proposed management mechanisms to protect ground water supplies included: contingency plans for public water systems; protect public drinking water supply from contaminants; protect aquifer recharge areas; WHPA delineation for existing public water supply wells (other than WAPA); site plan review for new wells; site plan review for new development in WHPAs; WHPA setbacks for potential sources of contamination; WHPA monitoring and closure requirements for abandoned wells.

The complete Wellhead Protection Project report is available at http://www.dpnr.gov.vi/dep/home.htm.

Figure IV.C.3 Typical distribution of potential sources of contamination within a WHPA



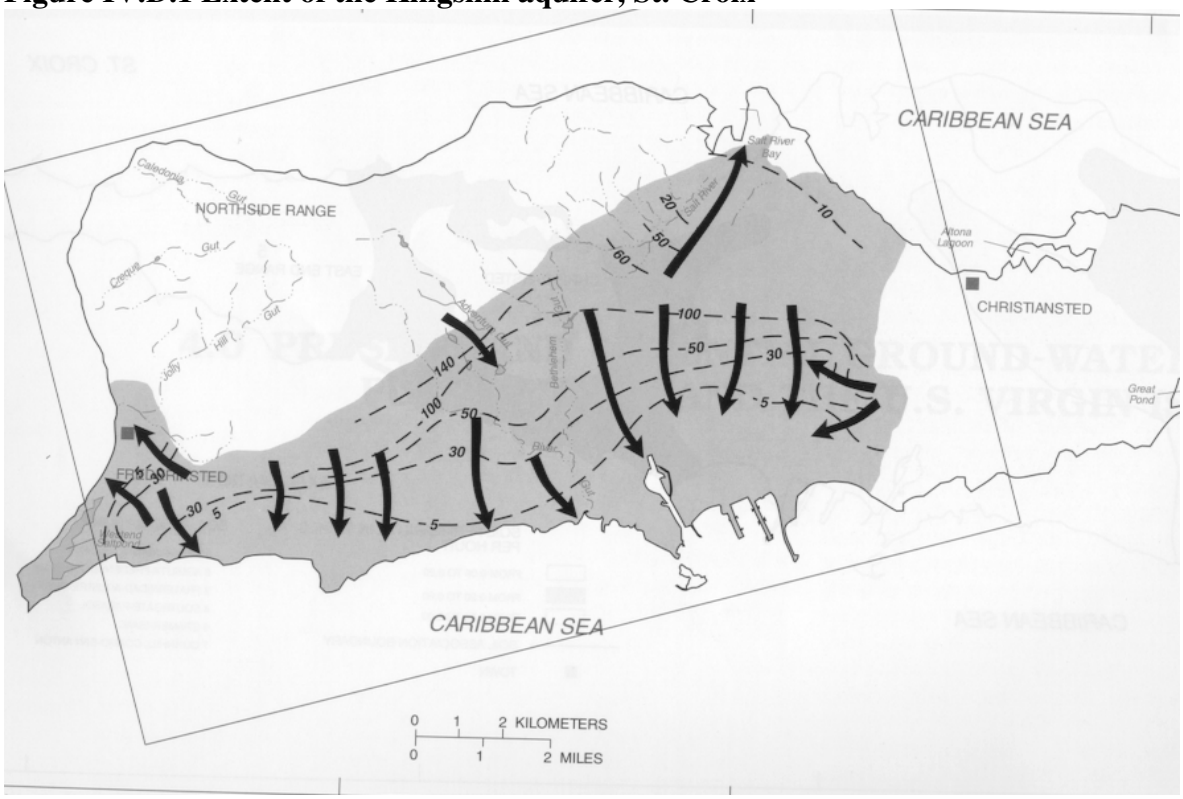
D. Kingshill Aquifer As A Sole Source Aquifer

A draft application to the US Environmental Protection Agency (USEPA) for sole source aquifer designation for the Kingshill Aquifer, St. Croix, was submitted in January 2004. For a complete discussion on the petition please refer to the "Sole Source Aqui fer Protection Program Application for Sole Source Designation".

The Kingshill aquifer is the largest and most productive aquifer in the USVI. The aquifer has an area of 25 square miles and accounts for 67% of all groundwater withdrawals. Approximately one-third of the population (35,558 (census 2000)) of the entire USVI lives within the aquifer boundary area. Yields from wells can surpass 70,000 gpd/well. Most of the groundwater exists at relatively shallow depths in unconsolidated alluvial sediments or in shallow limestone deposits. The depth to groundwater could range from 5 feet (WAPA Concordia well field) to 60 feet (WAPA Golden Grove well field) below ground surface. Well yields ranged from less than 5 gallons per minute (gpm) (WAPA Adventure well field) to 80 gpm (WAPA Golden Grove well field). Aquifer specific capacity ranged from 1 to 14 gpm per foot draw down with a corresponding aquifer transmissivity ranging from 180 to 3,300 feet squared per day.

There are over 325 wells within the aquifer boundary and it is estimated that the total production of the aquifer is 2.21MGD (WAPA, 1.13 MGD; private wells, 0.55 MGD; industrial/commercial 0.53 MGD). It is estimated that the aquifer can safely supply up to 2.5MGD.

Figure IV.D.1 Extent of the Kingshill aquifer, St. Croix



Within the aquifer service area, due to the high cost of WAPA water and unavailability or expense of alternate sources, groundwater provides:

- A sole source of potable water to many users
- A important supplement for daily shortfalls
- A significant percentage of supply to WAPA potable water system
- A majority or sole water supply during seasonal shortfalls and emergencies
- An economical alternative to municipal supply

- An important energy-saving renewable resource reducing reliance

The designation of the Kingshill aquifer as a sole source aquifer will increase DPNR's regulatory capacity to protect and responsibly develop the resource.

E. Groundwater Issues

There are four major issues related to groundwater management as follows:

- Overpumping of coastal aquifers
- Saltwater encroachment
- HOVENSA Hydrocarbon recovery project
- Institutional Controls at Tutu Wellfield Superfund Site and Island Chemical

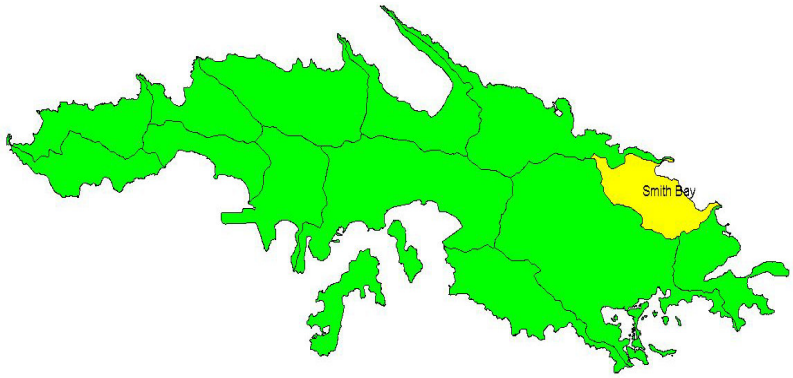


Figure IV.E.1 Superfund Watershed (St. Thomas)

Overpumping: Moratorium on well drilling and appropriation - Smith Bay, St. Thomas

A review of recent reports indicates that the ground water table in the Smith Bay area has declined form approximately 30 to 40 feet below ground level to more than 100 feet below ground level from early 1990 to the present. Additionally, the water quality in the aquifer is declining due to intrusion of more saline water from the sea. This overall decline in ground water levels and water quality in the Smith Bay aquifer is due to heavy pumping of several production wells tapping the aquifer, greatly exceeding the estimated recharge rate.

A water budget for the Smith Bay aquifer, indicates that the maximum amount of water that can be withdrawn from the aquifer on a sustainable basis, calculated using average rainfall values, is approximately 50,000 gallons per day. During drought conditions,

Smith Bay area has been shown to experience marginal precipitation, therefore, maximum pumping from the aquifer, to maintain stable aquifer conditions, will be substantially less than 50,000 gallons per day.

Pumping rates during the past several years, collectively, from private wells and commercial water companies and residential tapping the Smith Bay aquifer, have been as high as 140,000 gallons per day - almost three times the sustainable amount, which effectively "mines" the water resources. Continued pumping at these high rates will cause irreversible damage to the aquifer. In order to prevent further deterioration of the Salt River aquifer and in accordance with the declaration of policy by the legislature of the V.I., as contained in Title 12 VIC §151 and the authority vested in the Commissioner of DPNR by Title 12 VIC §153 et.seq., the following actions were instituted:

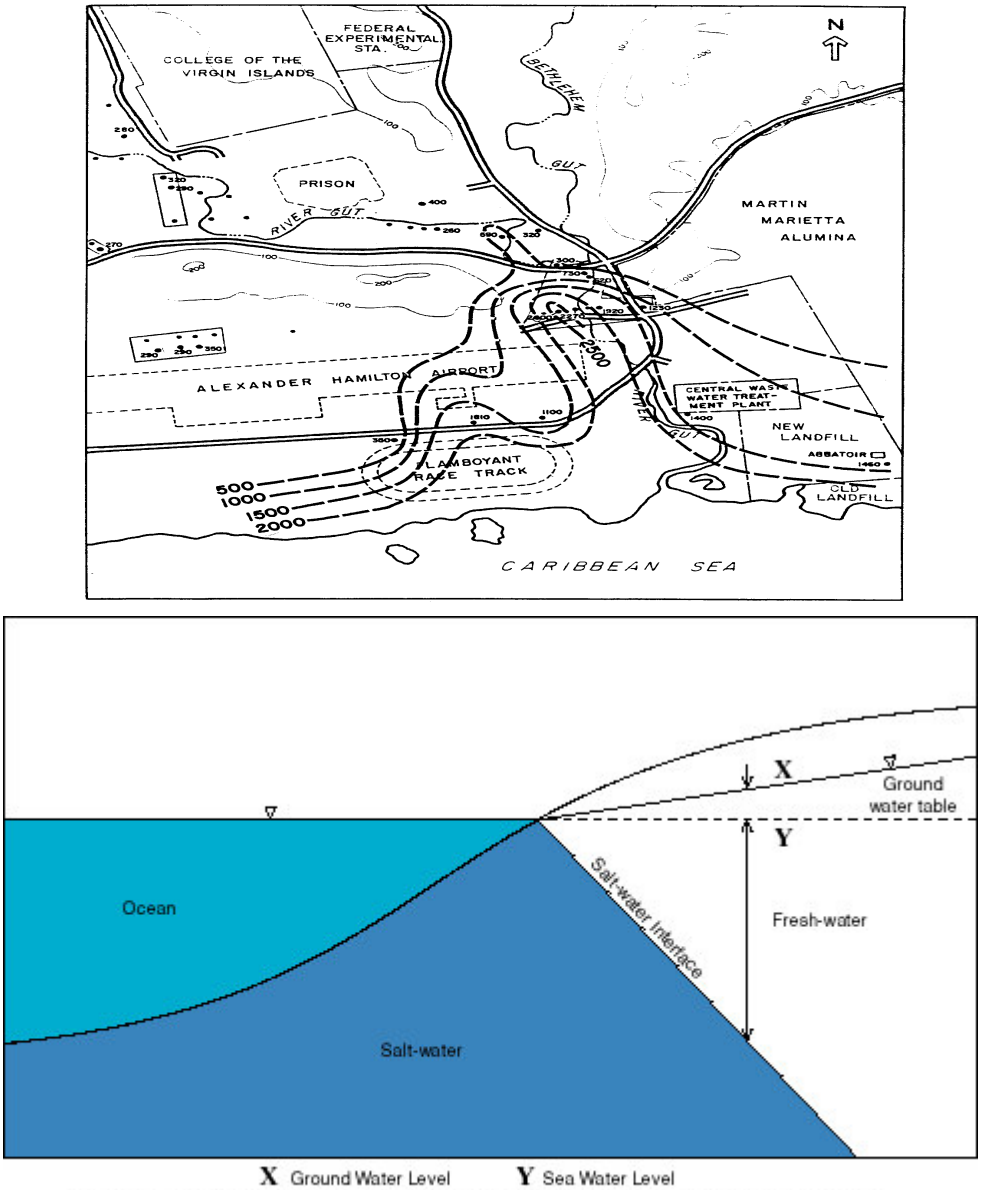
1. No new ground water appropriation permits will be issued for well drilled into the Smith Bay aquifer, for a period of two years, during which the ground water elevations in the aquifer will be closely monitored by DEP (Title 12 VIC §155).
2. Existing permitted wells will be inspected regularly by DEP to ensure compliance with the terms of the appropriation permit, specifically pumping rates (Title 12 VIC § 154).
3. Existing appropriation permits are subject to modification, such that the quantity allocated may be reduced (Title 12 VIC §155).
4. Renewal for existing appropriation permits are subject to modification, such that the quantity allowed may be reduced. Preference shall be given to domestic uses as against other beneficial uses (Title 12 VIC §156).

Presently, DPNR is investigating the need for similar moratoriums for Lindberg Bay, St. Thomas and Salt River Bay, St. Croix.

Saltwater encroachment: South shore St. Croix

Groundwater quality (generally total dissolved solids, specifically chlorides), has been steadily declining in the south shore area of St. Croix. This can be attributed to the following major shoreline modifications: channelization - dredging of Limetree Bay; construction of bulkhead/piers adjacent to HOVENSA refinery; dredging of Alucroix and Limestone Bay Channels; creation of red mud pile at St. Croix Alumina, leachate high in inorganic salts; filling of Krause Lagoon; creation of holding/detention ponds on HOVENSA and St. Croix Alumina properties.

Figure IV.E.2 Chloride Levels (ppm) in Groundwater in the Vicinity of STX Alumina and Bethlehem/Golden Grove



Salt-water interface in an unconfined coastal aquifer according to the Ghyben-Herzberg relation.

Figure IV.E.3

Saltwater encroachment can be caused by the reversal or reduction of freshwater discharge that allows the heavier saline water to move into an area where only freshwater previously existed (overpumping: HOVENSA process water wells, see discussion below); the destruction of natural barriers that formerly separated bodies of fresh and saline waters (shoreline modifications: channelization, dredging, etc)

Assuming hydrostatic conditions in a homogeneous, unconfined coastal aquifer, the weight of a unit column of fresh water extending from the water table to the salt-water interface is balanced by a unit column of salt water extending from sea level to the same depth as the point on the interface. According to the Ghyben-Herzberg relation, if the water table in an unconfined coastal aquifer is lowered by 1 ft, the saltwater interface will rise 40 ft. (see discussion on Smith Bay aquifer, St. Thomas)

F. HOVENSA Hydrocarbon Recovery Project

HOVENSA continued to make progress in the containment, source identification, and recovery of the phase separated (PSH) and dissolved phase hydrocarbon (DPH) constituent plumes impacting the soil and groundwater at the refinery. The report *"Hydrocarbon Recovery Project Status Report, Hovensa L.L.C. 2nd. Semi-annual Report 2003"* dated February 2004 summarizes the recovery activities and progress made during the second half of 2003 and provides an updated hydrocarbon production summary that spans the period November 1987 through December 2003.

During the second half of 2003, the recovery system operated with an average active recovery well count of 120 wells, 9 vapor extraction wells, 489 monitoring wells, and 101 regulated wells. The average daily recovery rate for the second half of 2003 was 23 barrels (1 barrel = 42 gallons) of hydrocarbon per day and 5,300 barrels of water per day (total of 5,323 barrels total fluid). At this rate, the percentage of recovered hydrocarbon of total fluid was 0.4%. From November 1987 through December 2003, HOVENSA has recovered a total of 953,978 barrels of PSH at the refinery. Since the primary focus has been on containment and recovery of the PSH, no estimate has been made on the amount of DPH constituents recovered with the groundwater. It is calculated using computer-based modeling that an in-place volume of 72,976 barrels of PSH still remained in the groundwater under the refinery, although this estimation may vary due to several factors including water table fluctuations resulting in the trapping and untrapping of PSH, interpolation uncertainties, and hydrocarbon recovery and vacuuming operations.

Table IV.F.1 HOVENSA hydrocarbon recovery system

HOVENSA Subdomain #	Subdomain Name	PSH Volume Estimates (Barrels) December 2003
1	Dock 7	875
2	Landfarm II	6,071
Alternate 2	Landfarm II	2,857
3	Tank Field 22	15,255
4	Lagoon West	348
5	Gasoline Blending Area	120
6	East Refinery	39,543
7	BTX Tank Field	66
8	West Refinery	1,280
9	SCPC/West Fence	9,418
TOTAL		72,976

During the second half of 2003, the hydrocarbon recovery system in subdomain #1, Dock 7 maintained hydraulic control to prevent the release of PSH into the sea (turning basin).

G. Institutional Controls At Tutu Well Field Superfund Site And Island Chemical Superfund Site

There are two superfund sites, Tutu Well Field and Island Chemical on St. Thomas and St. Croix, respectively. Pursuant to a cooperative agreement between US Environmental

Protection Agency (EPA) and and the VI Government, institutional controls will be placed on earth moving activities within the superfund site and/or on locations in the vicinity of the site. These controls will insure that soil/groundwater cleanup at the site will not be adversely impacted by construction activities.

Institutional controls in the form of existing well permitting laws and regulations will also limit the pumping of groundwater at the Site to prevent interference with the selected remedy and to also prevent human exposure to contaminated groundwater until MCLs are achieved.

Institutional controls shall be monitored and maintained to: 1) prevent human ingestion of ground water containing concentration of VOCs in excess of the performance standards for drinking water; and 2) restrict withdrawal of ground water within the vicinity of the plume that could adversely impact the ground water remedy.

1. Tutu Wellfield Site

The Tutu Wellfield Superfund Site is located in the Upper Turpentine Run basin, Estate Anna's Retreat, St. Thomas. Groundwater contamination was discovered when EPA sampled 18 wells (13 commercial wells and 5 private wells) in August 1987 and analytical results revealed elevated values of VOCs in 14 of the 18 supply wells, including 1,2-trans-dichloroethylene (DCE), trichloroethylene (TCE), tetrachloroethylene (PCE), toluene, benzene, and methyl-tertiary-butyl-ether (MTBE). The remedial investigation (RI) was conducted from April 1992 to July 1994. EPA issued the Record of Decision (ROD) for the Site in August 1996.

The Remedial Design for the site wide groundwater contamination and Curriculum center soil contamination was performed upon completion of the RI/FS and was completed in 2002. The Remedial Action began in 2003 with construction of the site wide groundwater and soil treatment facilities and will be fully operational in 2004. DPNR agrees to implement institutional controls (which may include governmental controls, proprietary controls, or both, as appropriate) sufficient to insure that no one uses groundwater or installs a groundwater well, or excavate or disturbs any impacted soil or rock at the Site without the written permission of EPA and DPNR.

2. Island Chemical Facility

The Former Island Chemical is located on Melvin Evans Highway (Route 66), about 1,500 feet north of the Alexander Hamilton Airport. Currently inactive, the facility was used to manufacture pharmaceutical chemicals between 1978 and 1980 or later. In 1984 and 1985, it produced benzyl acetate and benzyl salicylate, which are used in perfumes, sunscreen lotion, flavorings, resins, lacquers, printing ink, varnish removers, and as a solvent for synthetic musk. Hazardous substances disposed of at the Site, including pyridine, acids, and solvents.

According to the ROD issued by EPA in August 2002, the following objectives are to be met through the implementation of the remedy selected for Island Chemical Site:

- Mitigate the toxicity, mobility, and/or volume of volatile organic compounds (VOCs) (ethylbenzene and xylene) in soils in the Above-ground Storage Tank

(AST) area so as to minimize continued leaching to groundwater;
- Mitigate the toxicity, mobility, and/or volume of VOCs (mainly ethylbenzene and xylene) in groundwater in the AST area and downgradient so as to achieve maximum contaminant levels (MCLs) and protect potential future groundwater users;
- Mitigate the toxicity, mobility, and/or volume of chloroform in groundwater in the Former Process Pit (FPP) area and downgradient so as to achieve MCLs and protect future potential groundwater users; and
- Restrict on-Site groundwater use to non-potable purposes until the water quality is restored to MCLs.

H. Groundwater - Surface Water Interaction

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

With the exception of Turpentine Run (perennial due to discharge from package treatment plants and Publicly Owned Treatment Works (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.

Wetlands can be found alongside these intermittent guts and in the lower reaches of some watersheds along the shoreline. These wetlands are being sustained by groundwater discharges into the surface and by flooding during storm events. In September of 2002, DPNR initiated an investigation on the Territory wetlands through the project "Inventory of U.S.V.I. Wetlands and Riparian Areas" - Phase I. A Non-Point Source Section 319 Grant funds the project.

Wetlands have a fundamental importance as sink/filter of non-point source pollutants. Therefore, there is a need to better understand the wetlands characteristics (size, location, types and water quality) in the USVI. The objectives of the project are to update and correct the mapping of 636 wetlands in the Virgin Islands Rapid Environmental Assessment (REA) and design and test basic monitoring tools for wetland characterization in the US Virgin Islands. The monitoring tools are currently being applied to 18 reference watersheds distributed in three broad classes for each island (undisturbed, highly disturbed and intermediate disturbed). The level of disturbance is based on the interpretation of the data produced by the Territory's Unified Watershed Assessment, the Watershed Restoration Action Strategies and recent 2002 Integrated

Water Quality Monitoring and Assessment Report. The 18 watersheds chosen for sampling are presented in the table below:

Table IV.H.1 Reference Watersheds For Sampling

Watersheds			
Disturbance Level	**Reference**	**Intermediate**	**High**
St. John	Reef Bay Leinster Bay	Hawksnest Bay Fish Bay	Great Cruz Bay Coral Bay
St. Croix	Creque Dam-Butler Bay Madame Carty	Salt River Bay Great Pond Bay	HOVENSA Bethlehem
St. Thomas	Botany Bay Perseverance Bay	Magens Bay Smith Bay	Jersey Bay Red Hook Bay

The water quality monitoring parameters are: temperature, conductivity, salinity, pH, dissolved oxygen, turbidity, fecal and TKN. The sampling is scheduled during the fall season when wetlands are presumed wet during a full daylight periods (between two hours or more after sunrise and two hours or more before sunset). The field tests are scheduled for 5 months from October 2003 to February 2004.

Additionally, the project is assessing the effect of stressors on watershed/wetlands areas, based on the condition of the existing landscape/biological community, plants and animals, supported by appropriate chemical and physical data. The indicator chosen for that analysis was the IBI (Index of Biological Integrity), which is a bioassessment measure that integrates several biological metrics to indicate the site's condition.

DPNR is now working on Wetlands Phase II project, financed by EPA 2004 Wetland Program Development Grant. This phase will lead to the adoption of an ambient wetland monitoring and assessment program that builds the Virgin Islands' capacity to determine the causes, effects, and extent of pollution to wetland resources and develop pollution prevention, reduction, and elimination strategies. Hydrological regime is one important component of the wetland assessment Phase II. The knowledge of the wetlands hydrology will provide information on source, extent and frequency of water supply. Therefore, it will be possible to determine the contribution of groundwater to the wetland maintenance as well as the viability of restoration project. Finally, this project intends to use biological assessment methods to improve the evaluation and ranking of potential wetland sites for management and conservation, such as identify biological assemblage, group wetlands into classes that respond similarly to stressors, establish standard sampling methods, determine what time of year to sample, establish known reference conditions and provide an away to measure divergence from biological integrity.

Few people realize the value of our mangroves in filtering sediments and other pollutants, thus maintaining water quality in our nearshore waters. The loss of over 50 percent of our mangrove habitat over the last 70 years due to cutting and land filling for the creation of land and access ways to water has compounded the problem. The loss of our mangrove habitats has resulted in a decline in nearshore water quality as greater

quantities of sediments and pollutants entered the sea. This has affected seagrass beds and coral reefs through reduced levels of sunlight penetration and increased stress fron chronic sedimentation. Our coral reefs have also suffered from a decline in balanced fish populations as nursery habitats have been destroyed. The general decline in the health of the marine environment of the Virgin Islands threatens our economy via decreases in tourism and in the general quality of life.

I. Summary of Principal Territorial and Federal Ground Water Protection Agencies and Organizations

Department of Planning and Natural Resources-Division of Environmental Protection.

DPNR-DEP is the lead agency for implementation and administration of ground water protection activities in the Virgin Islands. DPNR DEP duties include the development and enforcement of regulations associated with the ground water and wellhead protection, the management of databases containing information on hydro-geology of the Virgin Islands, wells and well-related permits, the mapping of ground water supply well locations, the delineation of wellhead protection areas, and other technical activities.

Other agencies with roles for ground water management and protection include the following:

VI Water and Power Authority (WAPA). As the major public water supplier in the VI, WAPA assists the Division of Environmental Protection in the delineation of wellhead protection areas around its wells and in the development of inventories of potential pollution sources in the delineated areas. WAPA maintains and provides DEP with data on pumping rates and on ambient ground water quality at its public supply wells. WAPA assists DEP in the development of contingency plans for chemical spills. Underground and aboveground storage tank leaks and other incidents that might pose immediate threats to ground water.

VI Department of Health (DOH), Division of Environmental Health (DEH). DOH-DEH is the point of contact for citizens reporting leaking septic systems. VI-DOH coordinates with DEP in its response to reported septic system failures. In addition, VI-DOH is authorized, under. VIC Title 19, Ch. 53, subchapter 1404, to enforce certain provisions of the Virgin Islands Code relating to refuse collection, all aspects of solid waste disposal, sewage disposal including septic tanks and sewage treatment plants, etc., which may affect human health.

Department of Public Works (DPW). DPW manages the Publicly Owned Treatment Works (POTWs) in the Territory and has the major responsibility for the management of solid and hazardous waste in the VI (under VIC T19 Chapter..56). It owns and operates the two municipal solid waste landfills in the VI—at Estate Bovoni on St. Thomas and at Estate Anguilla on St. Croix. DPW inherited several inadequately designed POTWs on St. Thomas from defunct developers. Several of these facilities discharge into main

drainage ways in central St Thomas, and contribute to elevated nitrate and coliform levels in the ground water.

USDA Natural Resources Conservation Service (NRCS). This agency is active in the development of water resources for farmers, including the design and building of agricultural retention ponds, which directly aid in aquifer recharge and address nonpoint source pollution. NRCS completed the re-mapping of VI soils several years ago and the information should soon be available to assess aquifer vulnerabilities and influence decisions pertaining to development options. NRCS is also involved in the detailed mapping of Virgin Islands watersheds for the 14-Digit Hydrologic Unit Codes.

VI Housing Authority (VIHA) and the VI Department of Housing, Parks and Recreation (DHPR): On St. Thomas, VIHA' s Tutu high rise housing project, built in the early 1970s, utilized four (4) wells to supplement rainfall collection. These wells were closed for human consumption in. 1987. Following the discovery of tetrachloroethylene (PCE) and the petroleum compounds benzene, toluene, ethylbenzene, and xylene (BTEX) in a commercial supply well nearby. An investigation is ongoing in the Tutu Valley to determine the type and extent of contamination which includes, among the aforementioned chemicals, Trichloroethylene (TCE), 1,2 Dichloroethylene (1,2DCE) and Methyl Tert-Butyl Ether (MTBE).

On St. Croix, VIHA is operating a renewable energy project (called RENTEC for Renewable Energy TEChnology) with cooperation and funding from the VI Energy Office. The system is designed to supply approximately 10,000 GPD to a housing community in Frederiksted using two wells for sources of water and a reverse-osmosis (RO) plant for water processing. All electrical components are solar powered (solar panels charging massive battery banks).

DHPR plays a smaller role in public housing management than VIHA, managing only four housing communities on St. Thomas and four housing communities on St Croix. DHPR. Is principally focused on the operation and maintenance of public recreational, areas, many which use ground water to supply a portion of the water systems requirements (including gray-water systems for restrooms).

VI Department of Agriculture. The Department of Agriculture controls much of the open-space government land in the Territory. Much of this land is available for farming and grazing activities via leases issued to applicants, however some of the open space land has also been used by WAPA for well field areas. The Adventure we11 field on St. Croix, and in the Carolina well field on St. John, is on DEDA land. In these areas, The Department of Agriculture has the primary responsibility for land use management on non-developed government land.

VI Department of Public Safety (DPS): DPS has the responsibility of enforcing motor vehicle laws, rules and regulations. Its officers must be able to recognize hazardous materials shipment signs and be aware of the consequences of a hazardous materials spill in the vicinity of a wellhead.

VI Department of Planning & Natural Resources, Division of Permits (DoP): DoP is directly involved with land use permitting. DoP is the agency responsible for ensuring correct installation of septic systems.

US Geological Survey (USGS) Water Resources Division (WRD): USGS. -WRD completed a comprehensive wellhead location survey for its Ground Water Sites Inventory (GWSI) database in. the Virgin Islands in 1990. USGS has been instrumental in organizing the database information into a GIS format. The information will be available from USGS on a request basis, or through a contractual arrangement if needed. USGS-WRD is also directly involved in mapping Virgin Islands watersheds for the NRCS 14-digit Hydrologic Unit definition activity.

Attachment I: Unified Watershed Assessment: Category 1 Watersheds

Table 1.

CLEAN WATER ACTION PLAN :
UNIFIED WATERSHED ASSESSMENT.
UNITED STATES VIRGIN ISLANDS
WATERSHED CATEGORY 1 : PERIOD 1999-2000

Hydrologic Unit	Watershed	Sub-watershed	Acreage	APC's	Water Quality	Impaired Water Bodies	TPDES	Unpermitted Discharges	UST	Marine Water Intake &	RCRA	UIC
				CZMA	305 (b) Report	303(d) List		& Sewage Bypasses		Groundwater Resources		Class V
	Bethlehem	Bethlehem	2230			Yes - Manning Bay	STX PWD-1		11Q	Territorial Court (C)	10Q	18
	HOVIC-STX Alumina	Barren Spot	2087	Southshore IA	1	No	Hovic - STX Alumina-2	BC-9	14P	Caledonia Springs (W) Hovic (S)	12P	61
		Castle Coakley	1606	Southshore IA		No				STX Alumina (S)		
	Airport	Flamboyant Racetrack	6680	Southshore IA		No	VING-1		6R	Paradise Purification(W)	8R	3
	Diamond	VIRIL	1322	Southshore IA		Yes	VIRIL-1		7S	Paradise Bottling (GW)	1S	3
St. Croix	Southgate	Chenay Bay	387	Southgate Pond		No			1G	Southgate Gardens (GW)	0G	
16,372 out of 54,072 acres		Southgate Farm	704	Southgate Pond		No						
30.3%	Christiansted	Altoona Lagoon	557	STX Reef System		No	WAPA-1	BC-9	8E	WAPA (S)	8E	6
		Mt.	472	STX Reef System		No						

Hydrologic Unit	Watershed	Sub-watershed	Acreage	APC's	Water Quality	Impaired Water Bodies	TPDES	Unpermitted Discharges	UST	Marine Water Intake &	RCRA	UIC
		Welcome										
	Great Pond Bay	Great Pond	327	STX Reef System		No			0L		0L	
				Great Pond								
	St. Thomas Harbor &	St. Thomas Harbor	417	STT Harbor	21	No	No		30J	Blue Beards Castle N & W	21J	19
	Long Bay	Krum Bay / Long Bay	500	STT Harbor		No	No			Ramana Yacth Haven (S)		
	Red Hook Bay	Red Hook Bay	850	Mangrove Bay /Benner Bay	4	No	No		2G	Anchorage Condos, Cowpet Bay (S)	1G	1
		Vessup Bay	400	Vessup Bay		No	Yes (1)			Elysian Beach Resort (GW)		
	Benner Bay	Nadir	2135	Mangrove Lagoon	2	Yes	Yes (1)		14H	Anchorage Condos (S)	9H	5
St. Thomas & St. John		Benner Bay	378	Mangrove Lagoon	9	Yes	Yes (1)			Elysain Beach Resort (GW)		
8,260 out of 31,001 acres		Mangrove Lagoon	1153	Mangrove Lagoon	16	Yes	Yes (1)					
26.6%	Magens Bay	Lovenlund	920	Magens Bay		No	No		1D		8D	
				Mandahl								
	Great Cruz Bay	Great Cruz Bay	447	Enighed Pond		No	Yes (1)		3W	Caneel Bay Resort(S)	5W	2
	Fish Bay	Fish Bay	1060		1	No	Yes (1)		0U		0U	

Table 1: continued

Hydrologic Unit	Watershed	Special Studies &	FIFRA	Coastal Barriers	Fish & Wildlife	Marine	Soil Type	Others	Designated	Land & Water Use Impacts
		Areas of Special Significance		CBIA	Resources	Habitat	HEL	CERCLA	Use Class	Others
St. Croix 16,372 out of 54,072 acres 30.3%	Bethlehem	Sandy Point Federal Wildlife Refuge			MN,TE,FE,LM,WM,FN,ST,SG,RF.	Fringe Reef.		1Q	Class-C	Oil Seepage, heavy metals , sewage drainage noted.
	HOVIC-STX Alumina	Sandy Point FederalWildlife Refuge	NR -2, R -1	Krause Lagoon	SP,MN,TE,FE,LM,WM,FN,ST,SG,RF.	Mixed Coral, Pavement,Fringe Reef.	AgD, FrC2, AgC2, ScC, PrB, FrA, FcA, HeA, FrB, ScB, AgF, AgD.	0P	Class -C	Oil Seepage, heavymetals, sewage drainage noted .

		Sandy Point Federal Wildlife Refuge				Deep Reef ,Pavement, Mixed Coral, Fore Reef.	ScB, AgC2, AgD, ScC, AgE, AgF,DiB, DeF,.		Class-C	Oil seepage , heavymetals, sewage drainage noted.
	Airport	Sandy Point Federal Wildlife Refuge			MN,TE,FE,LM,WM,FN, RF.	Deep Reef, Pavement, Mixed Coral, Fore Reef	DeF,SaA,JaC,DeD,PaC,SgF,SaC,DeE,SgE,PaB,VcD, GyB,JaB,FeC2, AuA,FrB,FcA, ScB, JaD, AgC2, AgD,FcA, FrC2, AgE,AgF.	1R		Run-off from dump site and POTW discharge.
	Diamond	Sandy Point Federal Wildlife Refuge				Deep Reef, Pavement, Mixed Coral ,Fore Reef	CoA, AgC2 , AgD,ScB, AgE, Ls, CaB, FcC2, AgF, DeD, JaC, PaC.	0S	Class-C	Permitted discharge of molasses;Rumslop,oil,heavy metals and sewage .
	Southgate	Green Cay Federal Wildlife Refuge		Southgate Pond.	SP,MN,TE,FE,LM,WM,ST,SG,RF.	Mixed Coral, Deep Coral, Fore Reef.	CoA, JuB, JaC, SaA, DeE, CrF, SaC.	0G	Class- B	Bacterial and heavy metals levels have been higher than allowed.
		Green Cay Federal Wildlife Refuge				Mangrove	Crf,CrE,SaA,Def,CoA,DeD,PaC, SgF,Ivd,CaB,JuB,Ts			Marina , Hotel

	Christiansted	Secondary Priority Post Hugo VITPS Site.	NR - 16 ,R - 9	Altoona Lagoon	SP,MN,TE,FE,LM,WM,FN,ST,SG,RF.	Mixed Coral , Pavement.	DeE,JaC, Te, CoA, LaB, CrF, IvD,CrF,SaA.	0E	Class -C	C'sted Harbour : Run-off, sewage , POTW & WAPA discharge.
						Mixed Coral, Deep Reef, Pavement, Fore Reef.	Ma, IvD,LaB,CrE,SaC,CrF,CsF,SaA.		Class-C	Has been in violation for bacterial levels, has execessive amounts of heavy metals ,phosphorous and DDE.
	Great Pond Bay	Highest Priority Post Hugo VITPS Site.		Great Pond Bay.	SP,MN,TE,FE,LM,WM,FN,ST,SG,RF.	Mixed Coral ,Deep Reef, Fore Reef,Fringe Reef.	JuB, SaA, CrE, CrF, IvD, SaC	0L	Class- B	Sedimentation, nutrient loading and bactriea levels are of concern in Reef System

St. Thomas & St. John 8,260 out of 31,001 acres 26.6%	St. Thomas Harbor &	Hassel Island FederalWildlife Refuge.	NR-3 , R-8		TE,FE.			2J	Class-C	Pollution from five sources, 1. Run-off,sedementationand, 2. leeking sewer pipes and storm water flow.
	Long Bay						VcD, VcE, CrE, CrF, SaA, GyB,CvE, SaC, Ma.			3. Vessel waste discharge ,4.solid waste from both land and vessels, 5. Oil concentration fronmbothland and sea (dripping leeks)
	Red Hook Bay	Secondary Priority Post Hugo VITPS Site.	NR-3 ,R-2		MN,TE,FE,LM,WM,FN.			0G		
		St James Marine Reserve and Wildlife Sanctuary .			MN,ST,SG,LM,WM,FN.					High Cu & Hg levels ,sewage : High priority for TMDL.

	Benner Bay		NR- 4 ,R-3	Benner Bay	SP,MN,TE,FE,LM,WM,FN,ST,SG,RF.	Mangrove	JaC, CrE, CrF, IsE, CrC, CvE, GyB, LaB, ScA, VeD, VcE, Cb , Tf , Ts, DeD,DeE	5H	Class-B	However waters are very unhealthy four facilities have repeatedly violated their permits
		Compass Point Pond Marine Reserve /Wildlife Sanctuary.			SP,MN,TE,FE,LM,WM,FN,ST,SG,RF.	Mangrove	CrE, Tf, SaA, CrF, CvE,			Sewage and Urban Run-off.
		Cas Cay Marine Reserve /Wildlife Sanctuary.			SP,MN,TE,FE,LM,WM,FN,ST,SG,RF.					Permitted POTW sewage discharge.
	Magens Bay			Magens Bay	SP,TE,FE,LM,WM,FN,ST,SG.	Deep Reef, Pavement	Vr, CrE, CrF, AgE, PbB, PbC, IsE, CrE, DoF, VcE, AgF, DeF, CrF,	0D	Class -B	Usually under limits, stormwater run-off a problem, due to turbidity and bacterial concentration .
St. John	Great Cruz Bay		NR -5		SP,MN,TE,FE.	Mangrove	Tf, CrE, SaA, CsF,CrC, IsE, CsE2, CvE	0W	Class -B	Has been in violation due to storm sewer discharges and heavy commercial boat usage, dredging in Cruz Bay increase turbidity.
										Run-off, Sewage : Terrestrial Run-off POTW discharge.
	Fish Bay	Secondary Priority Post Hugo VITPS Site.		Fish Bay	SP,MN,TE,FE,LM,WM,ST,SG,RF.	Mangrove ,Mixed Coral, Deep Reef.	CrE, CvE, CrC, CaF, CrF, CsE2, Vr, JuB, Tf, SaA, IsD2, PbC.	0U	Class -B	Sediments

Attachment II: Areas of Particular Concern

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. Area that are under development are considered develop areas, but areas targeted for development are not.

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 byproducts 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.

Corresponding APC Numbers
1,4

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 VI 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 is 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.

Corresponding APC Numbers
1,2,4,5

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.

Corresponding APC Numbers
1, 3, 4, 5

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.

Corresponding APC Numbers
1, 3

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 owns 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.

Corresponding APC Numbers
4

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 US 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.

Corresponding APC Numbers
2, 4, 5

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.

Corresponding APC Numbers
5

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.

Corresponding APC Numbers
2, 3, 4, 5

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.

Corresponding APC Numbers
3, 6

Mandahl Bay

Resource Use

Attachment III:

The 2004 303(d) Impaired Waterbody List

I. SUMMARY

Section 303(d) of the Clean Water Act requires States and Territories to develop a list of impaired waters needing TMDLs every even-numbered calendar year. A impaired waterbody is one for which technology-based pollution controls are not stringent enough to attain or maintain compliance with applicable State and Territory water quality standards. In order for a water quality-limited waterbody to attain water quality standards, a Total Maximum Daily Load (TMDL) must be developed and implemented specifically for that waterbody and pollutant(s) of concern. A TMDL is a quantitative assessment of the amount of pollution that a certain waterbody can assimilate while still meeting water quality standards.

EPA regulations require States and Territories to:

- identify water quality limited waters still requiring TMDLs after the implementation of technology-based
  or other pollution controls,

- establish a priority ranking of these waters,

- identify pollutants causing impairment,

- identify waters targeted to begin TMDL development over the next two (2) years.

II. LIST DEVELOPMENT

This 2004 submission, required under Section 303(d)(1)(A) of the Clean Water Act, identifies waters within the territory of the U.S. Virgin Islands that are determined to be, or are suspected to be, “use impaired”. An assessment unit is designated as “use impaired” if the quality of the assessment unit may not meet the water quality standards for protection of designated uses.

The complete list of data sources used to develop the U.S. V.I. 2002 Section 303(d) list are as follows:

• U.S. Virgin Islands Ambient Monitoring data from Fiscal Years 2002-2003 (VIDPNR)
• 2002 U.S. Virgin Islands Section 305(b) Report (VIDPNR)
• 2002 U.S. Virgin Islands 303(d) List (VIDPNR)
• U.S. Virgin Islands St. Thomas/St. John oil and chemical spill log data from Fiscal Years 2002-2003(VIDPNR)
• Association of Marina Operators of the VI Marina Water Quality Monitoring and BMP Effectiveness Assessment Project 11/30/01 (AMOVI)[1]

• Water Quality Samples for the US Virgin Islands 2003 (NOAA)
• Technical Memorandum to the Record for Virgin Islands Rum, Industries, Ltd (VIRIL)
Subject: Ambient Ocean Monitoring Survey VIRIL Ocean Discharge November 4, 2003 (EPA)

The above list of data represents all existing and readily available data. This data is limited and many waters have been listed based on a suspected impairment. These waters will remain on the list pending further investigations as to a confirmation of the perceived impairment of designated use.

During the initial public notice period (February 14 to March 16, 2004) of the proposed 2004 USVI 303(d) list, US National Park Service (US NPS) submitted ambient water quality data for the Virgin Islands National Park in St. John, USVI. While US NPS provided data on March 11, 2004, this data was submitted with no direct comments to the proposed 2004 USVI 303(d) list. The US NPS data submission included a note indicating that the data sets were not the "final versions that will be sent to STORET" with no accompanying Quality Assurance/Quality Control (QA/QC) documentation. Additionally, US NPS did not provide information on the QA/QC methods upon request for the US NPS data set prior to the second public notice, which began on Monday, April 26, 2004. Therefore, DPNR could not utilize the US NPS data sets received on March 11, 2004, for the development of the 303(d) list nor the assessments included in the Integrated Report. USVI is committed to evaluating all readily available data to complete their assessments. Once the US NPS data is finalized, USVI can utilize this data to assess waters for the next listing cycle, which is in 2006.

III. DELISTING ACTIONS

DPNR has delisted three assessment unit/impairment combinations this cycle. A Dissolved Oxygen TMDL has been completed for assessment units VI-STT-33 (Benner Bay), VI-STT-34 (Benner Bay Lagoon) and VI-STT-35 (Mangrove Lagoon). VI-STT-33 was listed only for Dissolved Oxygen and thus was removed from the list. VI-STT-34 and VI-STT-35 however will remain listed for Total Fecal Coliform.

Some assessment units have shown improvement this cycle. DPNR however feels that to delist based solely on one cycle's worth of data would be premature. The assessment units that showed significant improvement are: Manning Bay/Estate Anguilla Beach (VI-STC-64), Turner Bay/Enighed Pond (VI-STJ-29) and Limetree Bay (VI-STT-38). Provided these assessment units continue to show improvement they may be delisted in 2006. On the list attached to this document, red text indicates a parameter an assessment unit was impaired for in the previous cycle but is not impaired this cycle. These parameters will be eligible for delisting in 2006.

VIRIL OUTFALL-CARIBBEAN SEA (St.Croix - VI-STC-74) was incorrectly listed in both the 2002 list and the 2004 initial draft. After a complete re-evaluation of DPNR ambient monitoring sites, it was discoverd that station STC-24B Rum Plant (VI Rum) Outfall is located in the adjacent assessment unit DIAMOND SUBWATERSHED, OFFSHORE (St.Croix - VI-STC-75).

Assessment data is not being correctly applied to VI-STC-75. In the process of re-evaluating the positioning of monitoring sites, assessment data were removed from some assessment units and applied to other asssessment units. VI-STC-75, however, was the only assessment unit shift on this 2004 303(d) list.

IV. LISTING ACTION

The Environmental Protection Agency released a guidance for developing the Integrated Water Quality Monitoring and Assessment Report on November 19, 2001 that would classify waterbody assessment units into one of five categories. The assessment guidance was refined on July 21, 2003 for the 2004 reporting cycle. The Virgin Islands has exercised the option of modifying the guidance to better suit DPNR's reporting needs. Below are the categories DPNR used for 2004 assessments:

Category 1
The assessment unit is placed in this category if it meets the water quality standards for the parameters that define support for both Primary Contact Recreation (PCR) & Aquatic Life Use Support (ALUS).

Category 2
The assessment unit is placed in this category if it attains water quality standards for the parameters that define support for either PCR or ALUS but data is insufficient to determine support for the other use. In addition, there is no data to indicate that the uses are threatened under the US EPA definition of threatened. Waters with insufficient data will be scheduled for more extensive monitoring in the USVI's multi-year monitoring schedule.

Category 3
The assessment unit is placed it this category if insufficient or no data is available to determine if water quality standards are attained and any designated uses are supported. The Virgin Islands considers insufficient data as anything less than four quarters of monitoring data. However, waters with less than four quarters of monitoring data may be reviewed on a case-by-case basis if the limited data strongly suggests that water quality standards are exceeded and the designated uses are impaired. Such waters may be eligible for inclusion on the 303(d) List. Remaining waters with insufficient data will be scheduled for more extensive monitoring in the USVI's multi-year monitoring schedule.

For the 2004 Integrated Report, DEP proposes the following Category 3 subcategories:

Category 3A
No data is available from any of the identified data sources for the assessment unit in question.

Category 3B
Insufficient Data is available from any of the identified data sources for the assessment unit in

question. Insufficient data is defined as less than four quarters of monitoring data. This category differs from Category 2 in that this condition must apply to all designated uses.

Category 3C
Inconclusive Data is available from any of the identified data sources for the assessment unit in question. This might include information from studies that do not directly provide information related to water quality standards.

Category 3D
Unreliable or low quality data is available from any of the identified data sources for the assessment unit in question. Unreliable or low quality data is defined as data sets that have significant gaps, obvious anomalies, etc.

Category 4
Assessment units that are found to be partially or not supporting for one or both designated uses are place in category 4 under the appropriate subcategory (4A, 4B, 4C).

Category 4A
The assessment unit is placed in this category if it was previously listed on the 303(d) list and a total maximum daily load has been established and approved by EPA.

Category 4B
The assessment unit is placed into this category only if other pollution control requirements are expected to address all water-pollutant combinations and attain all water quality standards within a reasonable period of time. The Virgin Islands considers a reasonable period of time as being the time between reporting cycles. If the impairment is the result of a point source discharge, is expected that the Territorial Pollution Discharge Elimination System (TPDES) program will take appropriate measures to control point source pollution. If the impairment is the result of non-point source pollution, DPNR will provide evidence that a pollution control measure is in place.

Category 4C
The assessment unit is placed into this category if the impairment was not caused by a pollutant. Assessment units place into this category must show improvement by the next reporting cycle. If the impairment persists because of current conditions it will be moved into Category 5. If the assessment unit shows improvement since the last cycle it will be moved into either Category 1 or 2. If the data available is insufficient to make an assessment, the assessment unit will be moved to Category 3 (see Category 3 for more detail).

Category 5
The assessment unit is placed into this category if water quality standards are exceeded in which case a total maximum daily load must be established. Assessment units that are placed into Category 5 will be placed on the 2004 303(d) Total Maximum Daily Load List.

The US Virgin Islands has created a standard waterbody delineation that organizes the coastal waters of the Virgin Islands into assessment units. This delineation is based on (in order of consideration):

1. legal limits of water quality classifications
2. subwatershed boundaries
3. shoreline geomorphology
4. benthic geomorphology
5. bathymetry
6. benthic habitats
7. 305(d) listing and total maximum daily loads (TMDLs)
8. management areas
9. 305(b) assessment

In the 2004 Integrated Report, these delineated assessment units have been grouped into categories. No assessment unit boundaries have changed since the 2002 asessment. The only difference is that the assessment units have been renamed to begin with VI instead of AU. Assessment units that fall into category 5 are listed in the 2004 303(d) list.

VESSUP BAY (St. Thomas- VI-STT-23), BENNER BAY (St. Thomas - VI-STT-33 & VI-STT-34), MANGROVE LAGOON (St Thomas - VI-STT-35), SPRAT BAY (Water Island - VI-STT-46), TURNER BAY - ENIGHED POND (St. John - VI-STJ-29), SALT RIVER ESTUARY (St. Croix - VI-STC-16, VI-STC-17 & VI-STC-18), DIAMOND SUBWATERSHED, OFFSHORE (St.Croix - VI-STC-75), and MANNING BAY (St. Croix - VI-STC-64) were listed on the 1998 and 2002 303(d) list and will be maintained on the 2004 303(d) list based on the review of new data available for this report and current TMDL projects in the VI with exception to Turbidity in the areas described in by VI Coastal Water Quality Standards to be exempt from Turbidity. Benner Bay Lagoon and Mangrove Lagoon remain listed as only a dissolved oxygen TMDL has been completed. VI-STT-33 has been removed from the list altogether. As per the methodology developed for the new Integrated Water Quality Monitoring and Assessment Report, any assessment unit that was listed as impaired in the 2002 list may not be delisted unless it qualifies as a category 1 or 2 assessment unit or has already undergone an EPA approved TMDL, in which case it would be placed in category 4A. In revision, it was discovered that several monitoring stations where inadvertently equated to the wrong assessment units. Of the above list VIRIL OUTFALL-CARIBBEAN SEA (St.Croix - VI-STC-74) was replaced with DIAMOND SUBWATERSHED, OFFSHORE (St.Croix - VI-STC-75).

HOVENSA HARBOR (St. Croix - VI-STC-61), GREAT CRUZ BAY (St. John - VI-STJ-28), MAGENS BAY (St. Thomas - VI-STT-10), MANDAHL BAY (MARINA) (St. Thomas - VI-STT-13), MANDAHL BAY SUBWATERSHED, OFFSHORE (St. Thomas - VI-STT-17), RED HOOK BAY (St. Thomas - VI-STT-24), LIMETREE BAY (St. Thomas - VI-STT-38), and HASSEL ISLAND AT HAULOVER CUT TO REGIS POINT (St. Thomas - VI-STT-47) are assessment units added to the 2002 303(d) list based on available new data.

In this 2004 assessment, ST. CROIX-BY-THE-SEA (St. Croix - VI-STC-23), LONG REEF

BACKREEF, WEST (St. Croix - VI-STC-24), CHRISTIANSTED HARBOR (St. Croix - VI-STC-26), LONG REEF FOREREEF, EAST (St. Croix - VI-STC-27), BUCCANEER BEACH (St. Croix - VI-STC-31), TAMARIND REEF LAGOON (SOUTHGATE LAGOON) (St. Croix - VI-STC-35), SOUTHGATE SUBWATERSHED, OFFSHORE (St. Croix - VI-STC-37), TEAGUE BAY (St. Croix - VI-STC-39), TEAGUE BAY BACKREEF (St. Croix - VI-STC-40), BUGBY HOLE BACKREEF (St. Croix - VI-STC-56), CARLTON BEACH (St. Croix - VI-STC-76), CANEEL BAY (St. John - VI-STJ-01), HAWKSNEST BAY (St. John - VI-STJ-02), TRUNK BAY (St. John - VI-STJ-03), CINNAMON BAY (St. John - VI-STJ-05), MAHO BAY/FRANCIS BAY (St. John - VI-STJ-06), CHOCOLATE HOLE (VI-STJ-26), CRUZ BAY (St. John - VI-STJ-30), SANTA MARIA BAY (St. Thomas - VI-STT-4), CARET BAY (St. Thomas - VI-STT-5), DOROTHEA (St. Thomas - VI-STT-7), HULL BAY (St. Thomas - VI-STT-8), SUNSI BAY (St. Thomas - VI-STT-15), SPRING BAY (St. Thomas - VI-STT-16), WATER BAY (St. Thomas - VI-STT-18), SMITH BAY (St. Thomas - VI-STT-19), ST. JOHN BAY (St. Thomas - VI-STT-21), RED BAY (St. Thomas - VI-STT-22), GREAT BAY (St. Thomas - VI-STT-25), FRENCHMAN BAY (St. Thomas - VI-STT-37), MORNINGSTAR BAY (St. Thomas - VI-STT-39), GREGERIE CHANNEL (St. Thomas - VI-STT-45) and FLAMINGO BAY (St. Thomas - VI-STT-50) have been added to the 303(d) list.

ST. CROIX-BY-THE-SEA (St. Croix - VI-STC-23) contains DPNR ambient monitoring station STC- 34 St. Croix-By-the-Sea. This assessment unit has been listed for pH.

LONG REEF BACKREEF, WEST (St. Croix - VI-STC-24) contains DPNR ambient monitoring station STC-48 Long Reef Backreef, west. This assessment unit has been listed for dissolved oxygen.

BUCCANEER BEACH (St. Croix - VI-STC-31) contains DPNR ambient monitoring station STC-3 Buccaneer Hotel. This assessment unit has been listed for turbidity.

TAMARIND REEF LAGOON (SOUTHGATE LAGOON) (St. Croix - VI-STC-35) contains DPNR ambient monitoring station STC-4 Tamarind Reef Lagoon. This assessment unit has been listed for turbidity and dissolved oxygen.

CHRISTIANSTED HARBOR (St. Croix - VI-STC-26) contains DPNR ambient monitoring stations STC-37 Christiansted Harbor Entrance West, STC-40 St. Croix Marine, STC-41 Gallows Bay, STC-42 Public Wharf, STC-43 Water Gut Storm Drain, STC-44 Protestant Cay Beach, STC-45 Christiansted Harbor, STC-46 WAPA Intake, and STC-47 Mill Harbor Condominium Beach. This assessment unit has been listed for dissolved oxygen.

LONG REEF FOREREEF, EAST (St. Croix - VI-STC-27) contains DPNR ambient monitoring station STC-36 Long Reef Forereef East. This assessment unit has been listed for dissolved oxygen and pH.

BUCCANEER BEACH (St. Croix - VI-STC-31) contains DPNR ambient monitoring station

STC-3 Buccaneer Hotel. This assessment unit has been listed for turbidity.

TAMARIND REEF LAGOON (SOUTHGATE LAGOON) (St. Croix - VI-STC-35) contains DPNR ambient monitoring station STC-4 Tamarind Reef Lagoon. This assessment unit has been listed for dissolved oxygen and turbidity.

SOUTHGATE SUBWATERSHED, OFFSHORE (St. Croix - VI-STC-37) contains DPNR ambient monitoring station STC-5 Green Cay Beach. This assessment unit has been listed for total fecal coliform.

TEAGUE BAY (St. Croix - VI-STC-39) contains DPNR ambient monitoring stations STC-8 Reef Club Beach and STC-9 St. Croix Yacht Club Beach. This assessment unit has been listed for pH.

TEAGUE BAY BACKREEF (St. Croix - VI-STC-40) contains DPNR ambient monitoring station STC-10 Cramers Park. This assessment unit has been listed for pH.

BUGBY HOLE BACKREEF (St. Croix - VI-STC-56) contains DPNR ambient monitoring stations STC-14A Halfpenny Bay - Manchenil and STC-14B Halfpenny Backreef. This assessment unit has been listed for turbidity.

CANEEL BAY (St. John - VI-STJ-01) contains DPNR ambient monitoring station STJ-54 Caneel Bay. This assessment unit has been listed for dissolved oxygen and turbidity.

HAWKSNEST BAY (St. John - VI-STJ-02) contains DPNR ambient monitoring station STJ-44B Hawksnest Bay. This assessment unit has been listed for dissolved oxygen.

TRUNK BAY (St. John - VI-STJ-03) contains DPNR ambient monitoring station. STJ-44A Trunk Bay. This assessment unit has been listed for dissolved oxygen.

CINNAMON BAY (St. John - VI-STJ-05) contains DPNR ambient monitoring station STJ-44C Cinnamon Bay. This assessment unit has been listed for dissolved oxygen.

MAHO BAY/FRANCIS BAY (St. John - VI-STJ-06) contains DPNR ambient monitoring station STJ-44D Francis Bay. This assessment unit has been listed for dissolved oxygen.

CHOCOLATE HOLE (VI-STJ-26) contains DPNR ambient monitoring station STJ-46 Chocolate Hole. This assessment unit has been listed for dissolved oxygen.

CRUZ BAY (St. John - VI-STJ-30) contains DPNR ambient monitoring stations STJ-43A Cruz Bay, North, STJ-43B Cruz Bay, South, STJ-43C Cruz Bay, North of Seaplane Ramp and STJ-43D Cruz Bay Creek North. This assessment unit has been listed for dissolved oxygen and turbidity.

SANTA MARIA BAY (St. Thomas - VI-STT-4) contains DPNR ambient monitoring station STT-11 Santa Maria Bay. This assessment unit has been listed for dissolved oxygen, pH and turbidity.

CARET BAY (St. Thomas - VI-STT-5) contains DPNR ambient monitoring station STT-12 Caret Bay. This assessment unit has been listed for dissolved oxygen and pH.

DOROTHEA (St. Thomas - VI-STT-7) contains DPNR ambient monitoring station STT-13 Dorothea. This assessment unit has been listed for dissolved oxygen and pH.

HULL BAY (St. Thomas - VI-STT-8) contains DPNR ambient monitoring station STT-14 Hull Bay. This assessment unit has been listed for dissolved oxygen and pH.

SUNSI BAY (St. Thomas - VI-STT-15) contains DPNR ambient monitoring station STT-17B Sunsi Bay. This assessment unit has been listed for dissolved oxygen and pH.

SPRING BAY (St. Thomas - VI-STT-16) contains DPNR ambient monitoring station STT-17A Spring Bay. This assessment unit has been listed for dissolved oxygen and pH.

RED BAY (St. Thomas - VI-STT-22) contains DPNR ambient monitoring station STT-21B Red Bay. This assessment unit has been listed for dissolved oxygen and turbidity.

GREAT BAY (St. Thomas - VI-STT-25) contains DPNR ambient monitoring station STT-23 Great Bay. This assessment unit has been listed for dissolved oxygen. GREGERIE CHANNEL (St. Thomas - VI-STT-45) and FLAMINGO BAY (St. Thomas - VI-STT-50)
WATER BAY (St. Thomas - VI-STT-18) contains DPNR ambient monitoring station STT-19 Water Bay. This assessment unit has been listed for dissolved oxygen.

SMITH BAY (St. Thomas - VI-STT-19) contains DPNR ambient monitoring station STT-20 Smith Bay. This assessment unit has been listed for dissolved oxygen.

ST. JOHN BAY (St. Thomas - VI-STT-21) contains DPNR ambient monitoring station STT-21A St. John Bay. This assessment unit has been listed for dissolved oxygen.

FRENCHMAN BAY (St. Thomas - VI-STT-37) contains DPNR ambient monitoring station STT-29A Frenchman Bay. This assessment unit has been listed for dissolved oxygen.

MORNINGSTAR BAY (St. Thomas - VI-STT-39) contains DPNR ambient monitoring station STT-30 Morningstar Bay. This assessment unit has been listed for dissolved oxygen.

GREGERIE CHANNEL (St. Thomas - VI-STT-45) contains DPNR ambient monitoring stations STT-1 Crown Bay, Near Outfall and STT-39 Water Isle, East Gregorie Channel This assessment

unit has been listed for dissolved oxygen.

FLAMINGO BAY (St. Thomas - VI-STT-50) contains DPNR ambient monitoring station STT-41 Water Island Flamingo Bay. This assessment unit has been listed for turbidity.

Most of the newly added assessment units were 4C waters in the 2002 assessment. Under DPNR's listing methodology, 4C waters may not be 4C again in following cycles (after all, 4C waters are still impaired). Even though no pollutant was identified, these former 4C waters from the previous assessment have been moved to Category 5 and thus have been added to this list.

V. HIGH PRIORITY WATERS

Vessup Bay (St. Thomas), Benner Bay (St. Thomas), Mangrove Lagoon (St Thomas), Sprat Bay (Water Island), Turner Bay - Enighed Pond (St. John), Salt River Estuary (St. Croix), VIRIL Outfall- Caribbean Sea (St.Croix), and Manning Bay (St. Croix) were listed on the 1998 and 2002 US Virgin Islands 303(d) list. These assessment units were considered high priority because they were already scheduled to receive TMDLs, most of which have already started and are near completion.

High priority rankings had also been granted to Magens Bay and Red Hook Bay for the 2002 303(d) list.

Magens Bay was granted high priority because it is the single most popular tourist beach on the island of St. Thomas. That being the case, a primary contact recreation impairment is a major concern. Magens Bay has been under the influence of wastewater spills resulting from onsite waste disposal systems and from failing septic systems located in that subwatershed. The turbidity is a result of the recreation related activities.

Red Hook Bay was granted high priority because of numerous spills recorded in that area. Red Hook Bay sports marinas for both recreational and industrial boating. It is suspected that the spills can be attributed to vessel discharges. The source of the low dissolved oxygen is suspected to be the result of internal nutrient recycling.

For this 2004 list, high priority ranking has been assigned to Christiansted Harbor. Christiansted Harbor receives much boat traffic from cargo vessels, fishing vessels, and inter-island craft. Christiansted Harbor is also a popular tourist destination on St. Croix and thus subject to impacts from tourist traffic. These factors are believed to have contributed to this assessment unit's history of low dissolved oxygen.

VI. TMDL Schedule

EPA and VIDPNR have developed a schedule for completion of TMDLs for all waters on the

2004 303(d) list although not required by EPA regulations. TMDL development for the high priority assessment units of Vessup Bay, Benner Bay (including Benner Bay Lagoon Marina), Mangrove Lagoon, Magens Bay, Red Hook Bay and Salt River Lagoon (Marina) (including Salt River Lagoon, Sugar Bay, and Salt River Bay) have been scheduled for completion in 2004. The high priority assessment unit of Christiansted Harbor has been scheduled for completion in 2013

Medium priority assessment units are scheduled as follows: Great Cruz Bay (2005), Limetree Bay (2006), Hassel Island at Haulover Cut to Regis Point (2007), Hess Oil Virgin Islands Harbor (2009), Manning Bay/Estate Anguilla Beach (2009), Enfield Green Beach/VIRIL Outfall (2009), Mandahl Bay (Marina) (2010), Mandahl Bay subwatershed, offshore (2010), Sprat Bay (2010), Turner Bay/Enighed Pond (2011), Cruz Bay (2011), Flamingo (2012) Long Reef Forereef, east (2013), Tamarind Reef Lagoon (Southgate Lagoon) (2017), and Teague Bay (2017).

Assessment units on St. John rank between medium and low. The following waters are within the jurisdiction of the National Park Service. The medium priority assessment units within NPS boundaries are: Caneel Bay (2006) and Trunk Bay (2010).

The low priority assessment units within NPS boundaries are: Hawknest Bay (2008), Cinnamon Bay (2012) and Maho Bay/Francis Bay (2014).

AU ID	AU Name	Associated Monitoring Stations	Priority	Class	Impairment	Source	Listed in 2002?	Tentative Year of TMDL Completion	TMDL Completed?
St. Croix									
VI-STC-16	Salt River Lagoon, Marina	STC-33 Salt River Marina, STC-33C Salt River Lagoon, Marina	High	B	Dissolved Oxygen	Erosion from Derelict Land (Barren Land) Other Marina/ Boating On-vessel Discharges Residential Districts	Y	2004	N
VI-STC-17	Salt River Lagoon, Sugar Bay	STC-33D Salt River Lagoon, Sugar Bay	High	B			Y	2004	N
VI-STC-18	Salt River Bay	STC-33A,B,E-J Salt River (Columbus Landing Beach)	High	B			Y	2004	N
VI-STC-23	St. Croix-By-the-Sea	STC- 34 St. Croix-By-the-Sea	Low	B	pH	Source Unknown	N		N
VI-STC-24	Long Reef Backreef, west	STC-48 Long Reef Backreef, west	Low	C	Dissolved Oxygen	Municipal Point Source Discharges	N		N

AU ID	AU Name	Associated Monitoring Stations	Priority	Class	Impairment	Source	Listed in 2002?	Tentative Year of TMDL Completion	TMDL Completed?
VI-STC-26	Christiansted Harbor	STC-37 Christiansted Harbor Entrance West, STC-40 St. Croix Marine, STC-41 Gallows Bay, STC-42 Public Wharf, STC-43 Water Gut Storm Drain, STC-44 Protestant Cay Beach, STC-45 Christiansted Harbor, STC-46 WAPA Intake, STC-47 Mill Harbor Condominium Beach, STC-49 Long Reef Back Reef East	High	B	Dissolved Oxygen	Marina Boat Maintenance Marina/Boating Sanitary On-vessel Discharges Discharges from Municipal Combined Storm Sewer Systems Impacts from Resort Areas (Winter and Non-winter Resorts) Other Spill Related Impacts	N	2013	N
VI-STC-27	Long Reef Forereef, east	STC-36 Long Reef Forereef East	Medium	B	Dissolved Oxygen, pH	Marina/Boating Sanitary On-vessel Discharges Discharges from Municipal Combined Storm Sewer Systems	N	2013	N
VI-STC-31	Buccaneer Beach	STC-3 Buccaneer Hotel	Low	B	Turbidity	Highways, Roads, Bridges, Infrasturcture (New Construction)	N		N

AU ID	AU Name	Associated Monitoring Stations	Priority	Class	Impairment	Source	Listed in 2002?	Tentative Year of TMDL Completion	TMDL Completed?
VI-STC-35	Tamarind Reef Lagoon (Southgate Lagoon)	STC-4 Tamarind Reef Lagoon	Low	B	Dissolved Oxygen, Turbidity	Marina/Boating Sanitary On-vessel Discharges Other Spill Related Impacts Erosion from Derelict Land (Barren Land) Post-development Erosion and Sedimentation Impacts from Resort Areas (Winter and Non-winter Resorts) Discharges from Municipal Combined Storm Sewer Systems	N	2017	N
VI-STC-37	Southgate subwatershed, offshore	STC-5 Green Cay Beach	Low	B	Total Fecal Coliform	Marina Boat Maintenance Marina/Boating Sanitary On-vessel Discharges Non-Point Source	N		N
VI-STC-39	Teague Bay	STC-8 Reef Club Beach, STC-9 St. Croix Yacht Club Beach	Low	B	pH	Highway/Road/Bridge Runoff (Non-construction Related)	N	2017	N

AU ID	AU Name	Associated Monitoring Stations	Priority	Class	Impairment	Source	Listed in 2002?	Tentative Year of TMDL Completion	TMDL Completed?
VI-STC-40	Teague Bay Backreef	STC-10 Cramers Park	Low	B	pH	Highways, Roads, Bridges, Infrasturcture (New Construction)	N		N
VI-STC-56	Bugby Hole Backreef	STC-14A Halfpenny Bay - Manchenil ,STC-14B Halfpenny Backreef	Low	B	Turbidity	Highways, Roads, Bridges, Infrasturcture (New Construction), Agriculture	N		N
VI-STC-61	HOVENSA Harbor	STC-16 HOVENSA East Turning Basin, NW Corner, STC-17 HOVENSA West Turning Basin, NW Corner	Medium	C	Total Fecal Coliform, Dissolved Oxygen, Turbidity	Other Marina/ Boating On-vessel Discharges On- site Treatment Systems (Septic Systems and Similar Decentralized Systems) Municipal Point Source Discharges Ballast Water Releases	Y	2009	N
VI-STC-64	Manning Bay/Estate Anguilla Beach	STC-23 Public Dump	Medium	B	Dissolved Oxygen, Turbidity	Highway/ Road/ Bridge Runoff (Non- construction Related) Municipal Point Source Impacts from Inadequate Industrial/ Commercial Pretreatment	Y	2009	N

AU ID	AU Name	Associated Monitoring Stations	Priority	Class	Impairment	Source	Listed in 2002?	Tentative Year of TMDL Completion	TMDL Completed?
VI-STC-75	Diamond subwatershed, offshore	STC-24A, STC-24B Rum Plant (VI Rum) Outfall	Medium	B	Dissolved Oxygen Toxicity, Turbidity	Ambient Bioassays -Acute Aquatic Toxicity Ambient Bioassays- Chronic Aquatic Toxicity Industrial Point Source Discharge	Y	2009	N
VI-STC-76	Carlton Beach	STC-25 Long Point	Low	B	Dissolved Oxygen	Industrial Point Source Discharge	N		N
St. John									
VI-STJ-01	Caneel Bay	STJ-54 Caneel Bay	Medium	B	Dissolved Oxygen Turbidity	Impacts from Resort Areas (Winter and Non-winter Resorts) Pollutants from Public Bathing Areas Other Marina/Boating On-vessel Discharges	N	FED. Juristiction 2006	N
VI-STJ-02	Hawksnest Bay	STJ-44B Hawksnest Bay	Low	B	Dissolved Oxygen	Pollutants from Public Bathing Areas	N	FED. Juristiction 2008	N
VI-STJ-03	Trunk Bay	STJ-44A Trunk Bay	Medium	A	Dissolved Oxygen	Pollutants from Public Bathing Areas	N	FED. Juristiction 2010	N

AU ID	AU Name	Associated Monitoring Stations	Priority	Class	Impairment	Source	Listed in 2002?	Tentative Year of TMDL Completion	TMDL Completed?
VI-STJ-05	Cinnamon Bay	STJ-44C Cinnamon Bay	Low	B	Dissolved Oxygen	Pollutants from Public Bathing Areas Highway/ Road/ Bridge Runoff (Non- construction Related)	N	FED. Juristiction 2012	N
VI-STJ-06	Maho Bay/Francis Bay	STJ-44D Francis Bay	Low	B	Dissolved Oxygen Turbidity	Pollutants from Public Bathing Areas Highway/ Road/ Bridge Runoff (Non- construction Related)	N	FED. Juristiction 2014	N
VI-STJ-26	Chocolate Hole	STJ-46 Chocolate Hole, NPS-24 Chocolate Hole	Low	B	Dissolved Oxygen	Marina/Boating Sanitary On-vessel Discharges, Non-Point Source	N		N
VI-STJ-28	Great Cruz Bay	STJ-45 Great Cruz Bay. NPS-25 Great Cruz Bay	Medium	B	Oil & Grease Dissolved Oxygen Turbidity pH	Illegal Dumping, Non-Point Source On- site Treatment Systems (Septic Systems and Similar Decentralized Systems) Other Marina/ Boating On-vessel Discharges Other Recreational Pollution Sources	Y	2005	N
VI-STJ-29	Turner Bay/Enighed Pond	STJ-55 Turner Bay, NPS-26 Turner Bay	Medium	B	Turbidity	Municipal Point Source Discharges	Y	2011	N

AU ID	AU Name	Associated Monitoring Stations	Priority	Class	Impairment	Source	Listed in 2002?	Tentative Year of TMDL Completion	TMDL Completed?
VI-STJ-30	Cruz Bay	STJ-43A Cruz Bay, North, STJ-43B Cruz Bay, South, STJ-43C Cruz Bay, North of Seaplane Ramp, STJ-43D Cruz Bay Creek North	Medium	B	Dissolved Oxygen Turbidity	Commercial Ferries Marina Fueling Operations Other Marina/Boating On-vessel Discharges Other Recreational Pollution Sources	N	2011	N
St. Thomas									
VI-STT-04	Santa Maria Bay	STT-11 Santa Maria Bay	Low	B	Dissolved Oxygen pH Turbidity	Agriculture Post-development Erosion and Sedimentation	N	2016	N
VI-STT-05	Caret Bay	STT-12 Caret Bay	Low	B	Dissolved Oxygen pH	Source Unknown	N	2016	N
VI-STT-07	Dorothea	STT-13 Dorothea	Low	B	Dissolved Oxygen pH	Source Unknown	N	2013	N
VI-STT-08	Hull Bay	STT-14 Hull Bay	Low	B	Dissolved Oxygen pH	Other Marina/Boating On-vessel Discharges Other Recreational Pollution Sources	N	2013	N

AU ID	AU Name	Associated Monitoring Stations	Priority	Class	Impairment	Source	Listed in 2002?	Tentative Year of TMDL Completion	TMDL Completed?
VI-STT-10	Magens Bay	STT-15A, STT-15B Magens Bay	High	B	Total Fecal Coliform Turbidity, Dissolved Oxygen	Highways, Roads, Bridges, Infrasturcture (New Construction) On- site Treatment Systems (Septic Systems and Similar Decentralized Systems) Other Recreational Pollution Sources Changes in Tidal Circulation/ Flushing Highway/ Road/ Bridge Runoff (Non- construction Related)	Y	2004	N
VI-STT-13	Mandahl Bay (Marina)	STT-16B Mandahl Bay Entrance, STT-16C Mandahl Point Entrance	Medium	B	Dissolved Oxygen, pH, Secchi Disk	Other Marina/ Boating On-vessel Discharges Other Recreational Pollution Sources Changes in Tidal Circulation/ Flushing	Y	2010	N
VI-STT-15	Sunsi Bay	STT-17B Sunsi Bay		B	Dissolved Oxygen pH		N		N
VI-STT-16	Spring Bay	STT-17A Spring Bay		B	Dissolved Oxygen pH		N		N

AU ID	AU Name	Associated Monitoring Stations	Priority	Class	Impairment	Source	Listed in 2002?	Tentative Year of TMDL Completion	TMDL Completed?
VI-STT-17	Mandahl Bay subwatershed, offshore	STT-16A Mandahl Bay, STT-18 Coki Point Bay	Medium	B	Dissolved Oxygen Total Fecal Coliform Turbidity, pH	Other Marina/ Boating On-vessel Discharges Other Recreational Pollution Sources Illegal Dumping On- site Treatment Systems (Septic Systems and Similar Decentralized Systems)	Y	2010	N
VI-STT-18	Water Bay	STT-19 Water Bay	Low	B	Dissolved Oxygen	On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems)	N	2014	N
VI-STT-19	Smith Bay	STT-20 Smith Bay	Low	B	Dissolved Oxygen	On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems)	N	2014	N
VI-STT-21	St. John Bay	STT-21A St. John Bay	Low	B	Dissolved Oxygen	On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems)	N	2014	N

AU ID	AU Name	Associated Monitoring Stations	Priority	Class	Impairment	Source	Listed in 2002?	Tentative Year of TMDL Completion	TMDL Completed?
VI-STT-22	Red Bay	STT-21B Red Bay	Low	B	Dissolved Oxygen Turbidity	On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems), Non-Point Souce	N		N
VI-STT-23	Vessup Bay	STT-22B Vessup Bay	High	B	Dissolved Oxygen Total Fecal Coliform	Other Marina/ Boating On-vessel Discharges Other Recreational Pollution Sources Other Spill Related Impacts Internal Nutrient Recycling Municipal Point Source Impacts from Inadequate Industrial/ Commercial Pretreatment	Y	2004	Y
VI-STT-24	Red Hook Bay	STT-22A Red Hook Bay	High	B	Oil & Grease Dissolved Oxygen	Other Marina/ Boating On-vessel Discharges Other Recreational Pollution Sources Other Spill Related Impacts Internal Nutrient Recycling	Y	2004	N

AU ID	AU Name	Associated Monitoring Stations	Priority	Class	Impairment	Source	Listed in 2002?	Tentative Year of TMDL Completion	TMDL Completed?
VI-STT-25	Great Bay	STT-23 Great Bay	Low	B	Dissolved Oxygen	Other Marina/ Boating On-vessel Discharges, Internal Nutrient Recycling	N		N
VI-STT-34	Benner Bay Lagoon Marina	STT-26 Benner Bay Lagoon	High	B	Total Fecal Coliform, Dissolved Oxygen	Other Marina/ Boating On-vessel Discharges Discharges from Municipal Combined Storm Sewer Systems Changes in Tidal Circulation/ FlushingHighway/ Road/ Bridge Runoff (Non- construction Related) Sanitary Sewer Overflows (Collection System Failures)	Y	2007	Y (For Dissolved Oxygen)

AU ID	AU Name	Associated Monitoring Stations	Priority	Class	Impairment	Source	Listed in 2002?	Tentative Year of TMDL Completion	TMDL Completed?
VI-STT-35	Mangrove Lagoon	STT-27A Mangrove Lagoon, Near Treatment Plant, STT-27B Mangrove Lagoon, Off Sanitary Landfill (East of Ecotours), STT-27C Mangrove Lagoon, Near Tropical Marine Fuel Dock	High	B	Total Fecal Coliform	Changes in Tidal Circulation/ Flushing Discharges from Municipal Combined Storm Sewer Systems Highway/ Road/ Bridge Runoff (Non- construction Related) Other Marina/ Boating On-vessel Discharges	Y	2007	Y (For Dissolved Oxygen)
VI-STT-37	Frenchman Bay	STT-29A Frenchman Bay	Low	B	Dissolved Oxygen	Impacts from Resort Areas (Winter and Non-winter Resorts) Other Recreational Pollution Sources	N	2015	N
VI-STT-38	Limetree Bay	STT-29B Limetree Bay	Medium	B	Total Fecal Coliform Turbidity	On- site Treatment Systems (Septic Systems and Similar Decentralized Systems) Erosion from Derelict Land (Barren Land) Highways, Roads, Bridges, Infrasturcture (New Construction)	Y	2006	N

AU ID	AU Name	Associated Monitoring Stations	Priority	Class	Impairment	Source	Listed in 2002?	Tentative Year of TMDL Completion	TMDL Completed?
VI-STT-39	Morningstar Bay	STT-30 Morningstar Bay	Low	B	Dissolved Oxygen	Impacts from Resort Areas (Winter and Non-winter Resorts) Other Recreational Pollution Sources	N	2015	N
VI-STT-45	Gregerie Channel	STT-1 Crown Bay, Near Outfall, STT-39 Water Isle, East Gregorie Channe	Low	B	Dissolved Oxygen	Non-Point Source, Marina Boat Maintenance, Marina/Boating Pumpout Releases	N		N
VI-STT-46	Sprat Bay	STT-42 Water Island Sprat Bay	Medium	B	Dissolved Oxygen	Residential	Y	2010	N
VI-STT-47	Hassel Island at Haulover Cut to Regis Point	STT-2 Crown Bay, Near Tamarind Outlet, STT-3 Subbase	Medium	C	Oil & Grease Dissolved Oxygen pH, Total Fecal Coliform	Dredging (E. g., for Navigation Channels) Wastes from Pets Other Spill Related Impacts Other Marina/ Boating On-vessel Discharges Highway/ Road/ Bridge Runoff (Non- construction Related) Ballast Water Releases	Y	2007	N

AU ID	AU Name	Associated Monitoring Stations	Priority	Class	Impairment	Source	Listed in 2002?	Tentative Year of TMDL Completion	TMDL Completed?
VI-STT-50	Flamingo	STT-41 Water Island Flamingo Bay	Medium	B	Turbidity	Commercial Ferries Residential Districts Other Marina/ Boating On-vessel Discharges Other Recreational Pollution Sources	N	2012	N

ATTACHMENT IV

United States Virgin Islands
Multi-Year Water Quality Monitoring Strategy

Submitted Pursuant to Section 106
of the
Federal Clean Water Act

January 2004

1. Introduction

The United States Virgin Islands (USVI) are located in the eastern extreme of the Greater Antilles and consist of three main islands (St. Croix, St. Thomas, and St. John) and 57 smaller islands and cays that surround them. The islands were purchased from Denmark in 1917, and are now a territory of the United States.

During the last century, the Virgin Islands have experienced a shift from mostly agriculture land use to industry. Since 1970, the population has tripled and the economy has been depending primarily upon tourism, government, petroleum processing, aluminum, and small-business industries.

The USVI Code has established the Department of Planning and Natural Resources (DPNR) as the environmental protection/regulatory agency. The US Environmental Protection Agency (EPA), under the auspices of Region II, has delegated responsibility for environmental protection to the DPNR's Division of Environmental Protection (DEP).

DEP operates three water quality programs: the Water Pollution Control (WPC), the Non-Point Source (NPS), and the Ground Water (GW) Program. WPC Program has oversight of the Territorial Pollutant Discharge Elimination System (TPDES) Permitting Program and the Ambient Monitoring Program. The former sets policies to mitigate point-source pollution and conducts public outreach and the latter is the primary mechanism to assess water quality and to develop and implement strategies to address the causes or sources of pollution. The NPS program administers grants and sets policies to mitigate non-point source pollution. The GW Program manages ground water appropriation, monitoring, and protection.

This document contains a description of how the WPC, NPS, and the GW Programs address water quality and how they incorporate the EPA recommended Elements of a State Water Monitoring and Assessment Program into their joint multi-year water quality monitoring strategy (MYMS).

1.1. Monitoring Strategy Goals

The purpose of the Virgin Islands MYMS is to develop and implement a long-term monitoring program that will result in a comprehensive and representative assessment of all waters in the US Virgin Islands.

Under provisions of the Federal and Local Water Pollution Control Act, the Virgin Islands Water Pollution Control Program is mandated to conserve, protect, preserve, and improve the quality of water for public use and the propagation of wildlife, fish, and aquatic life for the US Virgin Islands. To accomplish this mandate, MYMS has the following particular objectives:

- To collect data to determine the overall condition of water bodies.
- To identify existing and emerging problems and to establish status and trends related to water quality.
- To establish, review, and amend water quality standards.
- To aid in the design and implementation of water management and regulatory programs.
- To determine permitted facilities compliance and program effectiveness.
- To monitor and respond to events that threatened water quality standards.
- To evaluate program's monitoring activities in order to measure progress toward maintaining and attaining water quality.
- To establish coordination among various organizations to gain maximum benefit from sharing information and help eliminate duplication of efforts.

1.2. Monitoring Coverage

There are no large freshwater lakes or ponds and no perennial streams on any of the islands; intermittent streams can only be seen after heavy rainfall. Thus, monitoring efforts will focus on coastal waters, wetlands, and groundwater.

Coastal waterbodies that are within the jurisdiction of the USVI Department of Planning and Natural Resources, have been delineated into 176 Assessment Units (AU) (84 AUs for St. Croix, 60 AUs for St. Thomas, and 33 AUs for St. John) in accordance with EPA's AU methodologies. Primarily, the ambient water quality-monitoring program will undertake changes to cover each assessment unit. The new strategy will employ a combined approach where judgmental, probabilistic, and basin rotation designs are applied so that all water bodies are sampled after one year. Additional improvements will include biological monitoring.

Wetlands have been catalogued. Specific wetlands will be selected on each island to further assess their condition. Results will provide GIS data layers for the use of the DPNR and recommendations for management priorities.

2. General Description of the United States Virgin Islands

The United States Virgin Islands are located approximately 1 800 km southeast of Miami, Florida, in the eastern extreme of the Greater Antilles. They consist of three main islands, St. Croix, St. Thomas, and St. John, and 57 smaller islands and cays that surround them (Figure 1). To their northeast lie the British Virgin Islands. West, across the Virgin Passage, are the islands of Culebra, Vieques, and Puerto Rico.

The islands are classified as subtropical, with mean annual temperatures at sea level below 24 °C. Wind circulation is dominated by the easterly tradewinds. Rain-producing weather systems generally move into the USVI from the east in summer and from the northwest in winter. From June through November, these weather systems are in the form of tropical waves that can develop into tropical depressions, storms, or hurricanes. The amount of rainfall generally increases with increasing elevation; however, the total annual rainfall differs substantially at various locations throughout the islands.

Flooding is a major concern in the Virgin Islands. Watersheds have a small acreage, steep slopes, and increasing amounts of impervious surfaces, which in turn can result in high-volume runoff after short periods of intense rainfall. Freshwater supply for urban areas relies on desalinated seawater, while rural areas depend mainly on rainwater collected from rooftop rain catchments and, to a lower extent, ground water supplies. However, many of the once dependable wells have gone dry or have become contaminated by failing septic tanks, sewage infiltration, and petroleum.

The USVI have no natural inland bodies of fresh water (lakes). However, active freshwater streams can be found following heavy rains, but they are short-lived and dry up during the annual cycle. Wetlands expand and contract considerably depending on the amount and frequency of rainfall.

Marine ecosystems are diverse and are represented by coral reefs, seagrass beds, and wetlands. Coral reefs in the territory are mostly shallow fringing reefs that parallel the islands' coastline or patch reefs that are scattered around the territory. Barrier reefs are found only in St. Croix around Buck Island National Monument. Most of the drastic changes on the coral reef have been produced by white band disease and the physical destruction from hurricanes. However, sedimentation associated with runoff from coastal development sites has become a wider and increasing threat to corals. Seagrass beds may form isolated patches or vast meadows depending on water quality, nature of the substrate, and geomorphology of the coast. In some areas, intensive recreational use has extensively disturbed the shallow beds. Other beds have suffered from siltation caused by changing land-use practices or from dredge and fill operations during creation of shipping channels and docking accommodations. Wetlands vary by type, composition, size and the associated areas. There are roughly 636 wetlands in the territory of which, the rate of loss of these communities or the condition of the existing ones is unclear. Wetlands have been affected by urban upland development, sedimentation, and industrial growth.

St. Croix
St. Croix is the largest island (37 km long by 10 km wide) and the most southern of the USVI, located about 58 km south of St. Thomas and St. John. A passage 3.6 km deep separates St. Croix from the other islands. The highest elevation is Mount Eagle (355 m). The main communities are Christiansted, located mid-island in the north side, and Frederiksted, which is located west (Figure 1).

Buck Island is the largest of the four cays around St. Croix. Buck Island's 0.7 km^2 of land and 2.8 km^2 of water and coral reef system were proclaimed a national monument in 1961 by presidential proclamation. In 2001 the protected area was expanded to 76.1 km^2 (Figure 2). Spoil from the dredging of a shipping channel was stockpiled off the south shore, forming Ruth Cay.

The island was divided into 26 watersheds, from which 7 have been classified as areas of particular concern. From those, five are located in the south shore and have the particular impact of an oil refinery, an aluminum plant, a rum factory, a water treatment plant, and a sanitary landfill. The other two watersheds contain urban areas.

St. Thomas - St. John
St. Thomas is the second largest island (22 km long by 6 km wide). Compared to St. Croix and St. John, St. Thomas suffers from high urban and tourist developmental pressure. The highest elevation is Crown Mountain (477 m). Charlotte Amalie, which is the capital of the Virgin Islands, is located in the south (Figure 1).

St. John is about 3 km east of St. Thomas and is separated from St. Thomas by a relatively narrow passage only a few meters deep. The island is about 15 km long by 8 km wide (Figure 1). The highest elevation is Bordeaux Mountain (392 m). About 60 percent of the island is within the Virgin Islands National Park, therefore, it has a relatively small human population compared to the other islands. The Virgin Islands Coral Reef National Monument was created in 2001 by presidential proclamation from 50.8 km^2 of federal submerged lands.

St. Thomas and St. John were divided into 13 and 10 watersheds, respectively. From those, 4 have been classified as areas of particular concern in St. Thomas and 2 in St. John. Water pollution comes from runoff sedimentation, leaking sewer pipes and storm water flow, vessel waste discharge, solid waste, and oil contamination from dumping and leaks.

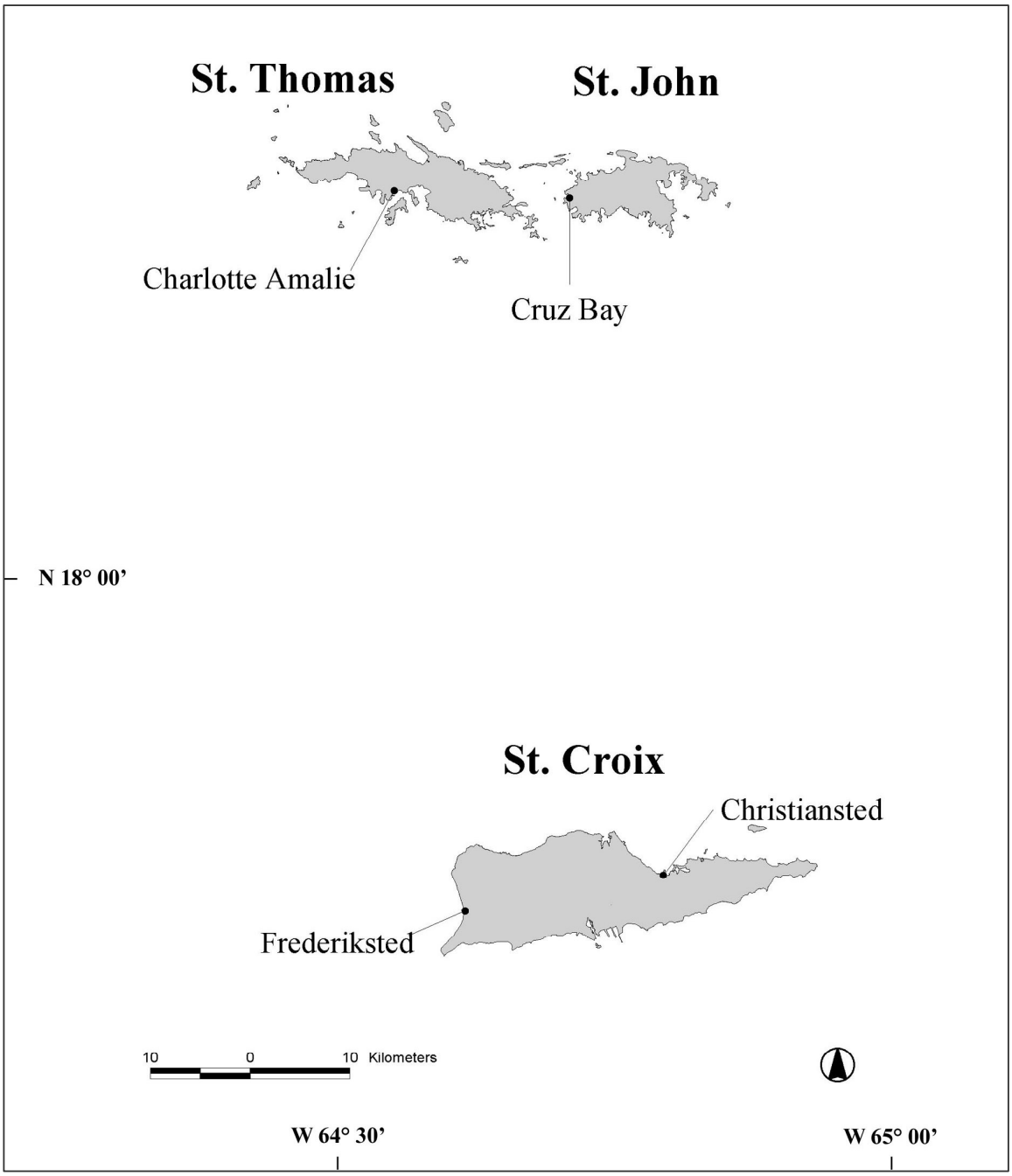


Figure 1. The United States Virgin Islands are located centrally in the West Indies, at about 1 800 km from the southern tip of Florida.

3. Water Pollution Control Program

The Water Pollution Control Program is comprised of two programs: 1) The Territorial Pollutant Discharge Elimination System (TPDES), which involves the permitting of wastes to be discharged from a point source into the waters of the VI; and 2) The Ambient Monitoring Program, which involves the collection of samples to comprehensively evaluate coastal water quality.

A TPDES permit requires that all source discharges of pollution be monitored by the facility and the results submitted to DPNR-DEP. In addition, WPC personnel conduct compliance inspections and compliance monitoring on all facilities annually to ensure compliance.

The Ambient Monitoring Program consists of three main monitoring programs: 1) Basic Water Quality Monitoring, 2) Beaches Environmental Assessment, Closure, and Health Monitoring, and 3) Episodic Monitoring. Furthermore, the program is planning to implement biological monitoring into the assessment of the coastal water quality.

3.1. Basic Water Quality Monitoring

Coastal water quality sampling was initiated by the Health Department in 1968. Sites were selected following a judgmental design, resulting in a network of fixed monitoring stations within the near-shore waters of the islands. This design targeted sites of particular concern, such as outfalls, harbors, marinas, and main recreational areas.

WPC personnel sample a total of 135 sites every quarter using a motor vessel, 53 around St. Croix, 64 around St. Thomas, and 18 around St. John (Figure 2 and 3, Appendix I for location and name of current stations). If conditions do not allow for sampling by boat, alternative beach monitoring sites are used instead, 32 around St. Croix, 23 around St. Thomas, and 10 around St. John (Appendix II for site names).

At each monitoring site, water surface-samples are collected and chemical and physical parameters are measured using an YSI multiparameter meter. All field data are recorded on hardcopy data sheets (Table 1, see also Coastal Water Collection and Handling Standard Operating Procedures). Water samples are taken to a DPNR certified laboratory for analysis. At the alternative beach monitoring sites, temperature, pH, turbidity, and water surface-samples for fecal coliform are collected.

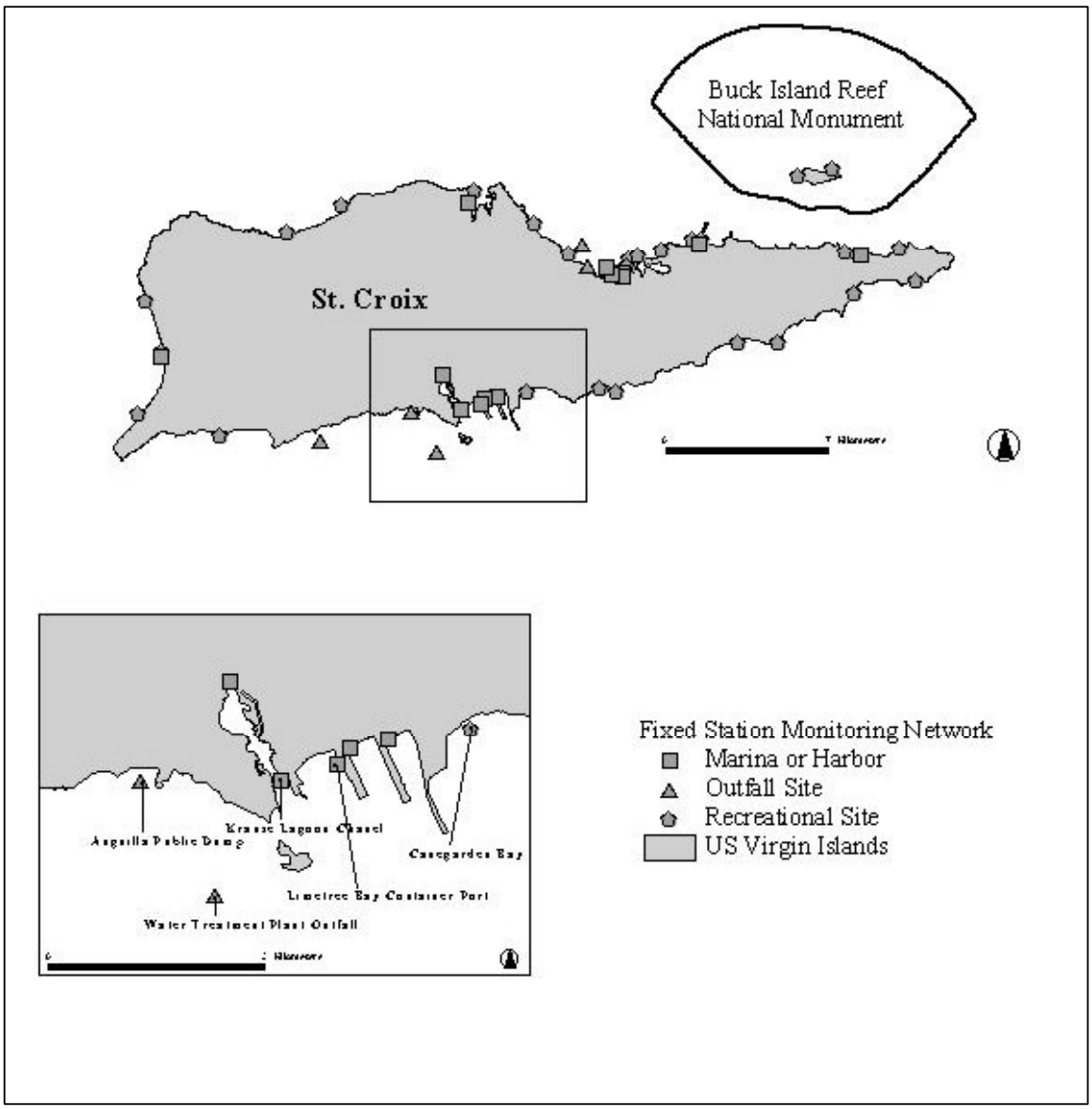


Figure 2. Figure depicts St. Croix's near shore fix-station monitoring network. Close-up details stations located on the south shore of the island.

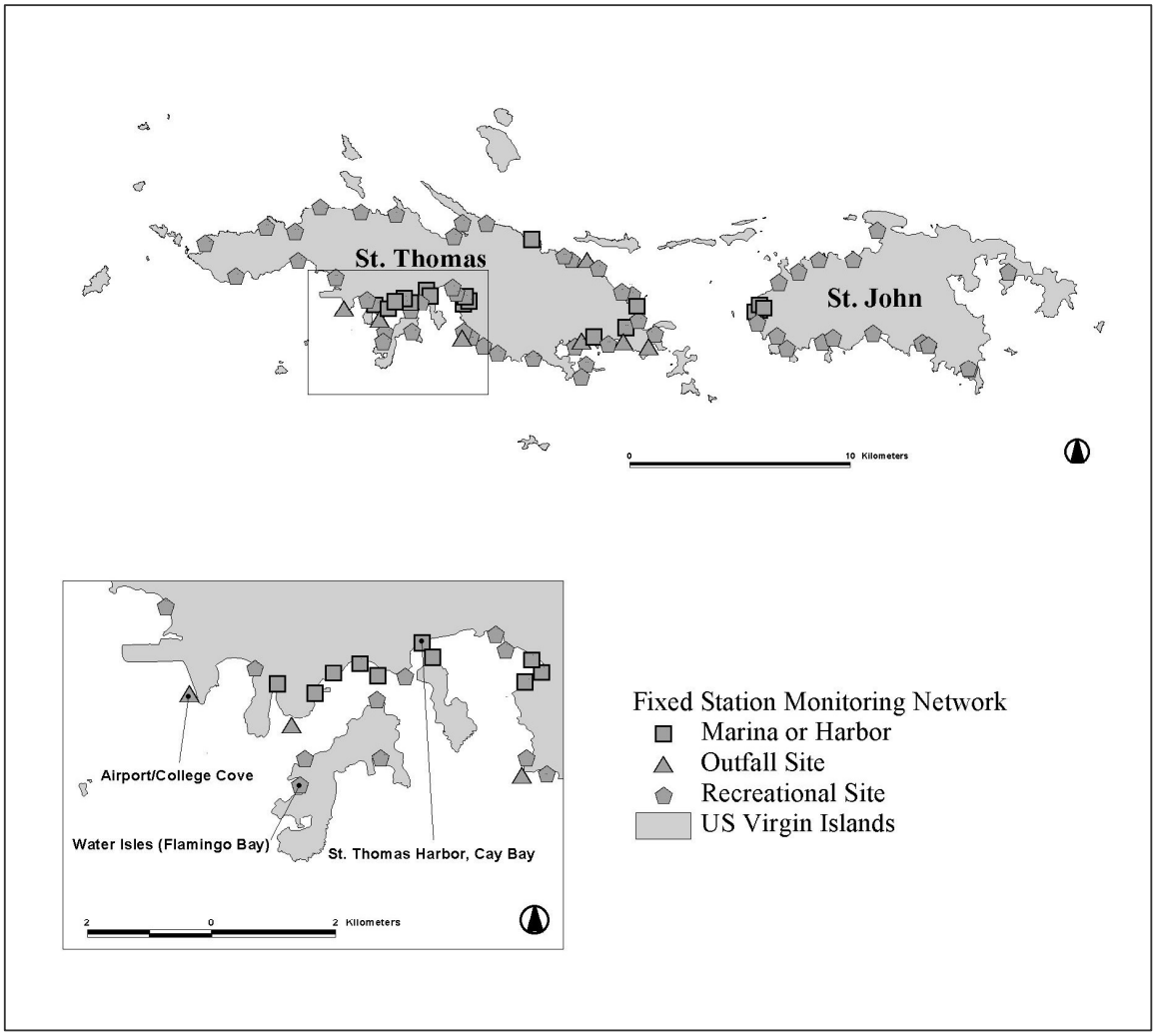


Figure 3. Figure depicts St. Thomas and St. John 's near shore fix-station monitoring network. Close-up details stations located on the south shore of the island of St. Thomas.

Table 1. Water quality indicators and sample collection methods for standard coastal water quality monitoring.

Parameter	Description	Collection method	Holding time
Temperature	A measure of the energy of molecular motion. Expressed in degrees Centigrade.	In situ, YSI multi parameter meter: surface and near bottom	N/A
Dissolve oxygen	The concentration of free molecular oxygen dissolved in water. Expressed in milligrams/liter (ml/L)	In situ - YSI multi parameter meter: surface and near bottom	N/A
Salinity	An estimate of the concentration of dissolved salts in seawater. Expressed in parts per thousand (ppm)	In situ - YSI multi parameter meter: surface and near bottom	N/A
pH	A measure of the concentration of hydrogen ions in the water. It ranges from 1 to 14.	In situ - YSI multi parameter meter: surface and near bottom	N/A
Turbidity	A measure of the degree to which light is scattered by suspended particulate material and soluble colored compounds in the water. Reported as nephelometric (NTU) units	In situ - YSI multi parameter meter: surface and near bottom	N/A
Secchi disk depth	Provides a method for assessing the water clarity and is expressed in meters	In situ - Average depth of Secchi disk (disappearance/appearance)	N/A
Total Suspended Solids	Indicate the amount of solids suspended in the water, whether mineral or organic. The TSS test measures an actual weight of material per volume of water. Expressed in mg/L	Grab near surface and send to a certified lab	6 hours
Fecal Coliform / Enterococci	The presence of fecal coliform bacteria indicates that the water has been contaminated with fecal material of man or other animals. Expressed as number of colonies per 100milliliters	Grab near surface and send to a certified lab	6 hours
Nutrients	Total Kjeldahl Nitrogen (TKN) and Total Phosphorus. Expressed in mg/L	Grab near surface and send to a certified lab	24 hours

In 2003, WPC's monitoring protocol was updated to include all water within the jurisdiction of the Territory. In order to accomplish this task, all Territorial waters within the 3 nm limits of St. Croix, St. Thomas, and St. John were delineated into 84, 60, and 33 waterbody assessment units (AUs), respectively, following guidelines published by the US Environmental Protection Agency (Batelle, 2003). A primary and a secondary network of monitoring stations were developed to sample all AUs at least once per year.

The original network of fixed monitoring stations was revised to include all known point-source discharges, such as factory and sewage treatment-plant outfalls, as well as non-point source pollution within harbors, marinas, landfills, and main recreational areas. All of its stations will continue to be monitored four times per year and in the new protocol will be identified as a **primary monitoring network**. The primary network includes most of the embayments and near-shore waters of the islands and covers 55 % of the AUs.

A **secondary monitoring network** was developed to include near- and offshore assessment units not previously monitored (35 in St. Croix, 26 in St. Thomas, and 18 in St. John). Once a year, a random monitoring location is selected within each of the AUs using Geographic Information System (GIS) software (ArcView 3x, ESRI Inc.) (Figure 4). In the field, WPC staff locates the random points using handheld Geographic Positioning System (GPS) units. When site locations are not accessible, predetermined alternative locations are used instead. A quarter of the sites are sampled every three months, thus completing all sites in one year. If an AU is determined not to be meeting water quality standards, it may be included into the primary network.

BENEFITS

The updated monitoring strategy provides a basic understanding of the water quality within the entire Territory. Within a year, all assessment units can be classified according to their water quality. Accuracy will be improved with the continuation of monitoring.

As funding increases, this strategy allows for a three-step improvement:

1) The secondary network can be expanded to all AUs to allow for unbiased sampling.
2) The sampling frequency can be increased to improve accuracy.
3) The number of sampling sites per AU can be increased to allow for estimations of sampling variation.

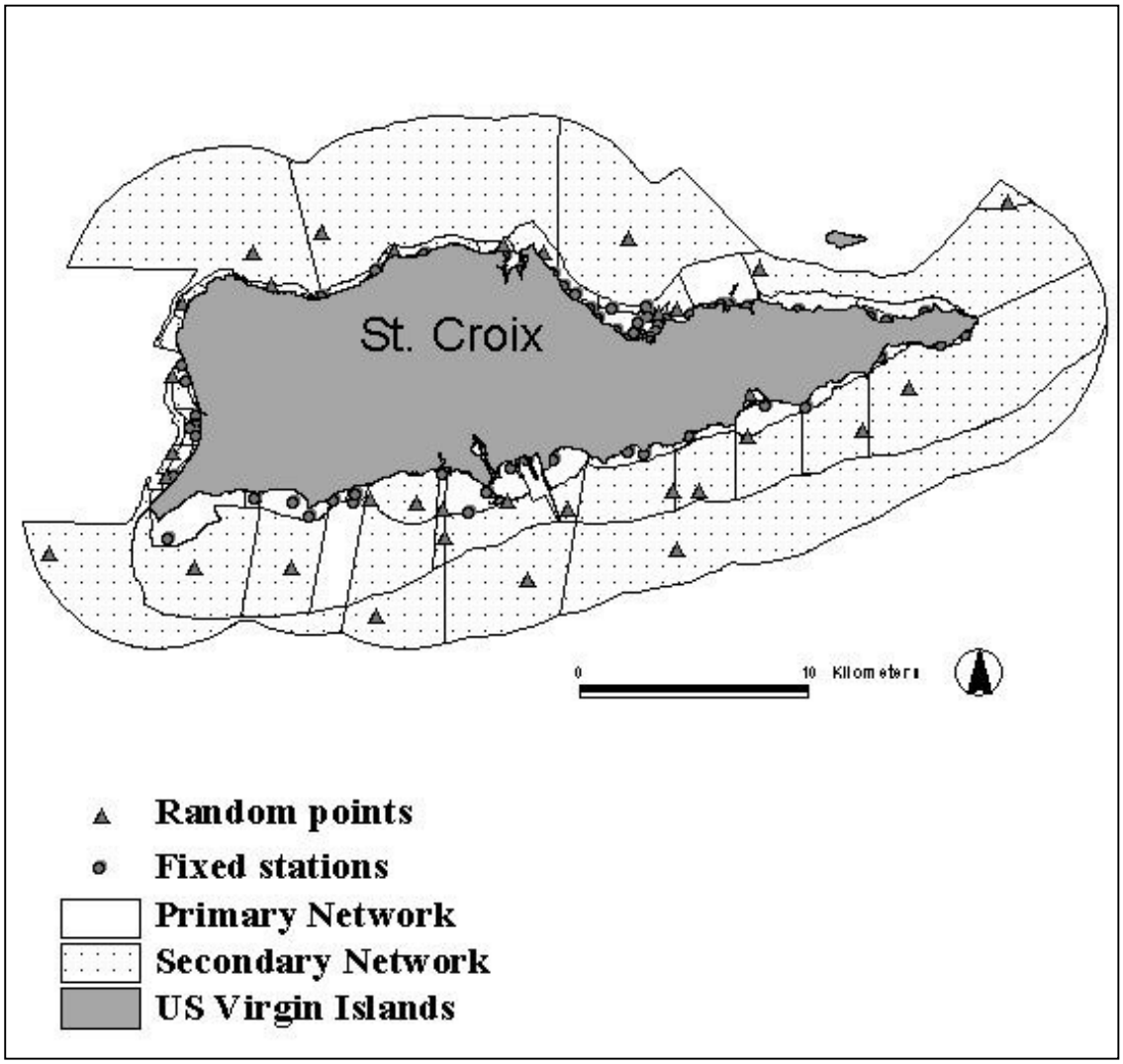


Figure 4. Figure depicts St. Croix's revised fix-station monitoring network and an example of the secondary monitoring network (random points).

3.2. Beaches Environmental Assessment, Closure, and Health (BEACH)

The BEACH Act funding will enable DPNR-DEP to implement a monitoring, assessment, and management program that is linked directly to health safety at recreational swimming areas. Data generated by the program will provide incentive toward the development of predictive models, anticipatory warning systems to inform the public more effectively, and aquatic sanitation programs for identifying and eliminating pollution sources or initiating enforcement actions.

The BEACH program will initiate as a pilot program during FY 2004 with the sampling of a 43 fixed-station network that is distributed as follows: 20 around St. Croix, 15 around St. Thomas, and 8 around St. John (Appendix III). These beaches correspond to the "Shoreline Guide to the US Virgin Islands" booklet, which was published in 1999 by DPNR- Division of Fish and Wildlife.

Sites were selected through interviews with territorial resource managers and researchers associated with DPNR, the VI Department of Housing, Parks, and Recreation, and the US National Park Service. Thus, this selection represents the best professional judgment of those interviewed.

Sampling will be conducted weekly by wading into the water to approximately knee depth. Samples will be taken to a DPNR certified laboratory for the analysis of enterococci bacteria. The project coordinator will furnish the laboratory results as they become available and upon satisfactory quality assurance review of the data, results will be made available to the public through a web site and a toll free number dedicated to this purpose. In addition, when data suggest that a public threat exist, a public advisory will be issued for the affected site.

The water quality data generated from the program will be gathered at the DPNR's offices and ultimately transcribed into the STORET database. Quarter-yearly reports will be directed to EPA Region 2 officers.

For further details concerning this program please refer to the Quality Assurance Project Plan (QAPP) and Work Plan.

3.3. Episodic Monitoring

Episodic monitoring was developed as a response for periods of noncompliance by permitted facilities that discharge into the waters of the USVI or when water quality concerns are reported as a result of sudden discharges from sewer overflows, release of untreated or partially treated wastes from sewage treatment plants, sewer line break discharges, storm water runoff from urban and rural areas, or oil spills.

WPC personnel respond to those events by investigating the sources and collecting water samples for the analysis of fecal and enterococci bacteria when appropriate. When violations to microbial standards are identified, the public is informed and/or a notice of violation

issued. Also, as part of the Territory's Emergency Response Plan (ERP) the WPC program performs post-hurricane water-quality monitoring and sampling at established beach sites (see Emergency Response Plan protocol).

All water quality data generated as a result of those activities are filed and stored in the DEP office and may also be added to the water quality assessment database or uploaded into STORET after a quality assurance evaluation.

3.4. Nutrient Criteria Development and Biological Monitoring

WPC received preliminary notification of the issuance of a grant for a proposal to study the composition and coverage of algae on coral reefs and the possible relation to nutrient levels in the water. This projects will start as pilot study at selected sites along the south shore of St. Croix, and after the completion of the study, the resulting data will be evaluated to determine the viability to conduct the study at specific areas of the other islands (e.g. sites of high population density, harbors). This project remains to be formalized, but likely will be implemented during FY 2004.

The program also plans to implement biological monitoring approaches to support the assessment of the marine waters of the Virgin Islands. The DPNR - Divisions of Fish and Wildlife and Coastal Zone Management and the University of the Virgin Islands are conducting coral monitoring programs at long-term fixed stations in the territory. WPC objective is to improve coordination with these units to incorporate these data into the water quality monitoring assessment strategy. This approach seeks to create an Index of Biological Indicators (IBI) specific to the territory

Furthermore, WPC will submit a proposal to EPA to study heavy metal content on leaves of manatee grass (*Syringodium filiforme*). This project will start as a cooperative effort between DPNR and EPA region 2. The study will target the south shore of St. Croix. The resulting data will be evaluated to determine the viability to expand the study to other islands (e.g. sites of high population density).

3.5. Other Data Sources

Under section 401 of the Federal CWA, WPC personnel takes part in reviews of the Environmental Assessment Reports (EARs) submitted to DPNR-Division of Coastal Zone Management (CZM) by individuals or groups seeking to acquire land development or earth change permits within the coastal zone. WPC issues a Water Quality Certificate only if the applicant can adequately demonstrate that the proposed activity will not adversely affect water quality. In some cases, the applicant is required to develop a water quality-monitoring plan as a condition for the issuance of a certificate.

Data generated from these monitoring activities or any baseline water quality data, generated prior to the beginning of the proposed activity, may be included into the water quality assessment database.

Additional water quality data are available from the regular sampling performed and archived by the USGS-Biological Resources Division (BRD) within federal waters. The Virgin Islands National Park (VINP) in St. John has indicated that a Memorandum of Understanding (MOU) can be developed to share data between DPNR and VINP. Any data received from VINP would first be scrutinized for quality assurance and quality control procedures prior to use in any legal regulatory format.

4. Non-Point Source Program

Since 1994, the Non-Point Source Pollution Program and Management Implementation CWA Section 319(h) of DEP has work in cooperation with local organizations to address non-point pollution issues. Memorandums of Agreement and Cooperation have been signed with partner agencies such as the VI Resource Conservation and Development Council (VIRC&D), VI Conservation District (VICD), University of the Virgin Islands (UVI), US Geological Survey (USGS), Island Resources Foundation (IRF), and the St. Croix Environmental Association.

Currently, the NPS program is funding the following water quality related projects:

4.1. Inventory of Wetlands and Riparian Areas

The Island Resources Foundation in partnership with the Conservation Data Center of the Eastern Caribbean has initiated an inventory of natural resources of the USVI wetlands and associated riparian areas.

The project includes: 1) mapping and analysis of all wetland and associated riparian areas by watershed in order to establish monitoring priorities taking into consideration watershed, wetland type, season, and wetland size; 2) field data collection of water quality, plant communities, and plant species of special concern; 3) summary reports of results including both narrative reports and GIS databases and maps.

4.2. Sediment Deposition and Coral Reef Assessment of the Coral Bay, St. John

The Eastern Caribbean Center and the Conservation Data Center of the University of the Virgin Islands are measuring sediment deposition, coral reef condition, and fish diversity in selected locations throughout Coral Bay and the adjacent waters. Data will help toward an understanding of delivery points, amount, and seasonal deposition of sediment. These data will establish a foundation of understanding for Coral Bay waters and allow comparison with other developed and undeveloped bays.

4.3. Territorial Biological Monitoring Program

The Marine and Environmental Investigations of the UVI and the Virgin Islands Marine Advisory Service of the University of Puerto Rico Sea Grant College Program are implementing a long-term coral monitoring system in the territory. Percent cover and species diversity are recorded using video assessment techniques. Recordings made during video-transects located at the same sites will be compared over time to track changes in the amount of live coral cover. Possible relations to non-point pollution will be established.

4.4. Erosion and Sediment Control Education and Outreach Project

The Cooperative Extension Service (UVI), the Resource Conservation and Development Council, and the Division of Coastal Zone Management (DPNR) conduct this project. The goal is to provide public access to up-to-date erosion and sediment control (ESC) technologies and provide hands-on training and instruction to public and private sectors entities involve in construction.

4.5. Mangrove Restoration

The St. Croix Environmental Association through partnership with the Virgin Islands Marine Advisory Service, the Division of Fish and Wildlife, the St. Croix Alumina, M.P. Walker and Associates, the US National Park Service, Ferdi's Forest, the St. Croix Boys and Girls Club, VI ReLeaf, and the St. Croix Educational Complex, has organized and conducted a pilot red and black mangrove planting at Sugar Bay in Salt River, St. Croix. The purpose is to promote restoration of Salt River's wetlands and riparian areas and their non-point source pollution abatement function.

4.6. VI Nonpoint Source Newsletter

NPS is supporting the University of the Virgin Islands' Cooperative Extension Service to publish the Non-point Source Newsletter to educate and inform the public about the programs of the NPS Committee and to increase the awareness of the different aspects of the non-point source pollution.

5. Wetland Program

The U.S. Virgin Island wetlands amount a total of 1 683.59 acres divided between freshwater ponds, mixed swamps, salt flats, salt ponds and mangrove wetlands (Table 2).

Table 2. Wetland types for the three islands: St. Croix, St. Thomas and St. John (IRF, 2003)

Wetland Type	St. Croix		St. John		St. Thomas		USVI	
	Number	Acres	Number	Acres	Number	Acres	Number	Acres
Freshwater Ponds	199	106.3	8	4.0	31	18.6	238	129.0
Mixed Swamps	7	22.5	1	0.7	2	19.2	10	42.3
Salt Flat	31	134.7	26	16.5	7	10.1	64	161.4
Salt Pond	42	565.0	33	108.3	35	41.4	110	714.7
Mangrove Wetland	92	359.9	46	95.2	76	181.1	214	636.2
All Wetlands	371	1188.4	114	224.7	151	270.5	636	1683.6

Wetlands are outstanding biodiversity sites as nursery and habitat for aquatic species. In the USVI they are also a major flyway and wintering habitat for migrant birds. At least 50 percent of all birds species found in the Territory are wetland-dependent for some aspect of their life cycle (i.e., food, shelter, and nesting) (Sladen, 1988).

The combination of high current population densities, a history of 500 years of continuous, intensive land use, an economy largely dependent on tourism and some heavy industries like oil refinery and aluminum plants have resulted in a major lost of wetlands. Over 50 percent of the mangroves on St. Croix have been destroyed during the past 200 years; most within the past 50 years. This loss has primarily been caused by the dredge and fill activities at Krause Lagoon site of Hess Oil and VIALCO (VIDPNR, 1993).

DPNR has been studying the local wetlands since 2002 through the Inventory of USVI Wetlands and Riparian Areas project funded by the 319 nonpoint source grants (described in previous section). Recently, DPNR received a grant from USEPA to further study the Territory wetlands. This is the first grant awarded by the EPA Wetland Program Development to the USVI. The objectives of the project developed under this grant are:

(a) Prepare a comprehensive wetland characterization and assessment process, directly linking territorial water quality; coastal zone management, and watershed management processes.

(b) Obtain information about the condition of territorial wetlands and associated riparian areas and their respective watersheds. Use GIS technologies for mapping and linking wetlands characteristics with relative Indices of Biological Integrity for Virgin Islands watersheds.

In general, this award will assist DPNR in developing a comprehensive wetlands monitoring and assessment program for the territory. The project will lead to the adoption of an ambient

wetland monitoring and assessment program that builds the Virgin Islands' capacity to determine the causes, effects, and extent of pollution to wetland resources and develop pollution prevention, reduction, and elimination strategies.

The project specifically addresses the development, testing, and demonstration of methods and programs to monitor and assess wetlands, including:

(a) the use of biological assessment methods to improve the evaluation and ranking of potential wetland sites for management and conservation, such as identify biological assemblage, group wetlands into classes that respond similarly to stressors, establish standard sampling methods, determine what time of year to sample, establish known reference conditions and provide an away to measure divergence from biological integrity.

(b) the cumulative effect of wetland loss and restoration in terms of change in the ambient ecological condition of the overall aquatic resource.

The present schedule was designed for a 10-year assessment of wetland water quality and general health.

FY 2004

- Develop a comprehensive monitoring and assessment program
- Documentation and mapping of the USVI wetlands
- Database design
- Analysis of all wetlands and riparian areas
- Land ownership records
- Review of Quality Assurance Project Plan for monitoring and data analysis
- Establish monitoring priorities and targets
- Definition of field survey protocols
- Preliminary field data collection on water quality
- Characterization of plant communities and plant species
- DPNR training on data collection and GIS application
- Training on Clean Water Act, Oil Pollution Act and SPCC Wetlands and Regulation
- Develop mangrove restoration plan for Salt River
- Reassessment of the 13 category I watersheds

FY 2005

- Develop a comprehensive monitoring and assessment program
- Documentation and mapping of the USVI wetlands
- Database design
- Review of Quality Assurance Project Plan for new monitoring and data analysis
- Establish monitoring priorities and targets
- Definition of field survey protocols

- Preliminary field data collection on water quality
- Characterization of plant communities and plant species
- Characterization of aquatic life
- Start mangrove restoration for Salt River
- Develop Watershed Restoration Strategies for Salt River
- Training on wetland mitigation and delineation
- Training on watershed assessment
- Develop Watershed Restoration Strategies for Salt River and Benner Bay
- BASINS training

FY 2006

- Implement a comprehensive monitoring and assessment program
- Input data on the database
- Review of Quality Assurance Project Plan for new monitoring and data analysis
- Field data collection on water quality
- Data collection on biological assemblages
- Develop standards for wetland health based on water quality and biological assemblages
- Characterization of plant communities and plant species
- Start mangrove restoration for Salt River
- Implement Watershed Restoration Strategies for Salt River and Benner Bay

FY 2007

- Implement a comprehensive monitoring and assessment program
- Input data on the database
- Review of Quality Assurance Project Plan for new monitoring and data analysis
- Field data collection on water quality
- Data collection on biological assemblages
- Develop standards for wetland health based on water quality and biological assemblages
- Characterization of plant communities and plant species
- Continue mangrove restoration for Salt River
- Implement Watershed Restoration Strategies for Salt River and Benner Bay

FY 2008

- Implement a comprehensive monitoring and assessment program
- Input data on the database
- Aggregate wetlands by similar types of stressors
- Input information from database on GIS
- Field data collection on water quality
- Data collection on biological assemblages
- Develop standards for wetland health based on water quality and biological assemblages

- Characterization of plant communities and plant species
- Start mangrove restoration for Salt River
- Implement Watershed Restoration Strategies for Salt River and Benner Bay

FY 2009

- Review the wetlands monitoring and assessment program
- Input data on the database
- Field data collection on water quality
- Data collection on biological assemblages
- Develop standards for wetland health based on water quality and biological assemblages
- Characterization of plant communities and plant species
- Continue mangrove restoration for Salt River
- Implement Watershed Restoration Strategies for Salt River and Benner Bay
- Training on wetland restoration

FY 2010

- Review the wetlands monitoring and assessment program
- Input data on the database
- Review of Quality Assurance Project Plan for new monitoring and data analysis
- Field data collection on water quality
- Data collection on biological assemblages
- Test and evaluate standards for wetland health based on water quality and biological assemblages
- Characterization of plant communities and plant species
- Continue mangrove restoration for Salt River
- Implement Watershed Restoration Strategies for Salt River and Benner Bay
- Develop Great Pond Enhancement Plan

FY 2011

- Make appropriate changes to the wetlands monitoring and assessment program
- Input data on the database
- Review of Quality Assurance Project Plan for new monitoring and data analysis
- Review procedures for field data collection on water quality
- Review procedures for data collection on biological assemblages
- Present a complete assessment report on USVI wetlands health and water quality
- Evaluate results from mangrove restoration project in Salt River
- Implement Watershed Restoration Strategies for Salt River and Benner Bay
- Implement Great Pond enhancement plan

FY 2012

- Continue with wetlands monitoring and assessment program
- Input data on the database

- Field data collection on water quality
- Data collection on biological assemblages
- Review of assessment report on USVI wetlands health and water quality
- Establish a mangrove restoration plan for critical areas based on the Salt River experience
- Implement Watershed Restoration Strategies for Salt River and Benner Bay
- Implement Great Pond enhancement plan

FY 2013

- Prepare a management plan for the USVI wetlands
- Establish regulations for USVI wetlands
- Identify new areas for wetland restoration
- Implement Watershed Restoration Strategies for Salt River and Benner Bay
- Implement Great Pond enhancement plan

6. Ground Water Monitoring Program

Ground water is vital to the health and economic future of the people of the Virgin Islands and must be properly managed and protected. In the past, DPNR-DEP and other federal and local agencies have conducted numerous investigations and produced reports on stream flow, ground-water levels, and selected meteorological parameters. To optimally manage the resource, DPNR will gather the available information and analyze it in order to:

- Update well head protection areas
- Identify boundaries of recharge areas
- Evaluate well field safe yields and maximum withdrawal rates to limit the potential for sea-water encroachment in coastal aquifers
- Identify areas where recharge can be improve through construction of designed facilities
- Prepare and submit documentation to establish the Kingshill aquifer as a "sole-source" aquifer
- Use local human resources to provide education opportunities in the natural science

Specific tasks to be completed include

1. Identification of potential cooperative/contributing programs.
This task contains two sub-tasks: a. specification and procurement of equipment for the monitoring of ambient conditions and ground water (Total Dissolved Solids (TDS), conductivity, hardness, and temperature). b. Specification of volunteer labor to assist in field work.

2. Software evaluation for managing the existing and newly collected data.
This task requires the gathering of information from sources identified in the Scope of Work and its incorporation into a database which can be managed by DPNR-DEP and incorporated into the national STORET database. The work will be performed in coordination with the Department's goal to create a unified data management system including: GIS mapping and data sharing, TMDL projects, total watershed management projects, full resource assessments, adaptation to other USVI watershed projects, use in the TPDES program and for evaluating, updating, and creating of USVI natural resource protection and management regulations.

In order to accomplish this task, a survey of the agencies (DPNR-DEP, EPA, UVI, USGS, NOAA, etc.) that may possess data valuable for predicting watershed flows and thus, potential recharge to the aquifers on the Islands will be made. Data on rainfall from the National Weather Service, the Henry Rohlsen Airport in St. Croix, and other similar facilities will be included.

3. Identification of monitoring sites at well fields, meteorological stations and stream gauging stations
In completing this task, a review of existing conditions and data from past projects will be made. Focus will be given to the procedures used for gathering the data, the condition of the wells, and the distribution of the meteorological and gauging stations. A survey will also be made of well fields and watersheds that recharge the aquifers to determine if there are potential monitoring points for stream flow and meteorological stations.

4. Site selection and design of real-time monitoring stations
This task provides the designs for integrated data gathering and processing into STORET and DPNR-DEP databases including all monitoring stations.

Recommendations will be made as to the need for new stations or, alternatively, if the existing stations are adequate for providing data to support the goals of DPNR-DEP to insure well head protection areas for the Islands.

5. Preparation of Quality Assurance/Quality Control Plan
This task addresses the preparation of a QA/QC Plan for project data gathering. The plan will establish acceptable data quality objectives and the criteria for its acceptance.

Implementation of the project tasks will provide for additional funding possibilities and greatly advance the current goals of DPNR water management programs/responsibilities and provide cross-program and cross-agency benefits. Furthermore, this project would allow for the establishment of a well network to provide guidance for long-term monitoring and resource management projects.

7. Assessment Methodology

7.1. Data Management

All raw data that has been generated from the Monitoring Programs are currently stored in the DEP office. WPC staff evaluates the data received from the analytical labs and stores them along with the field data sheets. Files are organized by quarter year and island (St. Croix and St. Thomas-St. John).

The Storage and Retrieval of Water-Related Data (STORET) has been implemented (1996 305(b)) in the USVI and is managed under the Water Quality Management Planning Program. All data are systematically transferred into an electronic version and ultimately into STORET. In addition, the attainment status for each assessment unit is evaluated using the Assessment Database (ADB). DPNR-DEP is integrating geographic information system (GIS) tools and applications for the evaluation of water quality data.

DEP- Quality Assurance (QA) program is committed to assuring and improving the quality of all environmental measurements performed by and for the department. The goal of the QA program is the acquisition of reliable and defensible environmental data. QA activities include technical audits, bi-annual file audits, and reviews of documents related to data collection and management.

7.2. Data Analysis

Pertinent coastal water data collected, through the different monitoring programs, are use to calculate arithmetic means of the parameters. Results are compared to specific water quality standards to assess if waterbodies are healthy and of sufficient quality.

According to the US Virgin Islands Water Quality Standards, the waters of the Territory correspond to one of three classes:

Class A waters are designated for the preservation of natural phenomena requiring special conditions that shall not be changed, such as the barrier reef at Buck Island Reef National Monument, St. Croix and the under water trail at Trunk Bay, St. John.

Class B waters are designated for propagation of desirable species of marine life and primary contact recreation (swimming, water skiing, etc.). Any waterbody not classified as Class A or C, are considered Class B waterbodies. Thus, most of the waters in the Territory belong to this class.

Class C waters use is designated for propagation of desirable species of marine life and for primary contact recreation (swimming, water skiing, etc.). However, some of the water quality standards are less stringent than Class B.

7.3. Waterbody Listing

Section 303(d) of the Clean Water Act requires Territories to develop lists of all waterbodies for which technology-based effluent limitations required by Section 301 are not rigorous enough to attain and maintain applicable water quality standards (impaired). For these priority waters, the Territory must establish Total Maximum Daily Loads (TMDLs) for the pollutants causing the impairment in those waterbodies. The list of impaired waterbodies and TMDLs must be submitted to EPA.

Monitoring data generated by the MYMS as well as from other monitoring agencies are used to establish and update the list. Assessment Units should be listed if there are data and information, which meet the requirements of the US Virgin Islands assessment and listing methodology, to support a determination about use attainment of use.

Once the information has been compiled and evaluated, the waterbodies can be classified into one of the five following categories:

Category 1: Attaining the water quality standard and no use is threatened. Assessment Units should be placed in this Category if there are enough data to show that all designated uses are met.

Category 2: Attaining some of the designated uses, no use is threatened and insufficient or no data and information is available to determine if the remaining uses are attained or threatened.

Category 3: Insufficient or no data and information to determine if any designated use is attained.

Category 4: Impaired or threatened for one or more designated uses but does not require the development of a TMDL.

Category 5: The water quality standard is not attained. The waterbody is impaired or threatened for one or more designated uses by a pollutant(s), and requires a TMDL.

7.4. TMDL Development

A TMDL is a quantitative assessment of pollutants that cause water quality impairments in a particular waterbody. A TMDL specifies the total amount of a particular pollutant that a segment of water can assimilate (from point, nonpoint, and natural background sources) while still meeting water quality standards. TMDL are developed and implemented for that waterbody and pollutant(s) of concern in order for a waterbody to attain water quality standards.

DPNR is in the process of developing TMDL’s for various waterbodies identified in the impaired waterbody list (for details see Integrated Water Quality Monitoring and Assessment Report for the United States Virgin Islands).

8. Program Schedule

Several aspects of this MYMS have already taken effect or are in the process of being implemented as part of existing efforts to strengthen the current Ambient Monitoring Program. The implementation schedule is as follows:

FY 2004

- Enter data into STORET.
- Implement new coastal water monitoring design.
- Review or develop Standard Operating Procedures (SOP) and Quality Assurance Project Plans for new monitoring techniques and equipment.
- Initiate pilot BEACH monitoring program.
- Conduct coral survey in the island of St. Croix.
- Conduct heavy metal study in the island of St. Croix.
- Establish Memorandum of Understanding (MOU) or Memorandum of Agreement (MOA) for sharing water quality and biological data with other monitoring agencies.
- Secure ground water monitoring contract.
- TMDL development for high priority waterbodies.
- Develop work plans for wetlands.

FY 2005

- Enter data into STORET.
- Incorporate Ambient Monitoring data into GIS format.
- Evaluate BEACH monitoring. Continue monitoring.
- Evaluate coastal water monitoring design. Continue water quality monitoring.
- Analyze and write reports of the coral and heavy metal studies.
- Develop Watershed Restoration Strategies.
- Conduct surface and ground water monitoring.
- Conduct wetland surveys.
- Revise water quality standards.

FY 2006

- Enter data into STORET.
- Incorporate episodic monitoring data into GIS format.
- Evaluate/continue BEACH monitoring.
- Continue coastal water monitoring.
- Conduct ground water and wetland monitoring.
- Evaluate need for a coral and heavy metal survey in the other islands. Allocate resources.
- Review or develop Standard Operating Procedures (SOP) and Quality Assurance Project Plans.
- Conduct wetland surveys.

FY 2007

- Enter data into STORET.
- Use correlated data to identify trends in water quality and to determine the necessity for the establishment of (additional) intensive surveys.
- Continue coastal water monitoring design.
- Evaluate/continue BEACH monitoring.
- Conduct surface and ground water monitoring.
- Evaluate the possibility of permanent biological monitoring. Write proposal allocate funding.
- Conduct wetland surveys.

FY 2008

- Enter data into STORET.
- Continue coastal water monitoring design.
- Evaluate/continue BEACH monitoring.
- Conduct surface and ground water monitoring.
- Evaluation of the US Virgin Islands Multi-Year Water Quality Monitoring Strategy.
- Conduct wetland surveys.
- Revise water quality standards.

FY 2009

- Enter data into STORET.
- Continue coastal water monitoring design.
- Evaluate/continue BEACH monitoring.
- Conduct surface and ground water monitoring.
- Develop special surveys.
- Conduct wetland surveys.

FY2010

- Enter data into STORET.
- Continue coastal water monitoring design.
- Evaluate/continue BEACH monitoring.
- Conduct surface and ground water monitoring.
- Develop special surveys.
- Conduct wetland surveys.

FY2011

- Enter data into STORET.
- Continue coastal water monitoring design.
- Conduct surface and ground water monitoring.
- Revise water quality standards.

9. Reporting

The US Virgin Islands CWA 305(b) Water Quality Assessment reports will be the primary document used to report the results of the MYMS. Additionally, each program submits mid-year and end of year reports to EPA.

10. General Remarks and Infrastructure Planning

1. Coordination and collaboration. Greater communication within and between DPNR's divisions and other programs outside DPNR is needed. The MYMS will be the main vehicle to promote greater integration with the various separated monitoring programs currently conducted by other partner agencies.

2. Quality Assurance/Quality Control. The main objective of the MYMS is to establish and maintain standards that will ensure the validity of the collected data. Each aspect of the MYMS will be internally evaluated to ensure continuous improvement of the assessment procedures. In addition, periodic reviews in consultation with EPA Region 2 officers will be part of the programmatic evaluation.

3. Analytical Resources. Monitoring efforts will be greatly dependent on the securing of analytical resources. The heavy metal study will require the services of specialized laboratories.

4. Training. Further training in GIS methodologies, basic web page design, database management (Assessment Database), and biological monitoring techniques will be required.

5. Funding. New monitoring programs, such as the heavy metal study and the coral reef monitoring will require additional funding for their implementation. In addition, the involvement of DPNR staff in coral reef initiatives will require funding for their participation in meetings and conferences.

Furthermore, when nonpoint sources of pollution are considered as significant contributors to water quality problems in a watershed, monitoring and modeling activities should be initiated to characterize the magnitude of those sources. Due to the infrastructure required for these assessments, special funding would likely be necessary.

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Appendices

Appendix I. Coastal Water Quality Offshore Monitoring Sites

St. Croix

Station	Class	Location	GPS coordinates	
STC-1	B	Lagoon Recreation Beach	17.75353	-64.69567
STC-2	B	Ft. Louise Augusta Beach	17.75537	-64.69245
STC-3	B	Buccaneer Hotel	17.75733	-64.68282
STC-4	B	Tamarind Reef Lagoon	17.75988	-64.66842
STC-5	B	Green Cay Beach	17.76176	-64.66694
STC-6	A	Buck Island Beach	17.78665	-64.62793
STC-7	A	Buck Island Anchorage	17.78982	-64.61367
STC-8	B	Reef Club Beach	17.75715	-64.60885
STC-9	B	St. Croix Yacht Club Beach	17.75565	-64.60233
STC-10	B	Cramer's Park	17.75918	-64.58620
STC-11B	B	Isaac Bay, Forereef	17.74613	-64.57990
STC-12	B	Divi (Grapetree) Beach	17.74117	-64.60473
STC-13A	B	Great Pond	17.72163	-64.65147
STC-13B	B	Robin Bay	17.72098	-64.63515
STC-14A	B	Halfpenny Bay - Manchenil	17.70313	-64.70725
STC-14B	B	Halfpenny Backreef	17.70263	-64.70067
STC-15	B	Cane Garden Bay	17.70000	-64.73853
STC-16	C	HOVENSA East Turning Basin, NW Corner	17.70010	-64.74868
STC-17	C	HOVENSA West Turning Basin, NW Corner	17.69895	-64.75402
STC-18	C	Limetree Bay Container Port	17.69658	-64.75582
STC-19	C	Krause Lagoon Channel	17.69438	-64.76388
STC-20	C	Alumina Plant Dock	17.70788	-64.77120
STC-21	B	Spoils Island (Ruth Island)	17.68723	-64.76493
STC-22A	B	Treatment Plant (POTW) Outfall	17.67865	-64.77280
STC-23	B	Public Dump	17.69410	-64.78355
STC-24B	B	Rum Plant (VI Rum) Outfall	17.68225	-64.81983
STC-25	B	Long Point	17.67643	-64.83788
STC-26	B	Good Hope Beach	17.68375	-64.86057
STC-27	B	Sandy Point Public Beach	17.69203	-64.89365
STC-28	C	Frederiksted Pier	17.71392	-64.88462
STC-29	B	Frederiksted Public Beach	17.71620	-64.88443
STC-30	B	Sprat Hall Beach	17.73560	-64.89095
STC-31	B	Davis Bay	17.76335	-64.83420
STC-32	B	Cane Bay	17.77348	-64.81182
STC-33	B	Salt River Marina	17.77517	-64.76183
STC-33A	B	Salt River (Columbus Landing Beach)	17.77992	-64.75860
STC-34	B	St. Croix by the Sea	17.76770	-64.73428
STC-35	B	Long Reef Forereef West	17.76478	-64.72960

Station	Class	Location	GPS coordinates	
STC-35A	B	LBJ (Pump Station) Outfall	17.75938	-64.71495
STC-36	B	Long Reef Forereef East	17.76028	-64.70103
STC-37	B	Christiansted Harbor Entrance West	17.75532	-64.70028
STC-38	B	Christiansted Harbor Entrance East	17.75737	-64.69515
STC-39	C	Altona Lagoon Inlet	17.75072	-64.69648
STC-40	C	St. Croix Marine	17.74822	-64.69848
STC-41	C	Gallows Bay	17.74663	-64.69860
STC-42	C	Public Wharf	17.74760	-64.70335
STC-43	C	Water Gut Storm Drain	17.74735	-64.71278
STC-44	C	Protestant Cay Beach	17.74927	-64.70378
STC-45	C	Christiansted Harbor	17.75003	-64.70547
STC-46	C	WAPA Intake	17.75073	-64.71278
STC-47	B	Mill Harbor Condominium Beach	17.75565	-64.72023
STC-48	B	Long Reef Back Reef West	17.75947	-64.72392
STC-49	B	Long Reef Back Reef East	17.75378	-64.70412

St. Thomas

Station	Class	Location	GPS coordinates	
STT-1	C	Crown Bay, Near Outfall	18.33111	-64.94776
STT-2	C	Crown Bay, Near Tamarind Outlet	18.33579	-64.94726
STT-3	C	Subbase	18.33380	-64.95141
STT-4	B	Krum Bay	18.33047	-64.96124
STT-5A	B	Lindbergh Bay, East	18.33420	-64.96408
STT-5B	B	Lindbergh Bay, West	18.33493	-64.96913
STT-6B	B	Airport College Cove	18.33878	-64.97757
STT-6C	B	S.W. Road, Near Red Point Outfall	18.33240	-64.97460
STT-7A	B	Brewers Bay	18.34287	-64.97750
STT-7B	B	Perseverance Bay	18.35088	-64.99552
STT-8	B	Fortuna Bay	18.34450	-65.01508
STT-9	B	Botany Bay	18.35598	-65.03408
STT-10	B	Stumpy Bay	18.36370	-65.00742
STT-11	B	Santa Maria Bay	18.36225	-64.99503
STT-12	B	Caret Bay	18.37215	-64.98492
STT-13	B	Dorothea	18.37047	-64.96173
STT-14	B	Hull Bay	18.37150	-64.95222
STT-15	B	Magens Bay	18.36310	-64.92428
STT-15A	B	Magens Bay, N. E.	18.36587	-64.92270
STT-15B	B	Magens Bay, NW	18.36005	-64.92708
STT-16A	B	Mandahl Bay	18.36187	-64.89542
STT-16B	B	Mandahl Bay Entrance	18.36013	-64.89390
STT-16C	B	Mandahl Point Entrance	18.40031	-64.94201
STT-17A	B	Spring Bay	18.35310	-64.88045
STT-17B	B	Sunsi Bay	18.35100	-64.88045
STT-18	B	Coki Point Bay	18.34968	-64.86660
STT-19	B	Water Bay	18.34635	-64.86728
STT-20	B	Smith Bay	18.33895	-64.85573
STT-21A	B	St. John Bay	18.33600	-64.85042
STT-21B	B	Red Bay	18.33295	-64.84828
STT-22A	B	Red Hook Bay	18.32701	-64.84791
STT-22B	B	Vessup Bay	18.32385	-64.85264
STT-23	B	Great Bay	18.32122	-64.84121
STT-24	B	Cowpet Bay	18.31743	-64.84407
STT-25	B	Nazareth Bay	18.31743	-64.85232
STT-26	B	Benner Bay	18.31742	-64.86070
STT-26A	B	Benner Bay	18.31742	-64.86070
STT-26B	B	Bovoni Channel	19.30531	-64.87148
STT-27A	B	Mangrove Lagoon, Near Treatment Plant	18.31676	-64.87461
STT-27B	B	Mangrove Lagoon, Off Sanitary Landfill (East of Ecotours)	18.31677	-64.87333

Station	Class	Location	GPS coordinates	
STT-27C	B	Mangrove Lagoon, Near Tropical Marine Fuel Dock	18.31879	-64.87180
STT-27D	B	Mangrove Lagoon, Near Lavida Marina	18.32094	-64.86718
STT-27E	B	Mangrove Lagoon, Near Compass Point	18.31884	-64.86707
STT-28A	B	Bovoni Bay	18.31440	-64.88947
STT-28B	B	Bolongo Bay	18.31357	-64.89437
STT-29A	B	Frenchman's Bay	18.31939	-64.91794
STT-29B	B	Limetree	18.31733	-64.91363
STT-30	B	Morning Star Bay	18.32140	-64.92401
STT-31A	B	Flamboyant Cove	18.32440	-64.92262
STT-31B	B	Hassel Island, Off Navy Dock	18.33747	-64.93487
STT-31C	B	Hassel Island, Careening Cove	18.33210	-64.93220
STT-32A	C	Long Bay, Near South Dolphin	18.33288	-64.92560
STT-32B	C	Long Bay, Northeast Corner	18.33520	-64.92203
STT-33A	C	Long Bay, Off Outfall	18.33650	-64.92100
STT-33B	C	Long Bay, Off Outfall	18.33711	-64.92211
STT-34	C	Long Bay, Off Pump Station	18.33973	-64.92455
STT-35	C	Groden Bay	18.34175	-64.92455
STT-36	C	St. Thomas Harbor, North of Coast Guard Dock	18.34247	-64.93108
STT-37	C	St. Thomas Harbor, Cay Bay	18.33910	-64.93822
STT-38	C	Haulover Cut	18.33620	-64.93852
STT-39	B	Water Isle, East Gregorie Channel	18.33001	-64.94623
STT-40	B	Water Isle Hotel, Beach	18.31622	-64.95688
STT-41	B	Water Island Flamingo Bay	18.31136	-64.95864
STT-42	B	Water Island Sprat Bay	18.32145	-64.94545

St. John

Station	Class	Location	GPS coordinates	
STJ-43B	B	Cruz Bay, South	18.33303	-64.79580
STJ-43C	B	Cruz Bay, North of Seaplane Ramp	18.33595	-64.79413
STJ-43D	B	Cruz Bay Creek North	18.33447	-64.79193
STJ-44A	A	Trunk Bay	18.35202	-64.77000
STJ-44B	B	Hawksnest Bay	18.34722	-64.77972
STJ-44C	B	Cinnamon Bay	18.35342	-64.75787
STJ-44D	B	Francis Bay	18.36542	-64.74493
STJ-45	B	Great Cruz Bay	18.32295	-64.78803
STJ-46	B	Chocolate Hole	18.31740	-64.78417
STJ-47	B	Rendezvous Bay	18.31973	-64.76868
STJ-48	B	Fish Bay	18.32235	-64.76510
STJ-49	B	Genti Bay	18.32302	-64.74680
STJ-50	B	Little Lameshur Bay	18.31870	-64.72672
STJ-51	B	Great Lameshur Bay	18.31865	-64.72382
STJ-52	B	Salt Pond Bay	18.30863	-64.70582
STJ-53	B	Coral Bay	18.34657	-64.71162
STJ-54	B	Caneel Bay	18.34273	-64.78725
STJ-55	B	Turner Bay	18.32665	-64.79655

Appendix II. Coastal Water Quality Alternative Beach Monitoring Sites

St. Croix

Station	Name	Station	Name
STC-B1	Yacht Club Beach	STC-B17	Buccaneer Beach
STC-B2	Cramer's Park Beach	STC-B18	Shoys Beach
STC-B3	Divi St. Croix Beach	STC-B19	Chenay Bay Beach
STC-B4	Frederiksted Pool Beach	STC-B20	Candle Reef Beach
STC-B5	Frederiksted Public Beach	STC-B21	Coakley Bay Beach
STC-B6	Rainbow Beach Club	STC-B22	Reef Beach
STC-B7	Butler Bay Beach	STC-B23	Club STC
STC-B8	Carambola Beach	STC-B24	Gallows Bay Fisherman's Pier
STC-B9	Cane Bay Beach	STC-B25	Christiansted Wharf
STC-B10	Gentle Wind Beach	STC-B26	Boy Scout Camp
STC-B11	Columbus Landing Beach	STC-B27	Tamarind Beach Hotel
STC-B12	Pelican Cove Beach	STC-B28	Salt River Marina
STC-B13	Mill Harbor Beach	STC-B29	Water Gut
STC-B14	Hotel on the Cay Beach	STC-B30	Green Cay Marina
STC-B15	Altona Lagoon Beach	STC-B31a	Billy French, S
STC-B16	Ft. Louise Augusta Beach	STC-B31b	Billy French, N

St. Thomas

Station	Name	Station	Name
STT-B1	Lindbergh Bay Beach East	STT-B13	Coki Bay Beach
STT-B2	Lindbergh Bay Beach West	STT-B14	Smith Bay Beach
STT-B3	Brewers Bay Beach	STT-B15	St. John Bay Beach
STT-B4	Perseverance Bay Beach	STT-B16	Vessup Bay Beach
STT-B5	Caret Bay Beach	STT-B17	Cowpet Bay Beach
STT-B6	Dorothea Beach	STT-B18	Bovoni Bay Beach
STT-B7	Hull Bay Beach	STT-B19	Bolongo Bay Beach
STT-B8	Magens Bay Beach Northeast	STT-B20	Frenchman's Bay Beach
STT-B9	Magens Bay Beach Northwest	STT-B21	Limetree Beach
STT-B10	Mandahl Bay Beach	STT-B22	Morning Star Beach
STT-B11	Spring Bay Beach	STT-B23	Flamboyant Cove Beach
STT-B12	Sunsi Bay Beach		

St. John

Station	Name	Station	Name
STJ-B1	Cruz Bay West Pier Beach	STJ-B6	Leinster Bay
STJ-B2	Trunk Bay Beach	STJ-B7	Great Cruz Bay Beach
STJ-B3	Hawksnest Bay Beach	STJ-B8	Great Lameshur Bay Beach
STJ-B4	Cinnamon Bay Beach	STJ-B9	Caneel Bay Beach
STJ-B5	Francis Bay Beach	STJ-B10	Turner Bay Beach

Appendix III. Virgin Islands BEACH Monitoring Sites.

St. Croix

Station	Location	GPS coordinates	
2	Stony Ground	17.69155	-64.89284
4	Dorsch	17.70280	-64.88514
5	Frederiksted (First Target)	17.71667	-64.88369
7	Rainbow (Prosperity)	17.72993	-64.88793
9	Sprat Hall	17.73818	-64.89144
13	Davis Bay	17.76247	-64.83235
15	Cane Bay	17.77259	-64.81081
17	Gentle Winds	17.78069	-64.76430
18	Columbus Landing	17.77997	-64.76008
20	Pelican Cove (Cormorant)	17.76226	-64.73133
23	Condo Row (Princess)	17.75376	-64.71958
24	Protestant Cay	17.74895	-64.70313
25	New Fort (Ft. Louise Augusta)	17.75204	-64.69468
25	Buccaneer	17.75469	-64.68453
26	Shoy's	17.75952	-64.67377
35	Cramer's Park	17.75875	-64.58571
39	Grapetree Bay	17.74363	-64.60434
46	Halfpenny	17.70537	-64.70541

St. Thomas

Station	Location	GPS Coordinates	
16	Hull Bay	18.36963	-64.95175
19	Magens Bay	18.36651	-64.92237
27	Coki Point	18.34939	-64.86656
30	Lindquist Beach	18.33804	-64.85599
32	Sapphire Beach	18.33518	-64.85083
34	Vessup Bay	18.32394	-64.84671
35	Bluebeards Beach	18.32245	-64.84320
39	Secret Harbor	18.31784	-64.85205
42	Bolongo Bay	18.31259	-64.89691
43	Limetree Beach	18.31769	-64.91395
44	Frenchman's Bay	18.31338	-64.90661
45	Morningstar	18.32012	-64.91946
48	Lindberg Bay	18.33601	-64.96608
49	Brewer's Bay	18.34509	-64.97880

St. John

Station	Location	GPS Coordinates	
1	Cruz Bay	18.33239	-64.79562
5	Caneel Beach	18.34328	-64.78680
20	Big Maho Bay	18.35745	-64.74479
37	Klain Bay	18.31865	-64.76799
38	Hart Bay	18.31493	-64.78118
39	Chocolate Hole	18.31756	-64.78376
40	Great Cruz Bay	18.32234	-64.78710
41	Frank Bay	18.32893	-64.79859