USVI Integrated Water Quality Monitoring & Assessment Report

Department of Planning & Natural Resources
Division of Environmental Protection
Water Quality Management Program

2012

The 2012 USVI Integrated Water Quality Monitoring & Assessment Report intends to satisfy the USVI requirements of the Federal Clean Water Act Sections 305(b) and 303(d).

Submitted by:

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I. EXECUTIVE SUMMARY

A. Purpose

The 2012 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 2010 and 2011 (October 1, 2009 through September 30, 2011).

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, stormwater run-off and vessel wastes increase stresses on US Virgin Islands (VI) waters.

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 US Virgin Islands. Point Source Pollution can be attributed to an antiquated municipal sewage system. Poor preventive maintenance practices due to lack of funding and other resources within the Waste Management Authority result in "bypasses" that result in the release of untreated sewage directly into the waters of the US Virgin Islands. The Government of the US Virgin Islands has made considerable progress towards resolving these issues by the upgrading of new treatment plants and upgrading other portions of the municipal system.

2. Ground Water

The primary sources of groundwater contamination in the US Virgin Islands are:

- 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 ground water contamination include intrusion of salt water caused by the over-pumping of the aquifers, invasion of volatile organic compounds (VOC's), contamination from leaking underground storage tanks, and the indiscriminate/illegal discharges of waste.

C. Program Initiatives

Under the provisions of the Federal and Local Water Pollution Control Act, the US Virgin Islands Water Pollution Control (WPC) and Water Quality Management (WQM) Programs are 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. To ensure the preservation of water quality WQM projects monitor compliance with the Water Quality Standards as set forth in the US Virgin Islands Environmental Laws and Regulations.

In addition, the program-reporting period (FY2010 and FY2011) saw water quality management activities in the US Virgin Islands being planned for integration for management and reporting purposes with the Unified Watershed Assessment process of the Clean Water Action Plan. This US Virgin Islands Water Quality Assessment presents water quality assessment information in a format that preserves the US Virgin Islands long-term data series by using the same water quality monitoring sites. This report also indicates how these data can be summarized at a level that is compatible for both Water Quality Assessment and Unified Watershed Assessment processes.

The Government of the Virgin Islands is presently enhancing and strengthening its territorial Water Pollution Control Act and revising its Water Quality Standards. The triennial review will be completed when the revised Water Quality Standards are adopted in FY2013. This ongoing process builds upon previous 305(b) and 303(d) reporting periods.

D. Summary of Classified Uses

USVI 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, Table II.A.4 has been revised to ensure that correct assessment unit and monitoring station pairings.
- Part III, Table III.C.1 has been updated to reflect the current classification of all US Virgin Islands assessment units.
- Part III, 2012 Assessment Methodology updated to include a table which displays assessment unit, monitoring station and monitoring frequency for reporting period.

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, 57 smaller islands and cays were documented in *A Natural History Atlas to the Cays of the US Virgin Islands* (Thomas and Devine, 2005). 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. 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 because the area is small (less than 600 acres or 1 square mile), and because the island is practically within St. Thomas Harbor.

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 popular dive sites, which are important to 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 or during the rainy season (May – November). 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

	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	3.5

Figure II.A.1 St. Croix subwatersheds and assessment unit overview

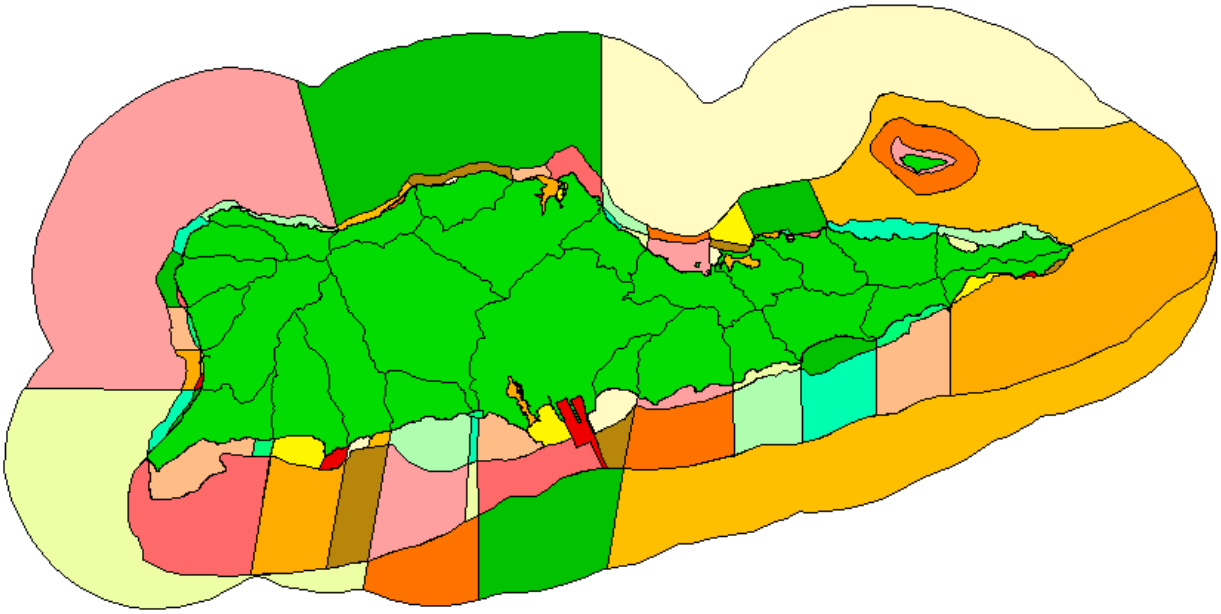
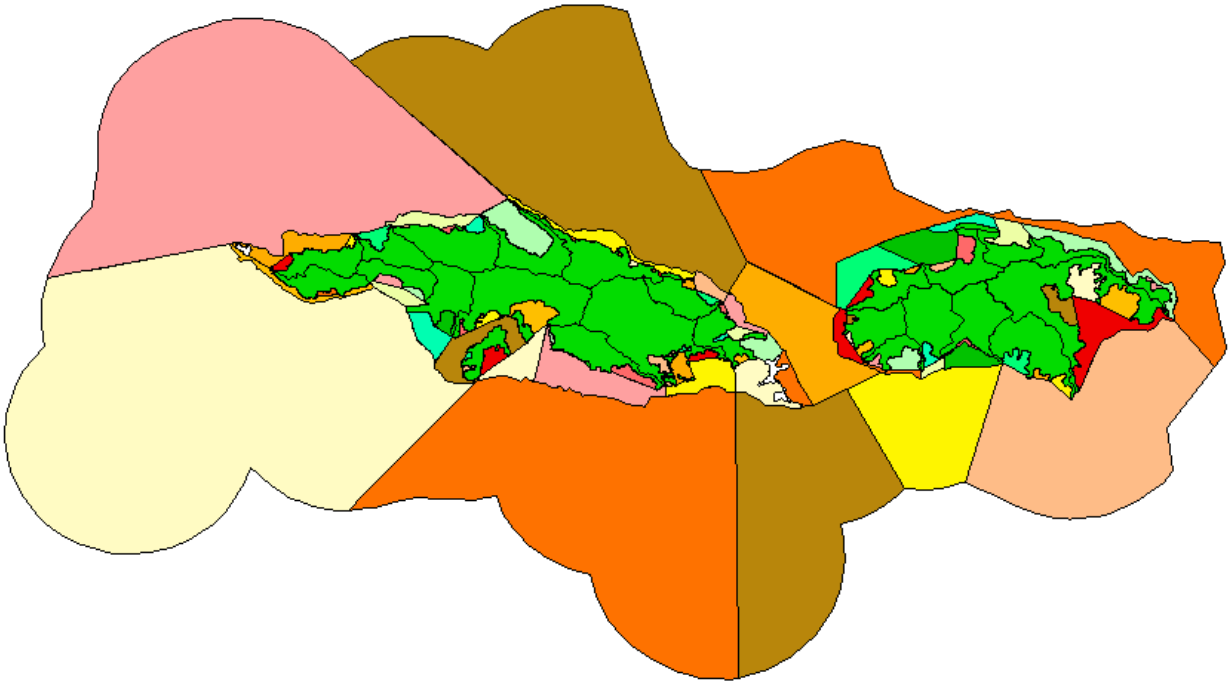


Figure II.A.2 St. Thomas/St. John subwatersheds and assessment unit overview



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

St. Croix

Watershed Name	Acres	UWA Category	Watershed Name	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

Watershed Name	Acres	UWA Category	Watershed Name	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

Watershed Name	Acres	UWA Category	Watershed Name	Acres	UWA Category
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.

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

Finally, these two systems are displayed with an indication of the monitoring stations associated with each assessment unit and the number of water quality monitoring sites (Battelle 2003) established by the US Virgin Islands Department of Planning and Natural Resources.

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

Assessment Unit ID	Assessment Unit Name	Class	AU Size (m^2)	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 Dorothea
VI-STT-08	Hull Bay	B	0.2049	STT-14 Hull Bay, VI616865 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-15, STT-15A, STT-15B Magens Bay, VI672756 Magens Bay
VI-STT-11	Northwest St. Thomas HUC14, offshore	B	55.088	STT-OFF1 STT NW-1, STT-OFF9 STT NW-3
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 , VI577932 Coki Point
VI-STT-18	Water Bay	B	0.0845	STT-19 Water Bay, VI591668 Water Bay
VI-STT-19	Smith Bay	B	0.1187	STT-20 Smith Bay, VI431925 Lindquist Beach
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, VI327776 Sapphire Beach
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, VI764950 Vessup Bay
VI-STT-25	Great Bay	B	0.5593	STT-23 Great Bay, VI505006 Bluebeards Beach
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, VI389422 Secret Harbor
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, east	B	0.3532	STT-28A Bovoni Bay,STT-28B Bolongo Bay, VI951607 Bolongo Bay
VI-STT-37	Frenchman Bay	B	0.0195	STT-29A Frenchman Bay, VI891065 Frenchman’s Bay
VI-STT-38	Limetree Bay	B	0.0065	STT-29B Limetree Bay, VI776527 Limetree Bay
VI-STT-39	Morningstar Bay	B	0.0215	STT-30 Morningstar Bay, VI937158 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	STT-OFF8 STT South-3, STT-OFF5 STT North2
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, VI514102 Lindberg Bay
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, VI293962 Brewer's 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, STT-OFF2 STT NW-1, STT-OFF11 STT SW-4
VI-STJ-01	Caneel Bay	B	0.2623	STJ-54 Caneel Bay, NPS-1 Caneel Bay, VI658467 Caneel Beach
VI-STJ-02	Hawksnest Bay	B	0.2246	STJ-44B Hawksnest Bay, NPS-3 Hawksnest (middle beach), NPS-4 Hawksnest (Gibney Beach), VI255380 Oppenheimer
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, VI536165 Big Maho Bay
VI-STJ-07	Maho Bay subwatershed, offshore	B	1.6071	There are currently no monitoring 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	STJ-56 Johnson Bay, STJ-53 Coral Bay, NPS-15 Coral Bay Dock, NPS-16 Johnson Bay, VI823989 Johnson's Bay
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-57 Round Bay
VI-STJ-16	Coral Bay	B	2.2337	STJ-58 Privateer Bay, 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, VI204627 Klain Bay, VI402599 Hart Bay
VI-STJ-26	Chocolate Hole	B	0.1004	STJ-46 Chocolate Hole, NPS-24 Chocolate Hole,VI391298 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, VI779192 Great Cruz Bay
VI-STJ-29	Turner Bay/Enighed Pond	B,	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), VI309453 Cruz Bay
VI-STJ-31	Great Cruz Bay watershed, offshore	B	0.5775	VI456779 Frank Bay

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	STJ-OFF13 STJ West-4
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, VI970611 F'sted (Fst. Target)
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	VI252619 Rainbow (Prosperity)
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, VI645288 Sprat Hall
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, VI201013 Cane Bay
VI-STC-13	Baron Bluff subwatershed	B	0.3498	STC-31 Davis Bay, VI398766 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-33 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-*no longer monitored*) Salt River (Columbus Landing Beach),

				VI146901 Gentle Winds, VI558328 Columbus Landing
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	STC-OFF4 North-2, STC-OFF11 North-4
VI-STC-23	St. Croix-By-the-Sea	B	0.0727	STC- 34 St. Croix-By-the-Sea, VI738082 Pelican Cove
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, VI572166 Condo Row (Princess), VI359239 Protestant Cay
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, VI213332 New Fort Louise Augusta
VI-STC-30	Beauregard Bay	B	0.2145	STC-2 Ft. Louise Augusta Beach, STC-38 Christiansted Harbour Entrance-East, VI651587 Buccaneer
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	VI610321 Shoy's
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	VI563397 Chenay Bay Beach
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, VI381319 Teague Bay (Reef)
VI-STC-40	Teague Bay Backreef	B	0.8547	STC-10 Cramers Park, VI351774 Cramer's 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	STC-OFF8 North-3
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, VI297470 Grapetree Beach
VI-STC-48	Turner Hole subwatershed, offshore	B	16.949	STC-OFF5 East-2
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	B	3.0288	STC-OFF13 SE-4

	subwatershed, offshore			
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, VI931289, Halfpenny
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	STC-OFF2 SE-1, STC-OFF10 SE-3
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	STC-OFF9 SW-3
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	STC-OFF6 South-2
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	STC-OFF12 SW-4
VI-STC-79	Good Hope Beach	B	0.1876	STC-26 Good Hope Beach
VI-STC-80	Sandy Point, nearshore south	B	2.0121	There are currently no monitoring 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, VI896490 Dorsch Bay, VI907985 Stony Ground
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	STC-OFF3 SW-1

B. Classifications, Total Waters and Applicable Standards

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.

Designated Uses of Class A Waters:
Preservation of natural phenomena requiring special conditions, such as the Natural Barrier Reef at Buck Island, St. Croix and the Under Water Trail at Trunk Bay, St. John. These are outstanding

natural resource waters that cannot be altered except towards natural conditions. No new or increased dischargers shall be permitted.

Legal Limits of Class A waters include:

(i) Within 0.5 miles of the boundaries of Buck Island's Natural Barrier Reef, St. Croix.

(ii) Trunk Bay, St. John

Designated Uses of Class B Waters:
For maintenance and propagation of desirable species of aquatic life (including threatened, endangered species listed pursuant to section 4 of the Federal Endangered Species Act and threatened, endangered and indigenous species listed pursuant Title 12, Chapter 2 of the Virgin Islands Code) and for primary contact recreation (swimming, water skiing, etc.). This Class allows minimal changes in structure of the biotic community and minimal changes in ecosystem function. Virtually all native taxa are maintained with some changes in biomass and/or abundance; ecosystem functions are fully maintained within the range of natural variability.

Legal Limits of Class B waters defined as all other coastal waters not classified Class "A" or Class "C". In addition, those Class "B" waters not 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.

(iii) All non-marine waters defined as all Virgin Islands waters shoreward of the mean high-tide line.

All other Class "B" waters are covered by the color and turbidity criteria in section 186-3(b)(11)(B) of this subchapter.

Designated Uses of Class C Waters:
For maintenance and propagation of desirable species of aquatic life (including threatened and endangered species listed pursuant to section 4 of the Federal Endangered Species Act and threatened, endangered and indigenous species listed pursuant Title 12, Chapter 2 of the Virgin Islands Code) and for primary contact recreation (swimming, water skiing, etc.). This Class allows for evident changes in structure of the biotic community and minimal changes in ecosystem function. Evident changes in structure due to loss of some rare native taxa; shifts in relative abundance of taxa (community structure) are allowed but sensitive-ubiquitous taxa remain common and abundant; ecosystem functions are fully maintained through redundant attributes of the system.

Legal limits of Class C Waters defined as:

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

St. Croix:

(a) Christiansted Harbor from Fort Louise Augusta to Golden Rock, along the waterfront and seaward to include the navigational channels and mooring areas.

(b) Frederiksted Harbor from La Grange to Fisher Street and seaward to the end of the Frederiksted Pier.

(c) Hess Oil Virgin Islands Harbor (alternatively named HOVENSA Harbor).

(d) Martin-Marietta Alumina Harbor (alternatively named Port Alucroix or St. Croix Renaissance Group Harbor).

St. John:

(a) Enighed Pond Bay

Table II.B.1 Summary of US Virgin Islands Water Quality Criteria

Class A

Quality criteria: Existing natural conditions shall not be changed. The biological condition shall be similar or equivalent to reference condition for biological integrity. In no case shall Class B water quality standards be exceeded.

Criterion	**Class B**	**Class C**
Dissolved Oxygen	Not less than 5.5 mg/l from other than natural conditions	Not less than 5.0 mg/l from other than natural conditions

pH	<8.3 Tolerable Limit >7.0 Normal range of pH must not be extended at any location by more than ±0.1 pH unit.	<8.5 Tolerable Limit>6.7 Normal range of pH must not be extended at any location by more than ±0.1 pH unit.
Temperature	Not to exceed 32° Celsius at any time, nor as a result of waste discharge to be greater than 1°C above normal.	Not to exceed 32° Celsius at any time, nor as a result of waste discharge to be greater than 1°C above normal.
Bacteria	A geometric (log) mean of 70fecal coliforms per 100 ml by MF or MPN count Not to exceed a geometric mean of 35 enterococci per 100 ml, not to exceed a single sample maximum of 104 per 100 ml at any time.	A geometric (log) mean of 200 fecal coliforms per 100 ml by MF or MPN count Not to exceed a geometric mean of 35 enterococci per 100 ml, not to exceed a single sample maximum of 104 per 100 ml at any time
Chlorine	The 4-day average concentration of Chlorine shall not exceed 7.5 ug/l. The 1-hour average concentration of Chlorine shall not exceed 13 ug/l	The 4-day average concentration of Chlorine shall not exceed 7.5 ug/l. The 1-hour average concentration of Chlorine shall not exceed 13 ug/l
Phosphorus	Total P shall not exceed 50 ug/L in any coastal waters	Total P shall not exceed 50 ug/L in any coastal waters
Suspended, colloidal or settleable solids	None from wastewater sources which will cause disposition or be deleterious for the designated uses shall be present in any waters.	None from wastewater sources which will cause disposition or be deleterious for the designated uses shall be present in any waters.
Oil and Floating substances	No residue attributable to waste water. No visible film; no globules of grease shall be present in any waters.	No residue attributable to waste water. No visible film; no globules of grease shall be present in any waters.

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	• A secchi disc shall be visible at a minimum depth of one meter
Toxicity	The applicable numeric water quality standards for toxic pollutants to protect the designated uses of waters of the U.S. Virgin Islands shall be the Environmental Protection Agency's (EPA) national recommended Clean Water Act section 304(a) water quality criteria, EPA's Office of Water, Office of Science and Technology (4304T), 2006, which is incorporated by reference for: the protection of saltwater aquatic life from acute (criterion maximum concentration) and chronic (criterion continuous concentration) effects; and, the protection of human health from the consumption of organisms. The applicable criteria may be found at: http://www.epa.gov/waterscience/criteria/wqctable/index.html	
Biocriteria	The Territory shall preserve, protect, and restore water resources to their most natural condition. The condition of these waterbodies shall be determined from measures of physical, chemical, and biological characteristics of each waterbody class, according to its designated use. As a component of these measures, the Territory may consider the biological integrity of the benthic communities living within waters. These communities shall be assessed by comparison to reference conditions(s) with similar abiotic and biotic environmental settings that represent the optimal or least	

	disturbed condition for that system. Such reference conditions shall be those observed to support the greatest community diversity, and abundance of aquatic life as is expected to be or has been historically found in natural settings essentially undisturbed or minimally disturbed by human impacts, development, or discharges. This condition shall be determined by consistent sampling and reliable measures of selected indicator communities of flora and/or fauna and may be used in conjunction with other measures of water quality. Waters shall be of a sufficient quality to support a resident biological community as defined by metrics based upon reference conditions. These narrative biological criteria shall apply to fresh water, wetlands, estuarine, mangrove, seagrass, coral reef and other marine ecosystems based upon their respective reference conditions and metrics.
General water quality criteria	These waters shall be free of substances attributable to municipal, industrial, or other discharges or wastes as follows: (1) Materials that will settle to form objectionable deposits. (2) Floating debris, oils, scum, and other matter. (3) Substances producing objectionable color, odor, taste, or turbidity. (4) Materials, including radionuclides, in concentrations or combinations which are toxic or which produce undesirable physiological responses in human, fish and other animal life, and plants. (5) Substances and conditions or combinations thereof in concentrations which produce undesirable aquatic life. (6) Exotic or aquatic nuisance species.
	All waters of the U.S. Virgin Islands shall meet generally accepted aesthetic qualifications and shall be capable of supporting diversified aquatic life. "Waters" of the U.S. Virgin Islands shall be defined, as follows, as in 12 V.I.C. § 182(f) (2013); "Waters of the United States Virgin Islands" means all waters within the jurisdiction of the United States Virgin Islands including all harbors, streams, lakes, ponds, impounding reservoirs, marshes, water-courses, water-ways, wells, springs, irrigation systems, drainage systems and all other bodies or accumulations of water, surface and underground, natural or artificial, public or private, situated wholly or partly within or bordering upon the United States Virgin Islands, including the territorial seas, contiguous zones, and oceans."

The USVI Water Quality Standards were revised during the previous reporting cycle. The standards were promulgated in June 2010. The assessments outlined in this report were made based on the 2010 USVI Water Quality Standards.

Table II.B.2 Area of Water Classes by Island

	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 Spatial Distribution of St. Croix Coastal Water Classes

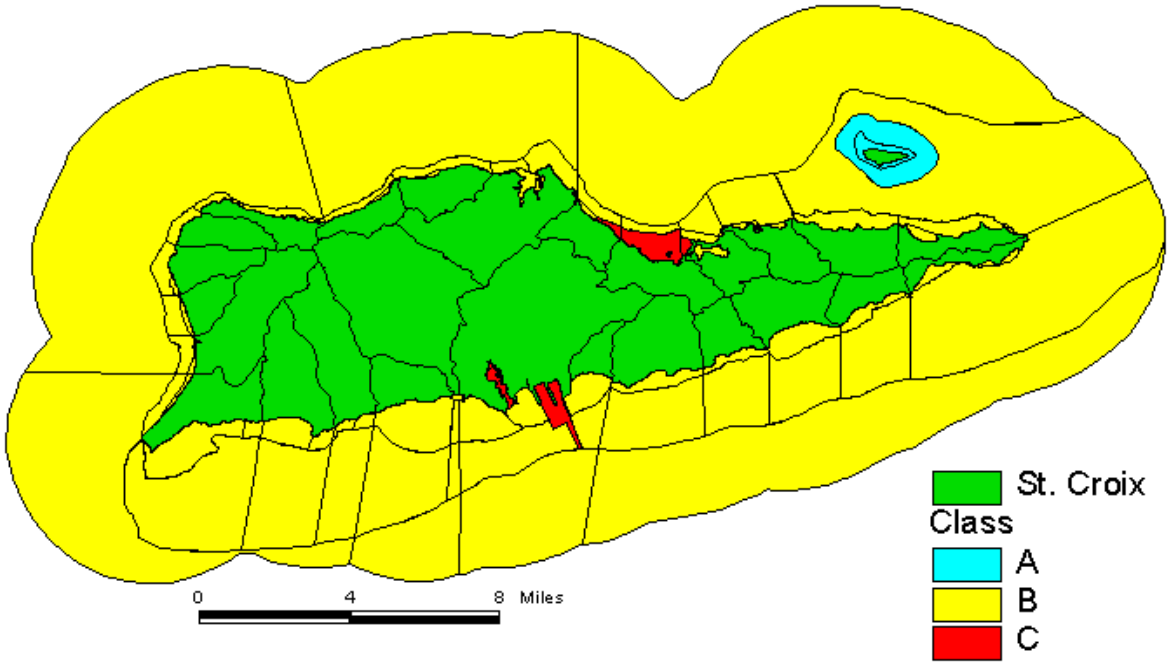
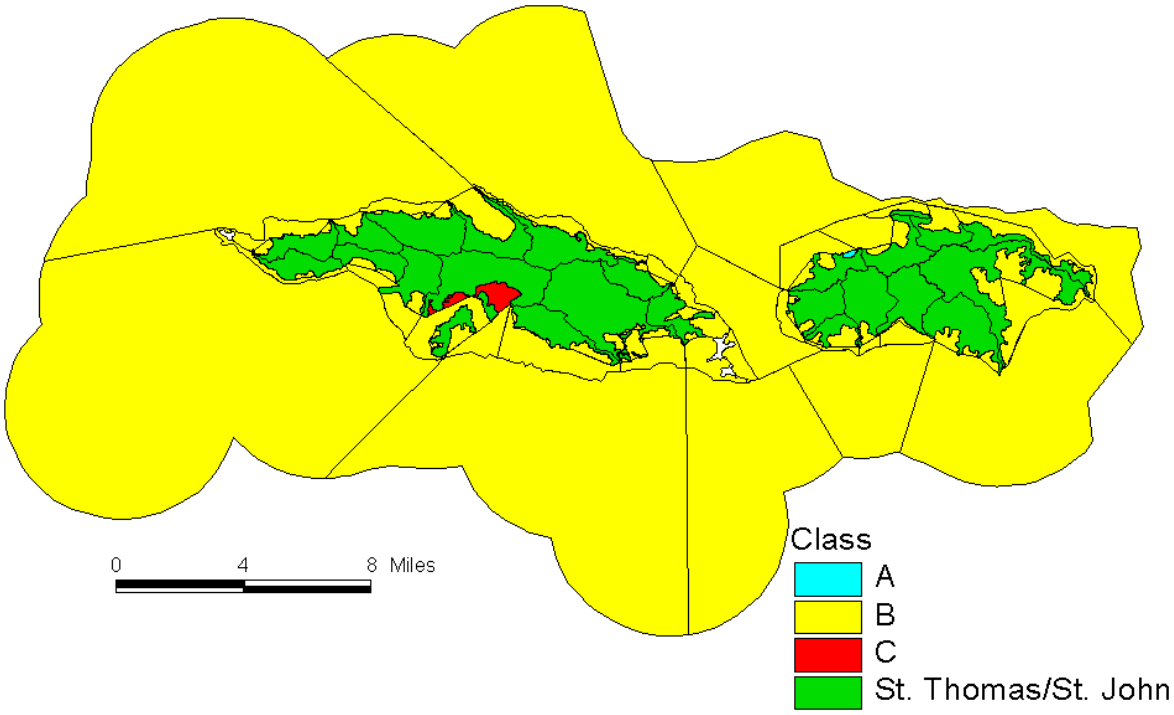


Figure II.B.3 Spatial Distribution of St. Thomas/St. John Coastal Water Classes



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

Water Quality Standards to Address Drinking Water Use Attainment

The water quality standards do not address drinking water use attainment. Since most of the USVI's drinking water supply comes from seawater purified by flash desalinization or reverse osmosis and 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 drinking water source-based 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 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. All waters of the Virgin Islands should not exceed a geometric mean of 35 enterococci per 100 ml or not to exceed a single sample maximum of 104 per 100 ml at any time. The reason that drinking water source-based 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 maintains 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 bacterial contamination through the relatively low temperature (60° C) flash desalinization processes.

C. Water Pollution Control Program

Under the Water Pollution Control Grant (pursuant to CWA §106), the V.I. Department of Planning and Natural Resources (DPNR), Division of Environmental Protection (DEP) is entrusted with the task of monitoring the marine waters of the USVI, and controlling the discharges into those waters. To accomplish this task the Water Pollution Control Program (WPC) is organized into the following sub-programs:

- TERMINAL FACILITY LICENSE AND INSPECTION PROGRAM (now managed by Underground Storage Tank/Groundwater Program)
- AMBIENT MONITORING PROGRAM (now managed by Water Quality Management Program)
- TMDL DEVELOPMENT AND IMPLEMENTATION PROGRAM (now managed by Water Quality Management Program)
- TERRIORIAL POLLUTANT DISCHARGE ELIMINATION SYSTEMS PERMITTING AND COMPLIANCE PROGRAM
- VIRGIN ISLANDS BEACH MONITORING PROGRAM (now managed by Water Quality Management Program)

Now there is only one WPC sub-program that this report will concentrate its focus on it is as follows:

1. The Territorial Pollutant Discharge Elimination Systems (TPDES) Permitting and Compliance Program permits and monitors point source waste streams, which are discharged into the waters of the VI, in accordance with the VI Water Quality Standards.

1. Territorial Pollutant Discharge Elimination Systems Program

The Territorial Pollutant Discharge Elimination Systems (TPDES) Permitting and Compliance Program is a federally delegated program which determines what waste streams are allowed to be discharged into the waters of the Virgin Islands, TPDES Permits are issued in accordance to Title 12, Chapter 7 §184-11 of the Virgin Islands Rules and Regulations states, that "…no person shall discharge or cause a discharge of any pollutant without a TPDES permit having been issued to such person…" TPDES permits require that point source discharges of pollution be monitored by the permittee (facility), and the self-monitoring results are submitted to DPNR-DEP and the United States Environmental Protection Agency (USEPA). Additionally, DPNR-DEP conducts compliance inspections and monitoring at all facilities that have been issued TPDES permits on an annual basis to ensure compliance. There are three types of compliance inspections conducted at TPDES permitted facilities throughout the Territory - Compliance Sampling Inspections, Compliance Evaluation

Inspections and Pump Station Inspections, which are conducted on a quarterly basis at the Territory's Publicly Owned Treatment Works (POTW).

If a facility is repeatedly found to be in non-compliance with its TPDES permit or has been found to violate the USVI's Water Quality Standards, enforcement actions may be taken against the facility. The enforcement action usually outlines corrective actions necessary for the facility to return to compliance and, if deemed necessary, fines may also be assessed. Facilities that are enforced against are usually granted the opportunity to work closely with the Department to develop a compliance schedule that sets the timeline the facility will use to achieve compliance.

If necessary or when requested, DPNR-DEP may work closely with the USEPA and the Department of Justice (DOJ) to address major enforcement cases. Cases of this nature included an ongoing case against the Department of Public Works which is currently under Federal Consent Decree for unpermitted discharges caused by sewage treatment infrastructure problems throughout the Territory. In such cases, DEP is called upon to monitor the facility in question and produce supporting inspection reports and other pertinent documentation.

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 TPDES Program currently regulates discharges from sewage treatment plant outfalls (both public and private facilities), brine discharges from reverse osmosis, desalination freshwater production plants, industrial facility process water discharges.

TPDES Program has several components, all under the auspices of the Division of Environmental Protection:

- TPDES Permit Issuance;
- TPDES Compliance Inspections: Compliance Evaluation (CEI), Compliance Sampling (CSI) and Pump Station Inspections (PSI); and
- Enforcement

TPDES Permit Issuance:

Territorial TPDES permits are issued with effluent limitations pertinent to Federal and Local Regulations. The major industrial dischargers, which have permitted discharges of over 1 MGD, include, the HOVENSA Oil Refinery, VI Rum Distillery, St. Croix Renaissance Group, Water and Power Authority in the St. Croix district; the Water and Power Authority and the Marriott Frenchman's Reef on St. Thomas. The major municipal dischargers include the St. Croix POTW, Mangrove Lagoon POTW and Charlotte Amalie POTW. The TPDES Program also permits a number of minor industrial and municipal facilities.

Table II.C.1 US Virgin Islands TPDES Permits, 2010 and 2011

PERMIT NUMBER	FACILITY NAME	ISLAND
VI0039870	AMERICAN YACHT HARBOR	ST. THOMAS
VI0040517	ANCHORAGE CONDOMINIUMS	ST. THOMAS
VI0040495	BLUEBEARDS BEACH CLUB & VILLAS	ST. THOMAS
VI0080012	BLOGONGO BAY BEACH RESORT	ST. THOMAS
VI0039977	BORDEAUX WWTP	ST. THOMAS
VI0039811	BRASSVIEW WWTP	ST. THOMAS
VI0040215	CABRITA SERVICES, INC.	ST. THOMAS
VI0080055	CALABASH BOOM WWTF	ST. JOHN
VI0039837	CANEEL BAY INC.	ST. JOHN
VI0020010	CHEVRON PUERTO RICO	ST. THOMAS
VI0040401	COMPASS POINT MARINA	ST. THOMAS
VI0040291	CORAL WORLD INC.	ST. THOMAS
VI0080071	CORY NEWBLOM	LOVANGO CAY
VI0039900	COWPET BAY EAST CONDOMINIUM	ST. THOMAS
VI0039853	COWPET BAY WEST CONDOMINIUM	ST. THOMAS
VI0040444	DOROTHEA BEACH CONDOMINUM	ST. THOMAS
VI0080021	DVERGSTEM COMPANY INC. (LIMA)	ST. THOMAS
VI0040321	ELYSIAN BEACH RESORT	ST. THOMAS
VI0040584	ESSENCE PROPERTIES	HASSEL ISLAND
VI0039829	FRENCHMAN'S REEF	ST. THOMAS
VI0040622	GALLOWS POINT	ST. JOHN
VI0040266	GEORGE SIMMONDS WWTP	ST. JOHN
VI0040207	H & V HEAVY EQUIPMENT	ST. THOMAS
VI0040801	HULL BAY HIDEAWAY	ST. THOMAS
VI0080098	JOHN MARKUS TRUST	LOVANGO CAY
VI0040738	LAKES WATER SERVICE	ST. THOMAS
VI0040525	LITTLE ST. JAMES	LITTLE ST. JAMES
VI0080047	LOVENLUND	ST. THOMAS
VI0040614	MAHOGANY RUN	ST. THOMAS
VI0040746	MARKET SQUARE EAST WWTP	ST. THOMAS
VI0040193	POINT PLEASANT RESORT	ST. THOMAS
VI0080063	RAPHUNE VISTAS	ST. THOMAS
VI0040479	RITZ CARLTON	ST. THOMAS
VI0039934	SAPPHIRE BAY CONDOMINIUM WEST	ST. THOMAS
VI0040312	SAPPHIRE BEACH RESORT	ST. THOMAS
VI0040029	SAPPHIRE VILLAGE CONDOMINIUM	ST. THOMAS
VI0040398	SECRET HABOUR BEACH RESORT	ST. THOMAS
VI0080004	SECRET HABOUR HOUSE III	ST. THOMAS
VI0040452	ST. JOHN WAPA	ST. JOHN
VI0040835	ST. JOHN WMA (CRUZ BAY)	ST. JOHN
VI0039993	ST. THOMAS DAIRIES (TRANS-CARIBBEAN DAIRY)	ST. THOMAS
VI0000060	ST. THOMAS WAPA	ST. THOMAS
VI0002003	ST. THOMAS WMA (MANGROVE LAGOON) WWTP	ST. THOMAS
VI0020044	ST. THOMAS WMA (Red Point) WWTP	ST. THOMAS
VI0040461	SUGAR BAY CLUB & RESORT	ST. THOMAS
VI0040703	TOTAL PETROLEUM TUTU SERVICE STATION	ST. THOMAS
VI0080080	TUTU PARK MALL	ST. THOMAS
VI0020133	VESSUP BAY WWTP	ST. THOMAS

VI0040762	VIRGIN ISLANDS NATIONAL GUARD - USVI	ST. THOMAS
VI0040606	WATER POINT ESTATES	ST. THOMAS
VI0040134	WATERGATE VILLAS CONDOMINIUMS	ST. THOMAS
VI0040151	WESTIN ST. JOHN HOTEL	ST. JOHN

PERMIT NUMBER	FACILITY NAME	ISLAND
VI0050024	ST. CROIX RENAISSANCE GROUP, LLLP	ST. CROIX
VI0000019	HOVENSA, LLC	ST. CROIX
VI0020052	CRUZAN VIRIL LTD.	ST. CROIX
VI0000051	V.I. WATER & POWER AUTHORITY - STX	ST. CROIX
VI0020036	STX POTW - ANGUILLA	ST. CROIX
VI0040240	RADISSON CARAMBOLA BEACH	ST. CROIX
VI0040916	CANDLE REEF II ASSOCIATION	ST. CROIX
VI0040231	GRAPETREE SHORES INC. (DIVI RESORT)	ST. CROIX
VI0050202	ST. CROIX FINANCIAL CENTER, INC.	ST. CROIX
VI0040886	NO. 7 SHOYS BEACH	ST. CROIX
VI0040878	THE REEF ASSOCIATES	ST. CROIX
VI0050032	COAKLEY BAY CONDOMINIUMS	ST. CROIX
VI0050229	GENTLE WINDS CONDOMINIUMS	ST. CROIX
VI0050326	GRAPETREE BAY HOTEL	ST. CROIX
VI0003042	KRYSTAL SPRINGS	ST. CROIX
VI0050245	CARDEN BEACH FACILITIES ASSOC.	ST. CROIX

Construction General Permit Coverages – FY2010 and FY2011

PERMIT NUMBER	FACILITY NAME	TYPE	ISLAND
VIGSA0001	Reliance Housing Services, LLC. (Calabash Boom Affordable Housing)	Stormwater	***St. John***
VIGSA0002	K&C Development	Stormwater	***St. Thomas***
VIGSA0008	Caribbean Petroleum	Stormwater	***St. Thomas***
VIGSA0010	WMA - Susannaburg Transfer Station	Stormwater	***St. John***
VIGSA0012	Raphune Vistas	Stormwater	***St. Thomas***
VIGSA0014	Greathouse Estates	Stormwater	***St. Thomas***
VIGSA0016	Pond Bay Club	Stormwater	***St. John***
VIGSA0018	St. Thomas Regional Library & Archives Center	Stormwater	***St. Thomas***
VIGSA0020	All Saints Cathedral School	Stormwater	***St. Thomas***
VIGSA0022	Federal Highway Administration - Virgin Islands National Park's North Shore Road	Stormwater	***St. John***

VIGSA0024	Boynes and 3RC Inc. Trucking System	Stormwater	***St. Thomas***
VIGSA0026	Meridian on the Green Condominiums	Stormwater	***St. Thomas***
VIGSA0028	Estate Tutu Apartments	Stormwater	***St. Thomas***
VIGSA0030	GEC, LLC. (Donoe Apartments) (A.K.A. Grandview Apartments)	Stormwater	***St. Thomas***
VIGSA0032	DCM (Foothills Professional Building)	Stormwater	***St. Thomas***
VIGSA0034	Michael Milne (Bordeaux Mountains)	Stormwater	***St. John***
VIGSA0036	Roger Minkoff (Governor's Gate)	Stormwater	***St. Thomas***
VIGSA0038	Market Square East Expansion	Stormwater	***St. Thomas***
VIGSA0040	Caribbean Cultural Center	Stormwater	***St. Thomas***
VIGSA0042	Walgreen's St. Thomas	Stormwater	***St. Thomas***
VIGSA0044	Whispering Hills at Donoe	Stormwater	***St. Thomas***
VIGSA0046	No. 481-1 Estate Chocolate Hole Gas Station, Convenience Store & Apartment	Stormwater	***St. Thomas***

PERMIT NUMBER	FACILITY NAME	TYPE	ISLAND
VIGSA0009	C'sted Bypass	Stormwater	***St. Croix***
VIGSA0013	Golden Gaming Resorts	Stormwater	***St. Croix***
VIGSA0017	Montpellier Small Farmers Project	Stormwater	***St. Croix***
VIGSA0019	DPW - Scenic Drive Road	Stormwater	***St. Croix***
VIGSA0023	Southgate Crossing	Stormwater	***St. Croix***
VIGSA0025	Ruparelia Ratan Sub	Stormwater	***St. Croix***
VIGSA0027	Home Depot - Pad Preparation Only	Stormwater	***St. Croix***
VIGSA0029	DPW - Project 70-11_Queen Mary HW	Stormwater	***St. Croix***
VIGSA0033	DIAGEO - Facility	Stormwater	***St. Croix***
VIGSA0035	Carlton Condos (GEC)	Stormwater	***St. Croix***
VIGSA0037	Sunny Isle Parking Lot	Stormwater	***St. Croix***
VIGSA0041	No 1-D Concordia Sub	Stormwater	***St. Croix***
VIGSA0045	Bonne Esperance Sub	Stormwater	***St. Croix***
VIGSA0047	Ruparelia Sion Hill Sub	Stormwater	***St. Croix***
VIGSA0049	R&T Park	Stormwater	***St. Croix***

VIGSA0053	Sandy Point Road Improvements	Stormwater	***St. Croix***
VIGSA0055	CVL Evap	Stormwater	***St. Croix***
VIGSA0057	Iglesia Pentacostal Church Project	Stormwater	***St. Croix***
VIGSA0059	Louis E. Brown Construction Project	Stormwater	***St. Croix***
VIGSA0061	Bonne Esperance Subdivision - Graci	Stormwater	***St. Croix***
VIGSA0063	VING Bethlehem Project	Stormwater	***St. Croix***
VIGSA0065	CVL Molasses Tanks	Stormwater	***St. Croix***
VIGSA0069	26 Rattan Subdivision	Stormwater	***St. Croix***
VIGSA0071	St. Croix VIWMA Transfer Station	Stormwater	***St. Croix***
VIGSA0073	Anguilla Landfill Closure	Stormwater	***St. Croix***
VIGSA0075	UVI Athletic Field Project	Stormwater	***St. Croix***
VIGSA0076	1Aa&1Bb Mt. Welcome Project	Stormwater	***St. Croix***

Wastewater General Permit Coverages – FY2010 and FY2011

PERMIT NUMBER	FACILITY NAME	ISLAND
VIGWA0001	ROBERT KAUFMAN RESIDENCE	***St. Croix***
VIGWA0003	DUANE BOBECK RESIDENCE	***St. Croix***
VIGWA0005	JOHN VAN STEENBERG RESIDENCE	***St. Croix***
VIGWA0007	LIONEL JACOBS RESIDENCE	***St. Croix***
VIGWA0009	CHRIS POWERS RESIDENCE	***St. Croix***
VIGWA0011	RICHARD BORCK RESIDENCE	***St. Croix***

PERMIT NUMBER	FACILITY NAME	ISLAND
VIGWA0002	Rance Pion	***St. Thomas***
VIGWA0004	Sean Lynch Residence	***St. Thomas***

TPDES 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 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, FY2010 - 2011

FY2010	**St. Thomas/St. John**	**St. Croix**
CEI	30	6
CSI	7	5
Supplementary	5	-
SCI	1	7

FY2011	**St. Thomas/St. John**	**St. Croix**
CEI	43	6
CSI	4	4
Supplementary	6	-
SCI	1	13

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

Table II.C.3 Supplementary POTW Inspections: TPDES Activities, FY2010 - 2011

FY2010 and FY2011

Facility Name	**Permit #**	**Type**	**Quarter**
St. Thomas Pump Stations	VI0039811 VI0039977 VI0020044 VI0002003 VI0020133	PSI (C)	1^{st}-4^{th}
St. John Pump Stations	VI0040835 VI0040266	PSI (C)	
St. Croix Pump Station	VI0020036	PSI (C)	

Legend
C-Compliance Evaluation Inspection

S-Compliance Sampling Inspection
AOE-Affidavit of Exemption
PSI-Pump Station Inspections
MMI-Multi-Media Inspection
ECS-Enforcement Case Support

2. 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 were:

Table II.C.4 Summary of TPDES Enforcement Activities, FY 2010 - 2011

FY2010

Against	Type	Status
HOVENSA LLC	NOV	Drafted
VIWMA	NOV	Issued (Consent Decree)
Food Center	NOV	Pending
Carambola	NOV	Settled
Renaissance	NOV	Pending
Chris Powers	AO	Issued

FY2011

Against	Type	Status
Frenchman's Reef	NOV	Issued and Settled
Food Center	NOV	Settled
VIWMA (STX)	AO	Drafted, Revoked
VI National Guard (STX)	AO	Issued
Caneel Bay	NOV	NOV Drafted
DIVI	NOV	NOV Drafted
Chris Powers	NOV	Pending
Krystal Springs	AO	Issued and Settled
Richard Borck	AO	Pending
Lionel Jacobs	AO	Pending
Carambola	NOV	Issued and Settled
VIMA (Barron Spot Lift Station)	NOV	Issued and Settled
Renaissance	NOV	Pending
VIWAPA	NOV	Pending
HOVENSA LLC	NOV	Re-Drafted

WPC continued to participate in the Department of Justice Teleconferences which discussed the Department of Public Works/Waste Management Authority's compliance with the Consent Decree.

D. Non-Point Source Program

Non-point source pollution, in the form of polluted runoff, impairs more water bodies than any other source of pollution in the Virgin Islands. Non-point 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 non-point source pollution. Two of the major non-point 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

THE NPS PROGRAM ACTIVITY MEASURES:

1. Waterbodies identified by States (in 2000 or subsequent years) as being primarily nonpoint source-impaired that will be partially or fully restored (cumulative).

There are fourteen waterbodies identified with established total maximum daily loads (TMDL) as listed below:

Table II.D.1 TMDLs Established for the USVI

TMDL Water body	TMDL Impairment	TMDL Established
Benner Bay	Dissolved Oxygen	Sept 30, 2003
Benner Bay Lagoon	Dissolved Oxygen	
Mangrove Lagoon	Biological Oxygen Demand	
Salt River Bay	Dissolved Oxygen	Sept 24, 2004
Salt River Bay Lagoon	Dissolved Oxygen	
Salt River Lagoon, Marina	Dissolved Oxygen	
Salt River Lagoon, Sugar Bay	Dissolved Oxygen	
Great Cruz Bay, St. John	Oil & Grease	Sept, 29 2005
Red Hook Bay, St. Thomas	Oil & Grease	
Hassel Island at Haulover Cut to Regis Point, St. Thomas	Oil & Grease	
Mangrove Lagoon, St. Thomas	Fecal Coliform	
Benner Bay, St. Thomas	Fecal Coliform	
Limetree Bay, St. Thomas	Fecal Coliform	
Magens Bay, St. Thomas	Fecal Coliform	
Vessup Bay, St. Thomas	Fecal Coliform	
Hassel Island at Haulover Cut to Regis Point, St. Thomas	Fecal Coliform	Sept 19, 2006
North Shore St. Croix Assessment Units	Phosphorus, Biological Oxygen, Fecal Coliform, Sediment Oxygen Demand, Total Suspended Solids, Enterococcus Bacteria	Sept 26, 2007
St. Thomas Harbor Assessment Units	Biological Oxygen Demand, Enterococcus Bacteria, Fecal Coliform and Sediment Oxygen Demand	Sept. 03, 2010

*No TMDLs were established during FY2011

2. Reduction in amount of total sediment loadings (in tons).

Not measured and quantified – currently revising the multi-year monitoring strategy to assess sediment reductions. Additionally a contract is being developed for the characterization of guts (intermittent streams), within watersheds feeding a TMDL waterbody, in relation to their location, daily flow, and condition (Manning's roughness coefficient). The contractor, Tetra Tech Inc, of Fairfax, Virginia was scheduled to begin work during the second quarter of FY10.

3. Reduction in amount of total nitrogen loadings (in pounds).

Not measured and quantified – currently revising the multi-year monitoring strategy to assess nitrogen reductions. Additionally a contract is being developed for the characterization of land use coefficients for use in determining NPS pollution loadings for parameters such as Biological Oxygen demand, nutrients (particularly nitrogen) sediment, bacteria, oil/grease, and impervious surfaces. The contractor, Tetra Tech Inc, of Fairfax, Virginia was scheduled to begin work during the second quarter of FY10.

4. Reduction in amount of total phosphorus loadings (in pounds).

Not measured and quantified – currently developing a multi-year monitoring strategy to assess load reductions. See discussions under items 2and 3 above.

5. Number of watershed-based plans (and water miles/acres covered), supported under state Nonpoint Source Management Programs since the beginning of FY'02 that have been substantially implemented.

Two watershed-based plans have been substantially implemented.

Fish Bay Watershed Management Plan, St. John) - 4.2 gut miles (water miles) covering 1,487.6 acres. The Fish Bay watershed is experiencing rapid residential development and corresponding impacts from uncontrolled erosion, sediment and stormwater. VI RC&D was contracted by the V.I. Department of Planning & Natural Resources Coastal Zone Management Program (DPNR-CZM) to assist in designing and implementing best management practices (BMPs) to mitigate pollution in the Fish Bay watershed. The primary goal of the project was to develop a Comprehensive Road Stabilization Plan with Best Management Practices. For more details please visit http://www.usvircd.org/FishBayPhoto/Gallery/index.htm

The Coral Bay Watershed Management Plan was finalized in March 2008 through a collaborative effort of multiple local and Federal agencies, the Coral Bay Community Council

(CBCC), and many local land owners and developers -- to serve as a guide for developing ways to protect Coral Bay from sediment and stormwater pollution. The plan provides a comprehensive set of objectives and actions that address land use planning, protection and restoration of sensitive lands and aquatic buffers, better site design and construction techniques, and effective stormwater management. Please note that the selected example sites are representative; there are many more sites in Coral Bay that deserve equal attention. This plan document is being used now as a helpful outline to undertake detailed actual multi-agency and community discussions to plan activities and prioritize actions on achieving the objectives. The EPA CARE grant being received by CBCC for 2009 and 2010 will bring stormwater expertise to Coral Bay expressly to implement the plan. The plan can be reviewed at http://www.coralbaycommunitycouncil.org/watershed.htm**.** The Coral Bay watershed is

- 5th largest watershed in VI: 3003 ac.
- Fastest developing area in VI
- 79% growth rate 1990-2000 Census
- 750+ residents in 2000
- 5% developed – Huge potential
- Area of Particular Concern
- Coral Reef National Monument
- Longest V.I. fringing mangrove
- 100's of acres of wetlands, coral reefs and seagrass beds

PROGRAM ACCOMPLISHMENTS

The NPS program can be subdivided into three sections:

1. Program Management to include development of total maximum daily loads (TMDLs)[1] implementation plans and restoration plans for Virgin Island's impaired waters; GIS capacity building, etc.
2. Section 319(h) nonpoint source control grants program; performs water quality restoration and educational projects
3. Earth Change permitting program in the second tier of the coastal zone.

Program Management

New Policies and Procedures were implemented during this reporting period as follows:

- Assessment of V.I. Zoning and Subdivision Code (29 V.I.C § § 221-78(2013))
  - The assessment was funded by $35,000.00 by DPNR's Division of Comprehensive and Coastal Zone Planning (CCZP), and was completed in FY09. The assessment undertaken by Stuart Meck of Rutgers University and Marya Morris of the Chicago-based Duncan and Associates provided DPNR with critical findings and recommendations that would allow the Department to update and revise the close to forty year old zoning code. Of special interest to the NPS program are the following issues to be addressed:

[1] A TMDL is calculation of the maximum amount of a pollutant a water body can receive and still meet water quality standards.

- Hillside development
- Environmental and aesthetic controls
- Mixed uses
- Conflicts among definitions, (such as those for mezzanines)
- Natural hazards

- Rules and regulations for telecommunication facilities
  - In January 2009, the NPS program provided input into the development of a draft due to the lack of standards and regulations in the V.I. Code that address such facilities. The first draft of the rules and regulations was completed and placed in the public domain in June 2009, when public hearings were conducted for feedback on same June 10-12, 2009. Thereafter, as a follow-up to the territorial public hearings that were conducted by the Planning Division in June, staff facilitated a workshop that was conducted on August 28, 2009 with stakeholders of the telecommunication industry, environmental groups, senators, attorneys and other interested persons, to garner their input in finalization of the draft rules and regulations prior to submittal to the Governor and the Office of the Attorney General.

- Small Wind Energy System Ordinance.
  - In conjunction with the VI Energy Office and as part of the Wind Energy Work Group, completed the final draft instruction sheet for applicants. The Application Guidelines Alternative Energy System will be used to ensure that applicants are made aware "up-front" of the various permits and clearances

  - In conjunction with the VI Energy Office, and as part of the Wind Energy work group, completed the draft final version of the "Small Wind Energy System Ordinance." The significant regulations as it relates to the earth change permitting program are as follows:
    - Tower Height: For all property sizes, the tower height shall be limited to 80 ft., provided that the application includes evidence that the proposed height does not exceed the height recommended by the manufacturer or distributor of the system.
    - Set-back: The setback of small wind energy systems from adjacent property and utility power lines shall not be less than the total height of the wind energy system. No part of the wind energy system structure, including guy wire anchors, may extend closer than the normally allowable setback distances to the property lines of the installation site as designated for the subject zoning district.

- In conjunction with the University of the Virgin Islands, Department of Agriculture, explored the potential for a "bladed equipment operator" certification program. In addition, the certification program may be expanded to include certification process for site inspectors for storm water discharges.

- In conjunction with UVI, provided input into the development of the USVI Ghut Monitoring project. The final plan on the use of ghuts as recreational spaces in the USVI was produced

by UVI and included recommendations to DPNR for incorporation into the earth change permitting review process.

- The Departmental Spatial Data Infrastructure Policy was completed and signed by Commissioner Robert Mathes. The policy establishes the following:
  - All departments and programs are encouraged to share GIS data and to make framework data available in ESRI Shapefile format with FGDC based metadata.
  - The DPNR GIS Work Group recommends that all data be submitted for use in a North American Datum of 1983 (NAD83) and a UTM20 North projection
  - All new GIS and CAD information be created using NAD83.

- In conjunction with The Nature Conservancy, and as part of the GIS work group, participated in kickoff meeting of the Conservation Planning for the U.S. Virgin Islands. This charter of this committee was developed to facilitate the development of a strategy to implement the Conservation Planning process for U.S. Virgin Islands. Products and process outcomes are as follows:
  - Draft Conservation component of the USVI's Comprehensive Land and Water Use Plan.
  - Develop specific maps outlining zoning with regulations, vegetation map, marine and terrestrial use maps, significant natural resources and geological features, priority threats.
  - Transfer of skills and technology for the DPNR to complete the process for the cultural component of the Comprehensive Land and Water Use Plan.

Inter-agency support

Technical assistance was also provided to other DPNR Divisions and Programs, such as Comprehensive and Coastal Zone Planning (CCZP) and the Groundwater Program for Land Development Permit Applications and Land Subdivision/Rezoning.

A total of one thousand two hundred and fifty-nine (1259) applications were submitted for review for zoning compliance. Seventy-one percent (71%) of the applications reviewed were for residential developments; eighteen percent (18%) for land clearing; six percent (6%) for other; Point-eight percent (0.8%) for agricultural purposes and four percent (4%) for non-residential developments.

Table II.D.1 Earth Change Summary

Earth Change Permit Applications Reviewed by Use FY 10-11						
	Residential (New/Addition)	**Land Clearing**	**Non-Residential**	**Agriculture**	**Other (fences, roads etc.**	**Total**
No. of Applications	**898**	**225**	**50**	**10**	**76**	**1259**

The NPS program also reviewed hydrology reports and provided environmental clearance for land subdivision applications, in support of the Division of Comprehensive and Coastal Zone Planning. Applications were reviewed for wellhead protection area concerns and other hydro-geological parameters such as drainage, ground water availability, septic tank suitability, flood plain concerns, etc. While the number of applications for subdivision processed this year remained the same as that of last fiscal year, there was a marked increase in the total acreage of property proposed for subdivision and the number of lots proposed for creation in the St. Croix District. The increase in subdivision activity is proposed for the Rattan and Sion Hill areas of St. Croix.

SUBDIVISION APPLICATIONS FY 2010-2011				
Preliminary				
	St. Croix	**St. Thomas**	**St. John**	**Total**
Received	6	2	2	10
Approved	6	1	1	8
Total Lots	119	9	2	130
Total Acreage	180	5	1	186
Pending	0	0	0	0
FINAL				
	St. Croix	**St. Thomas**	**St. John**	**Total**
Received	2	0	0	2
Approved	2	0	0	2
Total Lots	36	0	0	36
Total Acreage	11	0	0	11
Pending	0	0	0	0
PARTIAL FINAL				
	St. Croix	**St. Thomas**	**St. John**	**Total**
Received	1	0	0	0
Approved	1	0	0	0
Total Lots	21	0	0	21
Total Acreage	5	0	0	5
Pending	0	0	0	0

PRELIMINARY/FINAL							
	St. Croix		**St. Thomas**		**St. John**		**Total**
Received	4		4		5		13
Approved	4		4		5		13
Total Lots	4		33		2		39
Total Acreage	5		15		1		21
Pending	0		0		1		1

During FY 2010 -2011, the NPS Program did not participate in pre-application meetings and public hearings for zoning map amendments, in support of the Division of Comprehensive and Coastal Zone Planning.

Section 319 Contracts

During the reporting period, the NPS management plan was continually updated and reassessed to link the program's implementation goals to the accomplishment of other related programs, including TMDL development, stormwater permitting, and CZARA implementation schedules pursuant to the Coastal Nonpoint Pollution Control Program of the Coastal Zone Management Division

319 Nonpoint Source Pollution Projects **–2010-2011**	Completion Phase
2004 - Continuation and Expansion of the Territorial Biological (UVI) *The purpose of this task is to continue the biological monitoring program to track the health of one of our most sensitive and important biological resources – coral reefs.* ***Total award amount $52,380.00***	100%
2004- NPS Pollution for St. Croix Youths - Center for Marine & Environmental Studies (UVI) *The purpose of this task is to help reduce nonpoint source pollution and increase awareness of NPS pollution among students. – Complete* ***Total award amount $57,408.00***	100%
2004 - Nonpoint Source Pollution Committee Operating-Budget(UVI) *The NPS Pollution Control Committee was created in 1992 to provide oversight to the DEP- NPS Program, as stipulated in the 1989 VI NPS Management Plan. The committee operated on a shoestring budget with the primary participating agencies (DPNR,UVI/CES, USDA, VIRC&D) providing funds for materials,*	100%

supplied travel out of their individual budget. ***Total award amount $9,984.00***	
2004 – (DOA & DPNR) Environmental Quality Incentive Program (EQIP) ***The*** *goal is to install agricultural Best Management Practices to reduce nonpoint source pollution. The USDA-EQIP program is a cost shared program with the farmer whereby the farmer is responsible for a prescribed percentage of the cost.* ***Total award amount $30,000.00*** ***DEP staff is waiting for a report from the Department of Agriculture.*** ***DOA matched DPNR award for the availability of funding for the Farmers.***	unknown%
2004 - Clean Marinas Program – (DEP)In-House Project- Completed by the Water Pollution Program (STT) *To provide technical advice and educational material for marinas which would lead to a reduction in marina related pollution.* ***Total award amount $22,000.00***	100%
2005 -2009 Nonpoint Source Pollution Conservation School – *The objective of this program was to increase the level of environmental awareness among Virgin Islands public schools and to encourage schools to manage resources in their school grounds to help mitigate Nonpoint Source Pollution.* ***Total award amount $52,000.00 - 13 Schools in the territory received $4,000.00 each – All of the schools have completed their proposed tasks (8) St. Croix & (5) St. Thomas***	100%
2005 – 2009 VI Nonpoint Source Pollution Conference – *Objective of this conference was to increase public and private sector awareness of nonpoint source pollution issues in the VI and to inform and educate regulators, businesses and contractors in the proper design of BMP's to reduce or mitigate NPS pollution.* ***Total award amount $30,000.00*** ***The Conference was held on May 6&7, 2010 in St. Thomas @ the Wyndham Sugar Bay Resort & Spa.***	100%
2005 – 2009 Estate Adventure Gut Restoration Demonstration Project *The purpose of this project was to restore riparian habitat and natural stream channel function in a designated corridor/buffer adjacent to the Estate Adventure Gut and Nature Trail.* ***Total award amount $26,840.00***	100%
2009-2010 TMDL data development and gut characterization in priority bays	0%

and watersheds in the USVI by TetraTech, Inc. *a). Characterization of land use coefficients for use in determining non-point source pollution loadings for parameters such as Biological Oxygen Demand, nutrients (particularly nitrogen), sediment, bacteria, oil/grease, and impervious surfaces* *b). Characterization of guts within watersheds feeding a TMDL waterbody in relation to their location, daily flow, and condition (Manning's roughness coefficient)* ***Total award amount* ($60,643)**	
VI Wellhead Protection Program Actualization Project by Rural Community Assistance Program (RCAP), Inc *Prioritization of WHPP* ***Total award amount* ($32,640)**	80%
***** The Section 319 Nonpoint Pollution Program did not award any contracts for Fiscal Year 2010 – 2011.***	

Earth Change Permitting

An earth change permit is required before any real property can be cleared, graded, filled, or otherwise disturbed. Erosion and sedimentation resulting from improper construction and land clearing activities has been identified as the major nonpoint source problem in the Virgin Islands. The earth change permitting program is designed for residential development; facilities an acre or less in size. Larger facilities will be regulated under the Stormwater permitting discussed under Task 4 below. The earth change permitting program will emphasize the implementation of non-point source pollution controls, including sediment control, erosion mitigation measures, and protection of coastal and ground water resources.

Data management

All earth change permits issued were entered into the database. DPNR has contracted Ventera to develop online capabilities for the earth change permitting system. Ventera will provide an enterprise content management solution that will automate the Earth Change Permit Application Process. The project, as proposed, will be initiated in the first quarter of FY10 and is briefly summarized below

	Project: OnBase® Permitting Process- Earth Change Permit Process Date:

CR #: ECM Platform & Building Permit Process- Agency 2 Proposal for EC	Submitted Date: 4/15/2009 Agency 2 Proposal for Earth Change		
Requestor: DPNR	Type: New Requirement	Priority: High	Status: Submitted

Business Case: In an effort to reduce resource use and improve the efficiency of the permitting process, the Department of Natural Resources would greatly benefit from implementing the automation of the forms relating to the 'Earth Change Permit Process'.

Tasks Undertaken: Ventera will provide an enterprise content management solution that will automate the Earth Change Permit Application Process. The solution will be implemented in the following phases

1. Discovery Phase- will include analysis of the existing process and will involve a number of activities geared towards gathering requirements. At the end of this stage a composite requirements document called the 'Discovery Document' will be delivered.

2. Design Phase- will involve the design of the automated workflows, eForms, work queues, decision points. The functional and technical specifications are enumerated and designed during this stage. The deliverable will include a Design Document outlining the specs.

3. Build Phase – Following the approval of the Design Document by DPNR, Ventera will create the eForms, work queues and work flows in the existing OnBase environment.

4. Training Phase - will be done in two parts: customer training and system testing. The goal is to prepare and educate the business users on how to interact with the solution. The training will be followed by the user acceptance testing which will include an end-to-end test plan that incorporates all facets of the solution. Simultaneously, we will conduct training to educate end-users on how to interact with the solution. The deliverables at this stage will include a training and UAT plan. The users will be given test plans to test various scenarios that they face in their day to day operations

5. Roll Out Phase - Ventera will move the development/testing environment to the production OnBase server. Ventera will also work with DPNR to 'turn on' the application to the internal DPNR users and to its customers.

Impact Statement: The Earth Change Process will reside on the existing On Base Building Permit Process hardware and network infrastructure. No additional hardware or software is required since DPNR has already invested in the existing system. Through the use of electronic forms and automated workflows DPNR Earth Change will realize a significant improvement in process flow and

functionality. External users will be able to submit forms and receive notifications all electronically once the system is in production.	
Affected Artifacts/Documentation: ▪ Earth Change Permit Application Form I- Gut Clearing/Brush Clearings Only ▪ Earth Change Permit Application Form II- Single Residential Lot ▪ Earth Change Permit Application Form III- Major Development ▪ Cashier Transmittal Form	Affected Lines of Code: This section is not applicable for the proposed solution.

Issues/challenges encountered during this reporting period.

1. Onsite Sewage Treatment System Regulations

Septic System regulations and regulatory authority needs to be better defined for second tier of the coastal zone. Currently there is overlapping and conflicting jurisdictions between the Waste Management Authority, Department of Health, and DPNR in the various statutes and regulations. There is a need to develop permitting processes to include monitoring and pump out requirements.

2. Staffing needs

The Nonpoint Source program has developed an earth change action plan (during FY08) in an effort to improve on the earth change permitting and enforcement process. The action plan calls for two new positions within the Earth change program to facilitate timely review of applications and increased earth change enforcement actions. Implementation of the "Save our Soils" (SOS) initiative, partly through the adoption and implementation of the Earth Change Action Plan by management. The plan is comprised the following:

- Increase Enforcement capability – need to revise regulations especially with respect to issuance of administrative orders and stop work orders.
- Increase Inter-Divisional Permit Review – TMDL/Stormwater review in TMDL watersheds; septic system requirements and performance standards for water treatment plants; development in the floodplain, etc.

3. TMDL implementation

The NPS program was not able to facilitate the interdisciplinary approach necessary to achieve successful implementation of the TMDLs developed to date. The most fundamental element that will make the TMDL implementation more effective will be the involvement and integration of the different federal and local agencies and the citizens.

4. Driveway Permit

Beginning on May 7, 2008, DPNR attempted to address the subject of driveway permits for access onto public roads as many public roads on St. Thomas are being undermined by improperly constructed driveways. The issue at hand is the definition of what constitutes a

"public road" versus an "estate road". It was finally determined that an earth change permit will be issued without the requisite driveway permit, and it is the applicant's responsibility to obtain a driveway permit from the Department of Public Works.

E. Solid Waste Program

Under 19 V.I.C. § 1553(g)(1) (2013), DPNR is authorized to enforce provisions related to environmental effects of waste disposal, resource recovery and hazardous wastes. Pursuant to 19 V.I.C. § 1560 (2013), 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.

Within three years after its inception, the Used Oil Program issued more than 173 permits to facilities territory-wide. These permits were only valid for three years, and subsequently expired. Facilities are, therefore, required to submit updated information regarding their used oil management, and renew the permits to generate, store or transport used oil every three years.

The tables below provide a listing of used oil permits by District. All of the permits are listed to reflect the universe of facilities that have been issued permits to date, even if some permits are currently expired. Several businesses have become defunct since the previous reporting period or are no longer generating used oil, and those facilities are no longer included in the database.

One of the objectives of the Solid Waste Program's enforcement strategy is to pursue enforcement against facilities that have failed to renew their permits. Pursuant to 19 V.I.C. § 1561(c) (2013) , these facilities will be issued a Notice of Noncompliance initially, and enforcement will be escalated if compliance is not achieved within the corrective action period.

F. Oil and Hazardous Materials

1. Underground Storage Tank Program

The Underground Storage Tank Program has undergone management changes during the last few years 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 (2013)) 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 (2013) 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. These issues are important to ensure the protection of the island's groundwater and

DPNR is 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, the status list needs to be updated on a continuous basis. DPNR was awarded $80,000 in ARRA funds to address the LUST Sites.

The LUST list to date is as follows:

St. Croix

1. Texaco-Midway s/s
2. Esso-Estate Glynn (Site Assessment Pending)
3. Esso-Farmingdale s/s (No Further Action Letter Pending)
4. Esso-Estate Mint s/s
5. Esso-Hassan s/s

St. Thomas

1. Esso-Devcon
2. Esso-Gottlieb s/s (On-going Remediation)
3. Esso-One Stop Sugar Estate s/s (Phase 2 Site Investigation Pending)

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 numerous Notices of Violation.

2. The Used Oil Program

Under 19 V.I.C. § 1553(g)(1) (2013), DPNR is authorized to enforce provisions related to environmental impacts of waste disposal, resource recovery and hazardous wastes. Pursuant to 19 V.I.C. § 1560 (2013), 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.

Initially, the Used Oil Program issued more than 173 permits to facilities territory-wide. These permits were only valid for three years, and subsequently expired. Facilities were, therefore, required to submit updated information regarding their used oil management, and apply for renewal of the permits to generate, store or transport used oil every three years.

The tables below provide a listing of used oil permits issued within each district in the Virgin Islands. All of the permits that are listed reflect the universe of facilities that have been issued permits to date, even though some permits are currently expired. Several businesses have become defunct since the previous reporting period or are no longer generating used oil, and those facilities are no longer included in the database.

One of the objectives of the Solid Waste Program's enforcement strategy is to pursue enforcement against facilities that have failed to renew their permits. Pursuant to 19 V.I.C. § 1561(c) (2013), these facilities will be issued a Notice of Noncompliance initially, and enforcement will be escalated if compliance is not achieved within the corrective action period.

Table II.E.1.a List of Used Oil Permit Holders – St. Thomas-St. John District

075T	A.J. System	St. Thomas
236 T	M &S Auto Inc	St. Thomas
224C	VI Recycling Company	St. Thomas
220T	Amalie Car Rental	St. Thomas
120T	Automotive Enterprises Inc. dba Midas	St. Thomas
039T	It's Black It's White	St. Thomas
223T	Joel's Auto repair tech	St. Thomas
118J	P&S Trucking & Water Delivery	St. John
128T	Trans Caribbean Dairy	St. Thomas
109T	U.S. Postal Service Aubrey C. Ottley Branch-GPO	St. Thomas
125J	Varlack Ventures, Inc	St. John
126T	Crowley Liner Services (STT)	St. Thomas
138T	Discount Water Deliveries and Trucking Services	St. Thomas
089T	Lennards Auto Repairs	St. Thomas
200T	MOF VI Limited Partnership/DBA American Yacht Harbor	St. Thomas
056T	N & S Auto Services	St. Thomas
201J	Pimpy's Trucking	St. John
076T	Sapphire Beach Resort Marina	St. Thomas
131T	University of The Virgin Islands	St. Thomas
149T	Castillo Auto Repair	St. Thomas
188T	Lew Henley's Sewage Disposal L.L.C.	St. Thomas
151T	Matthews Auto Repairs	St. Thomas
158T	VI Cement and Building Products Inc.	St. Thomas
150T	VI Recycling Company	St. Thomas
133T	Air Center Helicopters	St. Thomas
134T	Air St. Thomas	St. Thomas
124T	Amco Auto Sales & Service Inc.	St. Thomas
108T	American Eagle dba Executive Airlines	St. Thomas
145T	Antilles Gas (STT)	St. Thomas
111T	Auto Excellence	St. Thomas
135T	Bohlke International Airway, Inc.	St. Thomas
113J	Boyson Inc	St. John
097C	Buccaneer Hotel	St. Thomas
096T	Bussue Auto & Repair	St. Thomas
098J	Caneel Bay Resort	St. John
139T	Challenger's Transport	St. Thomas

140T	Chuck Kline Water	St. Thomas
123T	Compass Point Marina, Inc.	St. Thomas
142T	Cowpet Bay West	St.Thomas
116T	Dependable Car Rental	St. Thomas
110T	Domino Oil Co. Inc.	St. Thomas
114T	Florida Coca Cola Bottling Comp.-St. Thomas	St. Thomas
117T	Four Star Aviation, Inc.	St. Thomas
099T	Heavy Materials (formerly St. Thomas Concrete)	St. Thomas
146T	Innovative Telephone	St. Thomas
102T	La Vida Marine Center L.P/B.J. Management *****	St. Thomas
119T	Metro Motors	St. Thomas
125T	Motor Trend	St. Thomas
129J	O' Connor Car Rental*	St. John
101T	Patrick Charles Enterprises Inc.	St. Thomas
104T	Public Works (#8 Subbase)	St. Thomas
105J	Public Works (susanaberg)	St. John
136T	Pueblo Supermarket	St. Thomas
132T	Ritz-Carlton Resort	St. Thomas
143T	Sanitary Trashmoval Services Inc.	St. Thomas
092T	School Busing, Inc	St. Thomas
129J	St. John Development dba Texaco	St. John
103T	The Auto Clinic	St. Thomas
137T	Tutu Texaco Service Station Inc	St. Thomas
130T	United Brothers Trucking	St. Thomas
106T	V.I. Department of Public Works (Bovoni)	St. Thomas
105J	V.I. Department of Public Works (St. John)	St. Thomas
104T	V.I. Department of Public Works (Sub Base)	St. Thomas
104TT	V.I. Department of Public Works (Subbase) Trans	St. Thomas
122T	V.I. Housing Authority	St. Thomas
080T	V.I. Port Authority, Transportation (STT)	St. Thomas
112T	VI Enterprises, Inc. (Avis)	St. Thomas
224C	Discount Car Rental/B.S.S.C.	St. Thomas
098T	Western Auto Supply Co (STT)	St. Thomas
121T	Wyndham Sugar Bay Resort	St. Thomas
073T	American Yacht Harbor Marina	St. Thomas
091J	Barry's Auto Service Center	St. John
068T	Budget Car Rental	St. Thomas
065T	Community Motors Inc.	St. Thomas
090T	Contran Resorts, Inc. dba Mahogany Run Golf Course	St. Thomas
061J	Coral Bay Marina Services Inc.	St. John
063T	Crown Bay Marina	St. Thomas
077T	CTF Hotel Management Corp	St. Thomas

088J	E. C. Gas & Service Station, Inc.	St. John
100T	Ge-Tech Auto Repair	St. Thomas
077T	Grand Beach Palace *****	St. Thomas
069TT	Green Hornet Environmental Management Inc	St. Thomas
094T	Hertz Rent A-Car	St. Thomas
066T	John's Auto Center Inc.	ST. Thomas
090T	Mahogany Run	St. Thomas
079T	Marriott Frenchman's Reef & Morning Star Beach Resort	St. Thomas
041T	K-Mart (Tutu Park)	St. Thomas
101T	Valrick Charles Enterprises, Inc.	St. Thomas
072TT	VI Regulated Waste Management, Inc	St. Thomas
087J	Westin St. John Hotel Company, Inc	St. John
067T	Yacht Haven (Long Bay Partners)	St. Thomas
037T	Caribbean Auto Mart	St. Thomas
037T	Caribbean Auto Mart, Inc (STT)	St. Thomas
047T	Diesel Dynamic Plus Inc.	St. Thomas
041T	East End Wreck Shop	St. Thomas
052T	Gas Station Auto Repair	St. John
225T	HI Performance Auto Repair	St. Thomas
046T	Sun, Sea & Sand Leasing & Sales	St. Thomas
221T	Heavy Materials, L.L.C.	St. Thomas
049T	Tropical Marine Inc	St. Thomas

Table II.E.1.b List of Used Oil Permit Holders – St. Croix District

031C	H.H. Tire Sales	St. Croix
172C	Old Time Auto Repair Shop	St. Croix
038C	St. Croix Dairy Products, Inc.	St. Croix
168C	Unique Auto Repair	St. Croix
169C	University of the Virgin Islands	St. Croix
058C	VI Regulated Waste Management, Inc	St. Croix
134C	Ambramson Enterprises	St. Croix
144C	Antilles Gas (STX)	St. Croix
115C	Bohlke International Airways	St. Croix
160C	Bunkers of St. Croix, Inc.	St. Croix
131C	Centerline Car Rental	St. Croix
152C	David's Auto Repair	St. Croix
165C	Divi Carina Bay Resort	St. Croix
155C	Frank's Garage	St. Croix
130C	Hendricks International Inc.	St. Croix
145C	Human Services maintenance	St. Croix
164C	Innovative Telephone Company	St. Croix
151C	MARCO St. Croix, Inc. Water and Trucking Services	St. Croix
166C	Monarch Heavy Equipment Rental	St. Croix
146C	Olympic Rent-A-Car	St. Croix
153C	Paradise Waste Systems, Inc.	St. Croix
033C	Rodney's Auto Repair	St. Croix
141C	Seaborne Airlines	St. Croix
035C	St. Croix Foreign Auto Sales Corp	St. Croix
154C	Tonges Concrete	St. Croix
131T	University of the Virgin Islands (STT)	ST. Croix
135C	Virgin Islands Rum	St. Croix
161C	Welco Gas Station	St. Croix
103C	Budget Car Rental	St. Croix
071C	Caribbean Auto Mart St. Croix, Inc	St. Croix
074C	Metro Motors	St. Croix
083C	St. Croix Marine	St. Croix
174CT	Chitolie Trucking Equipment	St. Croix
170C	Francis Water Services	St. Croix
175CT	M & T Trucking	St. Croix
171C	Ramco Transmission Repair	St. Croix
173C	Tonn Motor Corp.	St. Croix
006C	V.I. Department of Public Works (Annas Hope) DIY	St. Croix
148C	A+ Auto Repair *****	St. Croix
143C	Anthony Auto Repair & Maintenance	St. Croix
126C	Bates Trucking & Trash Removal	St. Croix
127C	Better Engine Svc & Tire Inc	St. Croix
140C	Caribout aka Florida Coca-Cola Bottling Company	St. Croix

150C	12/31/2006	Champion Auto Part	St. Croix
163C	12/31/2006	Department of Public Works (Maintenance)	St. Croix
142C	12/31/2006	Europa Motorworks *	St. Croix
136C	12/31/2006	Flemings Transport Company, Inc	St. Croix
159C	12/31/2006	H & H Avionics	St. Croix
003C	12/31/2006	HOVENSA	St. Croix
132C	12/31/2006	Karim Service Station *	St. Croix
149C	12/31/2006	P.M. Auto	St. Croix
057T	12/31/2006	PM's Auto Inc.	St. Croix
162C	12/31/2006	Roach Auto Service Inc.	St. Croix
129C	12/31/2006	Thrifty Car Rental	St. Croix
156C	12/31/2006	V.I. Housing Authority (STX)	St. Croix
133C	12/31/2006	V.I. Water & Power Authority	St. Croix
157C	12/31/2006	VI Cement & Building Products Inc. *	St. Croix
137C	12/31/2006	VI Paving, Inc	St. Croix
133C	12/31/2006	WAPA Maintenance	St. Croix
224C	12/31/10	VI Recycling Company	St. Croix
128C	12/31/2006	Zenon Construction Corp.	St. Croix
064C	12/31/2005	A & G Tire & Auto Service *	St. Croix
093C	12/31/2005	Chitolie Trucking & Equipment	St. Croix
086C	12/31/2005	Gold Coast Yachts Inc.	St. Croix
018C	12/31/2005	Marine Spill Response Corporation	St. Croix
008CT	12/31/2005	Public Works (Annas Hope)	St. Croix
062TT	12/31/2005	Puerto Rico Used Oil Collectors Inc	San Juan, PR
078C	12/31/2005	Stanley & Stanley	St. Croix
094T	12/31/2005	Tropical Automotive Repair	St. Croix
082T	12/31/2005	V.I. Army National Guard (STT)	St. Croix
081C	12/31/2005	V.I. Army National Guard (STX)	St. Croix
030C	12/31/2004	Bill Auto Repair & Maintenance	St. Croix
045C	12/31/2004	Sun Sea & Sand Car Dealer	St. Croix
032C	12/31/2004	Tropical Cars of St. Croix Inc.	St. Croix
011CX	12/31/2003	Cruzan Environmental Services	St. Croix
007C	12/31/2003	Public Works (Concordia)	St. Croix
036C	12/31/2003	St. Croix Radiator	St. Croix
009C	12/30/2004	Western Auto (STX) *	St. Croix
100C	?	Peters Rest Texaco Svc Station	St. Croix

* Denotes facilities that have either gone out of business or are no longer generating used oil.

3. Hazardous Waste Program

The Virgin Islands implements its own hazardous waste program independent of the US Environmental Protection Agency. All facilities which generate, store, transport and/ or collect

hazardous waste must meet the Territory's requirements except where federal requirements are more stringent or broader in scope.

The Virgin Islands has not adopted the Universal Waste Rule. As such, no waste may be managed as universal waste. Rather, all hazardous waste in the Virgin Islands must be managed under traditional hazardous waste requirements based on total monthly waste.

Any person engaged in the generation, storage, transportation, treatment, disposal or recovery of hazardous waste shall obtain a permit thereof from the Department of Planning and Natural Resources. Permits must be renewed annually.

Permit Number	**Facility Name**	**Location**
T-043	Kmart	9000 Lockhart Garden, St. Thomas
C-042	Kmart	Remainder Matriculate, St. Croix
T-041	Kmart	26-A Tutu Park Mall, St. Thomas
C-036	O'Neale Trucking	Wilfred Allick, St. Croix
C-038T	O'Neale Trucking	Wilfred Allick, St. Croix
C-069	Seaborne Airlines	St. Croix
C-191	VIPA	Rohlsen, St. Coix
C-023	Toyota	#1 Estate Body Slob, St. Croix
C-057	Adcon Environmental	Fort Louise Augusta Restrooms
C-063	VI Salvage d/b/a 180 Auto	236 Estate Glynn, St. Croix
C-024	Bunkers Of St. Croix	27 Castle Coakley, St. Croix
C-022	Caribbean Auto Mart	13 Glynn, St. Croix
T-028	FAA	Cyril E. King Airport, St. Thomas
C-025	FAA	#10 Estate White Lady, St. Croix
C-061	JFL Hospital	Estate Diamond, St. Croix
T-054	VIHA-Tutu Apartments	#387 Anna's Retreat, St. Thomas
C-041	VIHA-Paradise	Paradise, St. Croix
T-051	VI Army National Guard	Estate Nazareth, St. Thomas
C-052	VI Army National Guard	Estate Manning, St. Croix
C-002T	O'Neale's Trucking	Wilfred Allick, St. Croix
C-001T	VI Regulated Waste Mgt	Wilfred Allick, St. Croix
C-037	VI Regulated Waste Mgt	Wilfred Allick, St. Croix
T-190	TSA	Cyril King Airport, St. Thomas
C-040T	VI Regulated Waste Mgt	Wilfred Allick, St. Croix
T-032	FAA-Tower Control	St. Thomas
C-026	FAA-Recovery	St. Croix
C-027	FAA-ILS	St. Croix
T-031	FAA-Radar Facility	St. Thomas
T-030	FAA-Navigation Facility	St. Thomas
T-042	VIHA-Bovoni Apartments	Bovoni. St. Thomas
C-044	Managed Freight	Richmond, St. Croix
T-045	Total Petroleum	St. Thomas

T-046	RLS Hospital	Sugar Estate, St. Thomas
C-048	Seaborne	St. Croix
C-049	Hams Bluff Lighthouse	Hams Bluff, St. Croix
T-050	P&P	Sub Base, St. Thomas
C-191	TSA-Henry Rohlsen	St. Croix
T-053	DOE-LAGA Building	Tutu-St. Thomas
C-055	VI National Guard	Sprat Hall, St. Croix
C-056	VI National Guard	Hams Bluff, St. Croix
T-140T	VI Regulated Waste	Contant, St. Thomas
C-062	VI Rum	Diamond, St. Croix
C-066	Buccaneer Hotel	St. Croix
C-067	Bohlke International	Henry Rohlsen Airport, St. Croix
C-072	Salt River Restoration	Salt River, St. Croix
T-021	Heavy Materials, LLC.	St. Thomas
C-058	Gallows Bay	Gallows Bay, St. Croixc-059
C-059	DOL-STX	Sunny Isles, St. Croix
T-060	DOL-STT	St. Thomas

4. Brownfields Program

A brownfield is a property of which the expansion, redevelopment, or reuse may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. It is estimated that there are more than 450,000 brownfields in the United States.

Cleaning up and reinvesting in brownfield properties increases local tax bases, facilitates job growth, utilizes existing infrastructure, takes development pressures off of undeveloped, open land, and both improves and protects the environment

In 2009 DPNR conducted nine Phase I Environmental Site Assessments for properties located throughout the Territory. The purpose of these environmental assessments was to describe current site conditions and to establish if there was evidence that a release of oil or hazardous materials had occurred at the site or that a threat of release exists. Such a release could represent a liability to the property owner or operator.

Facility Name	**Location**	**Recommendation**
15 & 16 Prince Street & 54 & 55-B Hospital Street	Frederiksted, St. Croix	No further oil and/or hazardous materials assessments activities are necessary at this time
6, 6-a & 8 Penitentiary Land	Christiansted, St, Croix	Further assessment activities are necessary at the site. Phase II Assessment was recommended

10-13A West Lane	Christiansted, St, Croix	No further oil and/or hazardous materials assessments activities are necessary at this time
15 Sub B**ase**	Sub Base, St. Thomas	Further assessment activities are necessary at the site
24 & 25 Sub Base	Sub Base, St. Thomas	Further assessment activities are necessary at the site.
72 Lindbergh Bay	Charlotte Amalie, St. Thomas	Further assessment activities are necessary at the site.
27 Strand Street	Christiansted, St. Croix	No further oil and/or hazardous materials assessments activities are necessary at this time
4 Wimmelskafte Gade, back Street	Charlotte Amalie, St. Croix	No further oil and/or hazardous materials assessments activities are necessary at this time
Oscar E. Henry Customs House	Frederiksted, St. Croix	No further oil and/or hazardous materials assessments activities are necessary at this time. However, mold assessment and abatement activities are necessary to eliminate health hazards

F. Wetlands Programs

BACKGROUND

The quality of life in the Virgin Islands and the strength of the Virgin Islands economy depend heavily on maintaining and restoring the health of the nearshore coastal environment; including wetlands, mangroves, coral reefs, and seagrass beds; communities that form a tightly linked ecosystem connected through hydrology and runoff. For the past several decades, population growth has compounded the effects of poor land use practices. This is manifested in catastrophic runoff, sedimentation, nutrient enrichment from failed septic systems and pollutant contamination of coastal wetlands, waters, and bays. Various studies have associated land use in upland areas of watersheds are adversely affecting low-lying terrestrial and marine resources. Nevertheless, the extent of the impacts across the Territory is unknown, and a comprehensive assessment of the watersheds and wetlands of the VI is not presently complete. Additionally, the existing datasets maintained by public institutions have not been made available in published documents or placed into a web-accessible database for resource managers and public use.

PHASE I

The first phase of the wetlands inventory project, titled, "*The Virgin Islands Wetlands and Riparian Areas Inventory: A Pilot Study to Characterize Watersheds and Wetland Systems, Phase I*", was completed in 2004 by the Department of Planning and Natural Resources, in partnership with Island Resources Foundation (IRF) and the University of the Virgin Islands (UVI). Phase I of the project focused on a limited assessment of watershed/wetland ecosystems. Geographic Information System (GIS) technology was used to produce an inventory of watersheds and wetlands (type and location)

throughout the U.S. Virgin Islands (USVI), produce GIS map products, and data for statistical and spatial analyses. Eighteen (18) priority watersheds (of the 50 in the USVI) were assessed and characterized using a matrix based on categorizing watersheds into three groups; (i) undisturbed, (ii) moderately disturbed, and (iii) highly disturbed watersheds. Vegetation characterization, water chemistry sampling, sedimentation history, and an Index of Biological Integrity assessment were completed within each selected watershed. The information and data gathered from the pilot study of Phase I were used by the project collaborating institutions to determine the proposed Scope of Work for Phase II of the project.

PHASE II

The "*Virgin Islands Wetlands and Watersheds Characterization Phase II: Inventory, Monitoring, Assessment, Management, and Education in the U.S. Virgin Islands*", began in 2007 and was designed initially to complete the watershed/wetlands assessment for the Virgin Islands by compiling existing data from multiple projects and sources, filling data gaps, developing appropriate management strategies, and educating the public about the importance of wetlands and watersheds.

Phase II was scheduled for completion at the end of 2010. The major outputs of Phase II are:
1. Formation of a Wetlands Working Group.
2. Adoption of a definition of wetland for use in the USVI.
3. Maps showing the locations of wetlands in the USVI.
4. Conceptual framework for management of wetlands in the USVI.
5. Publication titled "Wetlands of the U.S. Virgin Islands".
6. Final Technical Report.

TYPES OF WETLANDS

Wetlands provide a range of goods and services that contribute to the economic and social development of the USVI. However, the various development activities result in significant degradation of the very resources that support the development of the USVI. In an effort to improve the development process, policies, laws, and initiatives have been developed to protect our natural resources. The primary purpose of the associated laws and programs is to ensure that development can be sustained and the quality of life can be
maintained for current and future generations of Virgin Islanders. By definition, "Wetlands in the U.S. Virgin Islands generally include watercourses, marshes, swamps, artificial ponds and impoundment, salt ponds, lagoons, shallow seagrass beds, and other similar areas."

Each type of wetland is formed under a specific set of conditions, and will typically have associated plants (flora) and animals (fauna).

<u>Type 1: Watercourses</u>

A watercourse is defined in the Virgin Islands Code as "… any stream with a reasonable well-defined channel, and includes streams which have a permanent flow, as well as those which result from the accumulation of water after rainfall and which regularly flow through channels formed by the force of the waters." See 12 V.I.C. § 123(b) (2013).

In the USVI, watercourses are commonly referred to as ghuts. These ghuts are the main drainage channels for discharge of runoff from rainfall events. In addition to that function, ghuts provide a

range of goods and services that support the development processes of the USVI. Ghuts also contain permanent pools of freshwater, which function as habitats for rare species of aquatic animals (e.g. Mountain Mullet and American Eel). Ghuts take a range of shapes, sizes, and depths, depending on the terrain and the size of the watershed. The vegetation found inside ghuts also varies accordingly, but two distinct forest types have been associated with ghuts. These forest types are Gallery Moist Forest and Gallery Shrubland.

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

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

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

Type 2: Marshes

A marsh is defined as "a water-saturated, poorly drained area, intermittently or permanently water covered, having aquatic and grass-like vegetation" (http://water.usgs.gov/water-basics_glossary.html). Marshes in the USVI are typically fresh-water wetlands formed in depressions in the landscape, and maintained by surface or subsurface flow of water.

Type 3: Swamps

A swamp is defined as "an area intermittently or permanently covered with water, and having trees and shrubs" (http://water.usgs.gov/water-basics_glossary.html). In the USVI, swamps are generally located on the coast. Water level is determined mainly by surface runoff during the rainy season, but brackish conditions exist in areas of the swamp closest to the sea, or during the dry season. As a result of this salinity gradient, plants adapted to both fresh water and saline conditions may be found in some swamps. Example, Magens Bay swamp, St. Thomas

Type 4: Artificial Ponds and Impoundments

"A pond is a body of standing water, either natural or man-made, that is usually smaller than a lake" (http://en.wikipedia.org/wiki/Pond). In the USVI, man-made (artificial) ponds are created primarily for provision of water for agricultural purposes. Increasingly, ponds are created for storm-water management purposes on sites with large developments or on sites that are periodically flooded. An impoundment is a body of water resulting from the placement of a stone dyke or earthen berm across a natural drainage channel (ghut). Impoundments were used in the early 1900s as part of the system of collection and distribution of potable water, particularly on St. Croix. Currently, impoundments are constructed and used mainly to provide water for agricultural purposes. Both ponds and impoundments provide habitats for a range of resident and migratory species of water birds.

Type 5: Salt Ponds

A salt pond is a coastal wetland that is separated from the sea by a low sandbank, sand dune, or similar feature. Salt ponds are formed over long periods by the accretion of reefs, growth of mangroves, or the accretion of sand along the mouth of an embayment. Once the pond is separated from the sea, water exchange between the two is primarily through the separating barrier. Depending on the size and structure of the salt pond, openings to the sea may be created during the rainy season if the pond collects significant amounts of surface runoff. The barrier may also be overtopped by the sea during periods of significant wave action. Such wetlands are commonly called salt ponds because the water in the ponds becomes hypersaline during the periods when the water level is low; that is, the water becomes more saline than ordinary sea water. In some ponds, the salt can be seen as a crystalline deposit along the edges of the pond or towards the landward portion (back) of the pond.

Salt ponds provide a habitat for many species of birds, but few plants are adapted to survive in such hypersaline conditions. Plants typically found at salt ponds are Black Mangrove, White Mangrove, and the shrubs Saltwort and Sea Purslane

Type 6 Lagoons

A lagoon is defined as "a stretch of salt water separated from the sea by a low sandbank, coral reef or similar natural or manmade feature." In the USVI, lagoons are typically formed by one of two processes. One process involves wave action moving sand and gravel along the shoreline, periodically closing the mouth of an embayment. Sandbars are sometimes breached by strong wave action, particularly during storms. Sandbars/sandbanks often become colonized and stabilized by plants, which can result in the closure becoming semi-permanent or permanent over time. The second process involves the formation of a sandbar across the mouth of a seasonal stream (ghut). In such cases, the sandbar is periodically breached by wave action or by surface runoff discharged through the ghut after rainfall events. Lagoons can have very restricted access or narrow channels that permit fairly consistent flows between the lagoon and the sea. Lagoons are ecologically productive sites, providing habitats for a range of fish and bird species, including migratory species of birds. Examples of lagoons are the Altona Lagoon (St. Croix) and Benner Bay/Mangrove Lagoon (St. Thomas).

Type 7: Seagrass beds

Seagrass beds are ecosystems dominated by marine grasses. Seagrass beds typically inhabit shallow nearshore areas, but can be found in a range of depths from shallow lagoons to open coastal areas 60 feet in depth. There are 40-50 species of seagrasses world-wide, and most are found in the tropics. Though seagrass beds are dominated by seagrasses, the communities contain many species of algae. Seagrass beds function as important nursery areas for a wide variety of marine organisms (including important food species). Seagrass beds also function to colonize open areas, and their root systems help to stabilize unconsolidated soils

PRIORITIES FOR MANAGEMENT OF WETLANDS

The major issues and priorities currently relevant to wetlands are:

1. Integration of the Policy Framework

There are several laws relevant to the management of wetlands, and those laws are administered by several agencies. The programs managed by the various agencies are usually in line with national priorities. In 2009, the Department of Planning and Natural Resources initiated activities to develop a Wetlands Management Program. That program will establish a mechanism for integration of the wetlands-related policies and programs of the public agencies in the U.S. Virgin Islands, including the involvement of community organizations

2. Reduction of Threats

There are significant threats to wetlands and associated resources from natural and man-made sources. The man-made threats are primarily from land use activities (e.g. changed drainage, sediment from construction activities, filling of wetlands, disposal of solid waste and effluents), but also from illegal practices (e.g. solid waste disposal). These threats reduce the benefits provided by wetlands. While threat reduction is a priority of the management agencies, the most important require changes in attitudes and practices of individuals in the community.

3. Storm Water Management

Due to the topography of the islands, most development activities (including residential development) involve the channeling of surface runoff from rainfall events. Poor storm-water management practices

result in damage to wetlands, social infrastructure (e.g. roads), and private property. Individuals and companies undertaking developments must therefore use best practices in the design of stormwater management systems.

4. Future Demand for Goods and Services from Wetlands
The existing uses of wetlands are expected to continue. There is increased use for recreation, including eco-tourism ventures. With increased development activity, particularly larger resort projects, there is increased use of wetlands for storm-water management. It is forecasted that global warming will increase rainfall variability and intensity. As such, wetlands will play an even greater role in flood protection.

5. Information Management
In order to make informed decisions concerning the management of wetland resources, the regulatory agencies are constantly updating the databases on physical conditions and status of the resources. The community should become engaged in the management process, especially by sharing information on the use of wetlands and associated resources, and threats to such resources.

FRAMEWORK FOR MANAGEMENT OF WETLANDS IN THE USVI

Rationale for Development of a Wetlands Management Framework

Wetlands in the U.S. Virgin Islands (USVI) provide a range of goods and services that support the social and economic development of the Territory. Due to the range of benefits provided by wetlands, as well as their distribution across the topographic landscape, wetlands fall within the area of responsibility of several Territorial and U.S. Federal agencies. As such, wetlands form critical components of several programs designed to maintain the economic growth of the USVI and quality of life of its residents. Environmental and development programs in which wetlands play a critical role include:

(a) Agriculture Development – Impoundments were established to collect water for agricultural uses. The 1979 report on the USVI Sediment Reduction Program noted that there were 278 impoundments in the USVI in 1979 (BC&E/CH2M Hill, 1979).

(b) Reduction in Non-Point Source Pollution – The 1979 Sediment Reduction Program was designed around the functioning of impoundments as sediment traps. The existing Earth Change Permit process was similarly designed to reduce soil erosion and sedimentation of waterways, and development activities affecting ghuts are regulated within this process.

(c) Coastal Zone Management – Wetlands form one of the nine (9) Enhancement Areas for the USVI Coastal Zone Management Program, as required by Section 309 of the Coastal Zone Management Act, 1972.

(d) Wildlife Management – Wetlands function as important habitats for a range of wildlife species, and associated management interventions range from periodic resource assessments to designation and management of wildlife reserves by both Territorial and Federal agencies.

(e) Water Resources Management – Surface water forms one of the components of waters of the USVI as defined by 12 V.I.C. § 182(f) (2013). While there is no water resource management program, the non-point source pollution program was developed to protect the quality of the waters of the USVI for a range of social and ecological purposes.

(f) Flood Control – Storm-water management in development activities and general flood control are managed by two separate agencies of the Government of the USVI (Department of Public Works and Department of Planning and Natural Resources).

(g) Waste Management – Wetlands are used as part of the waste disposal strategy in the USVI, in that; a number of municipal sewage treatment plants discharge effluent directly to ghuts. Discharge of untreated sewage to wetlands also takes place when there is equipment failure. Additionally, the two municipal landfills are located in wetlands.

Despite the above-mentioned program imperatives that involve wetlands, there is no wetlands program in the USVI. Attempts to establish a wetlands program include the 2006 draft wetlands conservation plan prepared by the Division of Fish and Wildlife and the current attempt by the Division of Environmental Protection. However, a wetlands program designed for a single agency to fulfill its mission objectives will not accommodate the afore-mentioned range of program needs. This is particularly true as a number of the uses of wetlands are conflicting across the various programs. What is needed is a unified approach that supports multiple policies and program objectives, and that prevents program conflicts. This unified approach to wetlands management is hereby termed the "Wetlands Management Framework for the U.S. Virgin Islands".

The purpose of the Wetlands Management Framework is to ensure that all management interventions for wetlands in the U.S. Virgin islands are designed based on a single policy and strategy and that institutional arrangements are established to minimize waste and conflicts while maximizing the impacts of each management intervention.

Current Wetlands Management Framework

There is a variety of laws that provide the foundation for a wetland management framework, and there are both Federal and Territorial agencies that are involved in programs and initiatives affecting wetlands. Though there is this range of institutions and programming that affect wetlands in one way or another, the focus on wetlands appears to be tangential at best. Programs and resource management strategies that should have wetlands management as a central feature have either been inexplicably terminated (Sediment Reduction Program), inconsistent in application (Areas of Particular Concern), relegated wetlands to a low level of priority (Coastal Zone Management Program), or treat wetlands as tangential (Water Pollution Control Program and 2005 Comprehensive Wildlife Conservation Strategy for the USVI). The single attempt to develop a wetlands conservation plan (Platenberg, 2006) focused on one district, and has been approved or implemented. Wetlands are not specifically mentioned in the priority goals or objectives identified in the 2010 USVI Coral Reef Management Program. However, two of the four priority sites (St. Thomas East End Reserve and St. Croix East End Marine Park) include large areas of wetlands.

The absence of policies and guidelines for wetlands management inhibit the development or integration of relevant programs. The 2009 Section 309 Assessment for the USVI Coastal Zone Management Program states that policies to increase protections for wetlands were approved by the Coastal Zone Management Commission in 2006, but now needs to be promulgated and adopted as rules and regulations within the coastal zone management program. Similarly, there is no institutional arrangement that supports information sharing and collaborative programming, both necessary to ensure the development of synergies between the various programs.

Trends and Major Issues Currently Relevant to Wetlands

The trends that have been identified are:

(a) Reduction in Acreage of Wetlands in the U.S. Virgin Islands – Damage to wetlands and loss of acreage has been chronicled in several reports (Sladen 1986, Stengel 1998). The major activity contributing to loss of wetlands is (past and current) development activity, primarily industrial, resort, and marina development. The continued generation of a range of other threats to wetlands and associated resources (Gardner et al, 2008) remain a cause of concern.

(b) Continued Provision of Goods and Services – Wetlands continue to provide a range of goods and services (Virgin Islands Department of Agriculture 1973, Smith 1989, Kelsey et al 2005, Rennis et al 2006, Gardner et al 2008, Valiulis 2009). In addition to the provision of water and food, the environmental services provided by wetlands include wildlife habitats, water purification, groundwater recharge, flood reduction, and storm protection.

(c) Contribution to Economic Development – Wetlands have played a significant role in the economic development of the U.S. Virgin Islands (Gardner et al, 2008) through the provision of water for domestic, agricultural, and industrial purposes. Current direct contributions include provision of recreational opportunities, educational opportunities, and water for agriculture.

The major issues and priorities are:

(a) Need for an Integrated Policy Framework – There are several laws relevant to the management of wetlands, and those laws are administered by different agencies. Though the programs managed by the various agencies are usually in line with national priorities, there is a need to establish a mechanism for integration of the wetlands-related policies and programs of the public agencies in the U.S. Virgin Islands, including the involvement of non-governmental organizations.

(b) Existence of Significant Threats – There are significant threats to wetlands and associated resources from natural and man-made sources. The man-made threats are primarily from land use activities (e.g. changed drainage, sediment from construction activities, filling of wetlands, disposal of solid waste and effluents), but also from illegal practices (e.g. solid waste disposal). These threats reduce the benefits provided by wetlands. While threat reduction is a priority of the management agencies, success of management interventions require changes in attitudes and practices of individuals and institutions in the community.

(c) Need for Improved Storm Water Management – Due to the topography of the islands, most development activities (including residential development) involves the channeling of surface runoff from rainfall events. Poor storm-water management practices result in damage to wetlands, social infrastructure (e.g. roads), and private property. Individuals and companies undertaking developments must therefore use best practices in the design of storm-water management systems.

(d) Future Demand for Goods and Services from Wetlands – The existing uses of wetlands are expected to continue. There is increased use for recreation, including ecotourism ventures. With increased development activity, particularly larger resort projects, there is increased use of wetlands for storm-water management. It is forecasted that global warming will increase rainfall variability and intensity. As such, wetlands will play an even greater role in flood protection.

(e) Need for Improved Information Management – There is no structured program for research and monitoring of wetland resources. As such, data collection is sporadic, ad hoc, and not necessarily linked to institutional mandates or programs. Data and information is consistently lost. Additionally, databases compiled by Federal agencies are not utilized by USVI regulatory agencies for management decision making. In order to improve decision making in the development planning and development control processes, the environmental management agencies need to develop an overall data management strategy. That strategy should ensure compatibility of data collection regimes and data management systems, as well as establishment of data sharing mechanisms. The civil society institutions engaged in wetland initiatives should also be brought into the information management process.

Other issues requiring attention are:

(a) Community Perception of the Value of Wetlands – The continuing threats to wetlands and associated resources indicate that there is a general perception in the USVI that wetlands are not important. However, the conflicts that sometimes arise during public hearings for development projects often focus on environmental issues, including potential impact on wetlands. This contradiction suggests that there is no consensus in the community regarding the value of wetlands. This issue should be addressed in order to reduce conflicts within the development control process, and enable the regulatory agencies and community to make informed decisions regarding tradeoffs in the development process.

(b) Climate Change associated with Global Warming – Climate change scenarios for the Caribbean suggest that sea level rise will be approximately 1.5 feet over the next century. This will result in inundation of some coastal areas, increasing acreage under wetlands, but also impacting negatively on social infrastructure and some major resources (e.g. aquifers). More immediately, increased intensity of storms and changing rainfall patterns are expected to create significant impacts on ecosystems, including wetlands. A comprehensive monitoring program should be established to support informed resource management decision making, particularly for critical or fragile ecosystems.

PROPOSED WETLANDS MANAGEMENT FRAMEWORK

The Wetlands Wise Use Project of the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) identifies the elements of an effective wetlands management program as:

- Appropriate Policy Framework;
- Appropriate Legal Framework;
- Appropriate Institutional Framework;
- Management Strategy;
- Management Plan/Action Plan; and
- Institutional Program/Annual Plan.

Appropriate Policy Framework

The development of an appropriate policy framework is best guided by an environmental ethic, which provides the broad philosophical basis and guiding principles for policy and program development. The guidelines prepared by the Ramsar Secretariat on the wise use of wetlands (Davis, 1993) identify the following as principal elements of a national wetland policy:

A. Improvement of institutional arrangements so that wetland policies can be fully integrated into the planning process; and the establishment of mechanisms and procedures for incorporating this integrated, multi-disciplinary approach into planning and execution of projects concerning wetlands.

B. Review of existing legislation and government policies (including subsidies and incentives) including, where appropriate, application of existing legislation and policies, adoption of new ones, and use of development funds for wetlands.

C. Increasing knowledge and awareness of wetlands and their values, including exchange of information, propagation of their benefits and values (a statement of which is given), review of traditional techniques, and training of appropriate staff.

D. Review of the status of wetlands in the national context, including compilation of a national inventory, and definition of each wetland's particular values and conservation priorities.

E. Addressing of problems at particular wetland sites, by integrating environmental considerations into their management, regulated utilization, establishment of management plans, designation as appropriate for the Ramsar List, establishment of nature reserves and, if necessary, restoration.

Appropriate Legal Framework

The legal framework supports not only the development of regulations, but also provides an underpinning for the establishment of creative and evolving management and compliance strategies. Elements of an effective legal framework include:

A. A framework law that addresses wetlands as a specific ecosystem requiring directed management intervention, that links the primary enabling legislation to other relevant legal instruments directed at other programs and development processes.

B. Subsidiary legislation that facilitates the development of an effective institutional framework.

C. Guidance and guidelines to support the use of a wide range of measures and instruments (regulatory, fiscal, and non-fiscal) to enable effective management interventions.

Appropriate Institutional Framework

Although one public sector institution will be given the responsibility of being the lead agency for coordination of a territorial program, effective management will include collaborative arrangements between several public, private, and civil society institutions. An appropriate institutional framework will address the following:

A. Collaborative programming, to assist in resolving conflicts, assist in making decisions relating to trade-offs, clarify roles and responsibilities of different stakeholders, and facilitate diverse stakeholder involvement.

B. Development of an institutional coordinating mechanism that facilitates harmonization of management arrangements and institutional cultures (planning and decision-making systems, legal requirements in the various regulatory processes, reporting requirements and mechanisms, etc.).

C. Shared information collection and management systems.

Management Strategy

The territorial management strategy is meant to provide strategic focus, translating the policy framework into strategic directions for wetlands management over an agreed period. The territorial strategy should:

A. Provide a structured framework for wetlands management, establishing the goals and objectives of the territorial program, and establishing guidelines and practices that link site management interventions to system management goals and objectives.

B. Facilitate integration with other relevant planning strategies, such as those for tourism, biodiversity conservation, and protected areas.

C. Facilitate integration with the economic development strategies and development control processes.

D. Provide guidance on the design and implementation of a public engagement strategy.

E. Provide a structured approach for coordinating the initiatives of the various institutions implementing wetlands-related activities.
F. Provide a broader perspective for addressing site-specific issues.

Management Plan/Action Plan

The wetlands management plan is the action plan for the strategy period, and should:

A. Identify priority interventions for the strategy period, setting targets and identifying milestones.

B. Assign institutional roles within each area of intervention.

C. Establish coordinating mechanisms and structures.

D. Identify resource requirements.

E. Establish monitoring and evaluation guidelines and procedures for the implementation of the management plan/action plan

Institutional Program/Annual Plan

Each institution with assigned roles in the management plan/action plan should establish an institutional plan designed to:

A. Fulfill the institution's obligations identified in the Wetlands Strategy and Management Plan.

B. Be responsive to the institution's legal mandate.

IMPLEMENTATION AGENDA

If the above program elements are used as the guide for the development of a wetlands management program for the USVI, the process of development of an appropriate wetland policy will take a minimum of five (5) years. As such, establishment of some elements will proceed apace, rather than wait on the completion of the policy process. The following actions are proposed as the initial steps in the development of the wetlands management framework for the USVI:

1. Preparation of a Draft Wetlands Policy.
2. Preparation of a Wetlands Management Strategy and Action Plan.
3. Design of inter-agency management structure and preparation of associated collaborative agreement.
4. Preparation of institutional work plans.
5. Development of data management policies and data management mechanisms1.
6. Establishment of framework management support systems (planning, communications, etc.).
7. Establishment and testing of data management system.
8. Preparation of first biennial Territorial Wetlands Report.
9. Preparation of a 5-year work plan.

10. Preparation of program financing strategy and plan.
11. Convene workshop (finalize report and work plan).

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. DPNR-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 (WPC) Program were placed under the WQMP. In FY2009, WQMP was merged with WPC, as such the 2010 Integrated Report was drafted by the newly segmented Water Quality Management Program (WQM).

WQM is tasked with the following sub-programs:

- COASTAL WATER QUALITY (AMBIENT) MONITORING PROGRAM
- TMDL DEVELOPMENT AND IMPLEMENTATION PROGRAM
- VIRGIN ISLANDS BEACH WATER QUALITY MONITORING PROGRAM
- WATER QUALITY MANAGEMENT AND PLANNING GRANT PROGRAM

The Coastal Water Quality (Ambient) Monitoring Program is the primary mechanism for monitoring the Virgin Islands coastal water quality. The locations the fixed station network is monitored on a quarterly basis. WQM also manages the VI Beach Water Quality Monitoring Program which monitors 43 designated beaches throughout the Territory on a weekly basis. The Ambient and Beach Programs data are used to make water quality assessments for which this Integrated Report is based. All the monitoring locations are listed in Table II.A.1.

The Storage and Retrieval of Water-Related Data (StoRet) program is managed and updated by WQM staff. The monitoring data is uploaded to StoRet via the Water Quality Exchange Web Template.

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 Delineation project. The VI has been steadily upgrading ADB v.2 as necessary. The most current version of ADB is ADB v2.2

1. *Other Ambient Monitoring Activities*

As part WQM, 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 U.S. Virgin Islands, a Water Quality Certificate is necessary as part of the CZM Water Permits.

During this reporting period, certificates that were issued are as follows:

Table II.G.1 Summary of Issued Water Quality Certificates, FY 2010 - 2011

FY2010

Pre-Application Meetings Attended: 9

Environmental Assessment Reports (EARs) Reviewed: 15

Water Quality Certificates Issued: 1

- Virgin Islands Port Authority (WQT-10-0001)

FY2011

Environmental Assessment Reports (EARs) Reviewed:
STT/STJ - 17
STX - 3

Water Quality Certificates Issued:
STT/STJ – 9
STX – 3

Storage and Retrieval Program (STORET)
During this reporting cycle, DPNR-DEP used the WQX_Web Template to catalog its water quality monitoring data. After the template was populated, DPNR-DEP uploaded it to the Water Quality Exchange from which it can be queried using StoRet. All data used to make assessments in the FY2012 Integrated Report has been uploaded into WQX Web.

Comprehensive Watershed Restoration Action Strategy
USEPA guidelines request each state to develop a "comprehensive watershed assessment strategy." The Department of Planning and Natural Resources continues to work towards its plans to implement this assessment in the current multi-year monitoring strategy.

H. Coral Reef Monitoring

DPNR-DEP continued the Regional Applied Research Effort (RARE) Project during this reporting cycle. All though no RARE samples were collected in FY10; RARE monitoring was conducted and completed in conjunction with BWQM in March and April FY11.

III. SURFACE WATER MONITORING & ASSESSMENT

A. Surface Water Monitoring Program

DPNR-DEP work plans require quarterly monitoring of seventy-seven (77) stations around St. Croix, sixty-eight (68) stations around St. Thomas, and eighteen (18) around St. John. These sites are located offshore and are sampled by WPC staff using a vessel. DPNR-DEP expanded the monitoring network to include deep-water offshore sites at the outer rim of the USVI's three-mile boundary. Some sites in the St. John network were abandoned in this reporting cycle due to their location within the jurisdiction of expanded federal waters of national parks and monuments.

1. Monitoring Sites

Table III.A.1. Virgin Islands Ambient Monitoring Sites (153).

St. Croix 67 Sites

Stations	Class	Location	Stations	Class	Location
STC-1	B	Lagoon Recreational Beach	STC-25	B	Long Point Bay
STC-2	B	Ft. Louise Augusta Beach	STC-26	B	Good Hope Beach
STC-3	B	Buccaneer Hotel	STC-27	B	Frederiksted Public Pool
STC-4	B	Tamarind Reef Lagoon	STC-28	C	Frederiksted Pier
STC-5	B	Green Cay Marina	STC-29	B	Frederiksted Public Beach
STC-6	A	Buck Island Beach	STC-30	B	Sprat Hall Beach
STC-7	A	Buck Island Anchorage	STC-31	B	Davis Bay
STC-8	B	Reef Club Beach	STC-33	B	Salt River Marina
STC-9	B	St. Croix Yacht Club Beach	STC-33A	B	Salt River (Columbus Landing Beach)
STC-10	B	Cramer Park	STC-33B	B	Salt River Bay
STC-11B	B	Jack Bay, Forereef	STC-34	B	St. Croix By the Sea
STC-12	B	Divi (Turner Hole Beach)	STC-35	B	Long Reef Forereef West
STC-13A	B	Great Pond	STC-35A	B	LBJ (Pump Station) Outfall
STC-13B	B	Robin Bay	STC-36	B	Long Reef Forereef East
STC-14A	B	Manchenil Bay	STC-37	B	Christiansted Harbor Entrance West
STC-14B	B	Halfpenny Backreef	STC-38	B	Christiansted Harbor Entrance East
STC-15	B	Canegarden Bay (Gut)	STC-39	C	Altoona Lagoon Inlet
STC-15A	B	Canegarden Bay	STC-40	C	St. Croix Marine

STC-16	C	HOVENSA East Turning Basin, NW Corner	STC-41	C	Gallows Bay
STC-17	C	HOVENSA West Turning Basin, NE Corner	STC-42	C	Public Wharf
STC-18	C	Limetree Bay Container Port	STC-43	C	Water Gut Storm Drain
STC-19	C	Krause Lagoon Channel	STC-44	C	Protestant Cay Beach
STC-20	C	Alumina Plant Dock	STC-45	C	Christiansted Harbor
STC-21	B	Spoils Island (Ruth Island)	STC-46	C	V. I Water and Power Intake
STC-22A	B	Treatment Plant (POTW) Outfall	STC-47	B	Mill Harbor Condominiums
STC-23	B	Public Dump	STC-48	B	Long Reef Back Reef West
STC-24B	B	Rum Plant (VI Rum) Outfall	STC-49	B	Long Reef Back Reef East
STC-OFF1	B	NW-1	STC-OFF2	B	SE-1
STC-OFF3	B	SW-1	STC-OFF4	B	North-2
STC-OFF5	B	East-2	STC-OFF6	B	South-2
STC-OFF7	B	West-3	STC-OFF8	B	North-3
STC-OFF9	B	SW-3	STC-OFF10	B	SE-3
STC-OFF11	B	North-4	STC-OFF12	B	SW-4
STC-OFF13	B	SE-4			

St. Thomas 68 Sites

Stations	Class	Location	Stations	Class	Location
STT-1	C	Crown Bay, Near Outfall	STT-22B	B	Vessup Bay
STT-2	C	Crown Bay, Near Tamarind Outlet	STT-23	B	Great Bay
STT-3	C	Subbase	STT-24	B	Cowpet Bay
STT-4	B	Krum Bay	STT-25	B	Nazareth Bay
STT-5A	B	Lindbergh Bay, East	STT-26	B	Benner Bay
STT-5B	B	Lindbergh Bay, West	STT-27A	B	Mangrove Lagoon, Near Treatment Plant
STT-6B	B	Airport College Cove	STT-27B	B	Mangrove Lagoon, Off Sanitary Landfill
STT-6C	B	S.W. Road, Near Red Point Outfall	STT-27C	B	Mangrove Lagoon, Near Tropical Marine Fuel Dock
STT-7A	B	Brewers Bay	STT-27D	B	Mangrove Lagoon, Near LaVida Marina
STT-7B	B	Perserverance Bay	STT-27E	B	Mangrove Lagoon, Near Compass Point
STT-8	B	Fortuna Bay	STT-28A	B	Bovoni Bay

STT-9	B	Botany Bay	STT-28B	B	Bolongo Bay
STT-10	B	Stumpy Bay	STT-29A	B	Frenchman's Bay
STT-11	B	Santa Maria Bay	STT-29B	B	Limetree
STT-12	B	Caret Bay	STT-30	B	Morning Star Bay
STT-13	B	Dorothea	STT-31A	B	Flamboyant Cove
STT-14	B	Hull Bay	STT-31B	B	Hassel Island, off Navy dock
STT-15	B	Magens Bay	STT-31C	B	Hassel Island, Careening Cove
STT-15A	B	Magens Bay, N.E.	STT-32A	C	Long Bay, Near South Dolphin
STT-15B	B	Magens Bay, NW..	STT-32B	C	Long Bay, N.E. Corner
STT-16A	B	Mandahl Bay	STT-33A	C	Long Bay, Off Outfall
STT-16B	B	Mandahl Bay Entrance	STT-33B	C	Long Bay, Off Outfall
STT-17A	B	Spring Bay	STT-35	C	Groden Bay
STT-17B	B	Sunsi Bay	STT-36	C	STT Harbor, North of Coast Guard Dock
STT-18	B	Coki Point Bay	STT-37	C	St. Thomas Harbor, Cay Bay
STT-19	B	Water Bay	STT-38	C	Haulover Cut
STT-20	B	Smith Bay	STT-39	B	Water Isle, East Gregorie Channel
STT-21A	B	St. John Bay	STT-40	B	Water Isle Hotel, Beach
STT-21B	B	Red Bay	STT-41	B	Water Island Flamingo Bay
STT-22A	B	Red Hook Bay	STT-42	B	Water Island Sprat Bay
STT-OFF1	B	STT-OFF1	STT-OFF8	B	STT-OFF8
STT-OFF2	B	STT-OFF2	STT-OFF9	B	STT-OFF9
STT-OFF5	B	STT-OFF5	STT-OFF11	B	STT-OFF11
STT-OFF6	B	STT-OFF6	STT-OFF12	B	STT-OFF12

St. John 18 Sites

Stations	Class	Location	Stations	Class	Location
STJ-43A	B	Cruz Bay, North	STJ-48	B	Fish Bay
STJ-43B	B	Cruz Bay, South	STJ-53	B	Coral Harbor
STJ-43C	B	Cruz Bay, North of Seaplane Ramp	STJ-55	B	Turner Bay
STJ-43D	B	Cruz Bay Creek North	STJ-56	B	Johnson Bay
STJ-45	B	Great Cruz Bay	STJ-57	B	Round Bay
STJ-46	B	Chocolate Hole	STJ-58	B	Privateer Bay
STJ-47	B	Rendezvous Bay			
STJ-OFF3	B	STJ-OFF3	STJ-OFF10	B	STJ-OFF10

STJ-OFF4	B	STJ-OFF4	STJ-OFF13	B	STJ-OFF13
STJ-OFF7	B	STJ-OFF7			

2. Monitoring Measurements

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

Turbidity: expressed in Nephelometric Turbidity Units (NTU's) measured 1 meter below the surface and 1 meter above the sea floor (or at the max depth of the instrument (~30 m)) using an EPA approved field instrument.

Dissolved Oxygen: expressed in mg/l saturation and measured 1 meter below the surface and 1 meter above the sea floor (or at the max depth of the instrument (~30 m)) with an EPA approved field instrument.

pH: expressed in Standard Units (SU) measured 1 meter below the surface and 1 meter above the sea floor (or at the max depth of the instrument (~30 m)) with an EPA approved field instrument.

Temperature: expressed in degrees Centigrade measured 1 meter below the surface and 1 meter above the sea floor (or at the max depth of the instrument (~30 m)) with an EPA approved field instrument.

Salinity: expressed in parts per thousand and measured 1 meter below the surface and 1 meter above the sea floor (or at the max depth of the instrument (~30 m)).

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

Bacteria: Water samples are collected by surface grab sample at each station on a quarterly basis and taken to a DPNR certified laboratory where they are analyzed for **Fecal Coliform and Enterococci bacteria.** Results are expressed as number of colonies per 100 milliliters. Analysis is performed utilizing an EPA approved methodology. The geometric mean is also factored in before it is determined that an assessment does not meet the water quality standard.

Total Suspended Solids: Water samples are collected by surface grab sample at each station on an annual basis and taken to a DPNR certified laboratory where they are analyzed utilizing an EPA approved methodology.

Total Phosphorous / Total Kjeldhal Nitrogen: Water samples are collected by surface grab samples at each station on an annual basis and taken to a DPNR certified laboratory where they are analyzed utilizing an EPA approved methodology. DPNR-DEP is working to increase the sampling frequency for these parameters. A lack of resources, to include scheduling conflicts with the local lab, has resulted in limited sampling. Currently, the local lab is being checked for quality assurance issues and the efficiency of the methods used is also being evaluated. Once these issues are assessed, it is anticipated that the monitoring frequency will be increased.

3. 2010 and 2011 Monitoring Frequency

During this reporting period Ambient Monitoring was conducted for 1 quarter for FY2010 and for 2 quarters for FY2011. DPNR-DEP also conducted BEACH sampling on a weekly basis.

Figure III.A.1 St. Croix Water Quality Monitoring Network

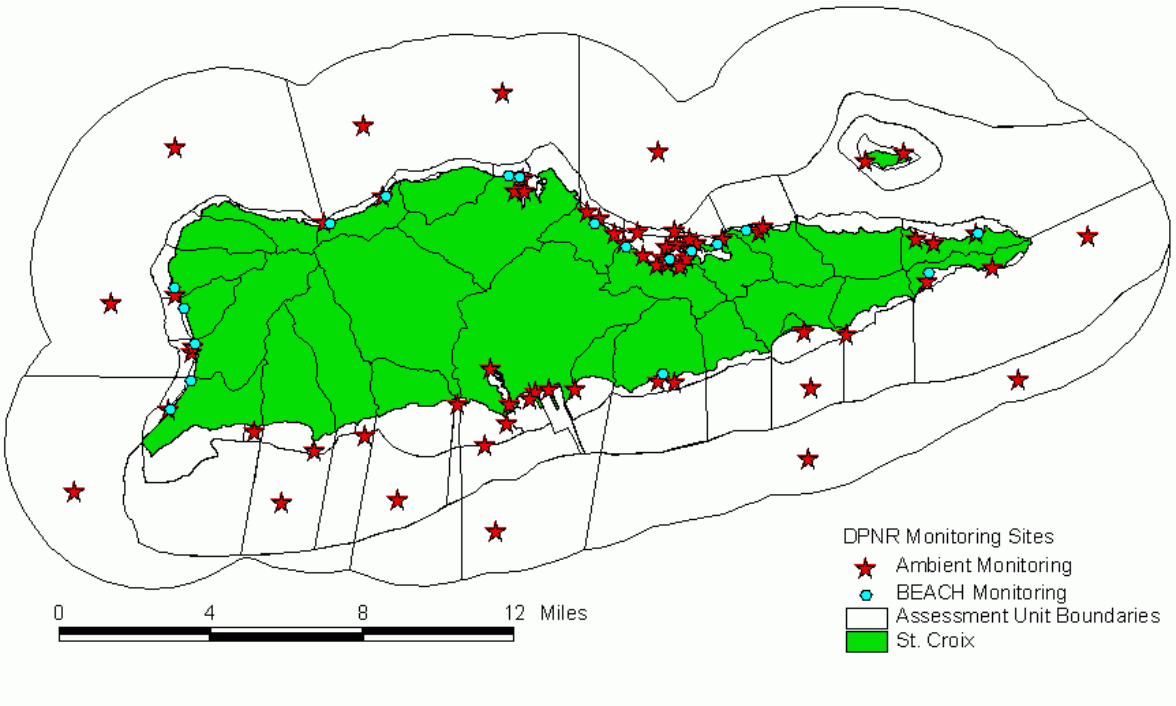
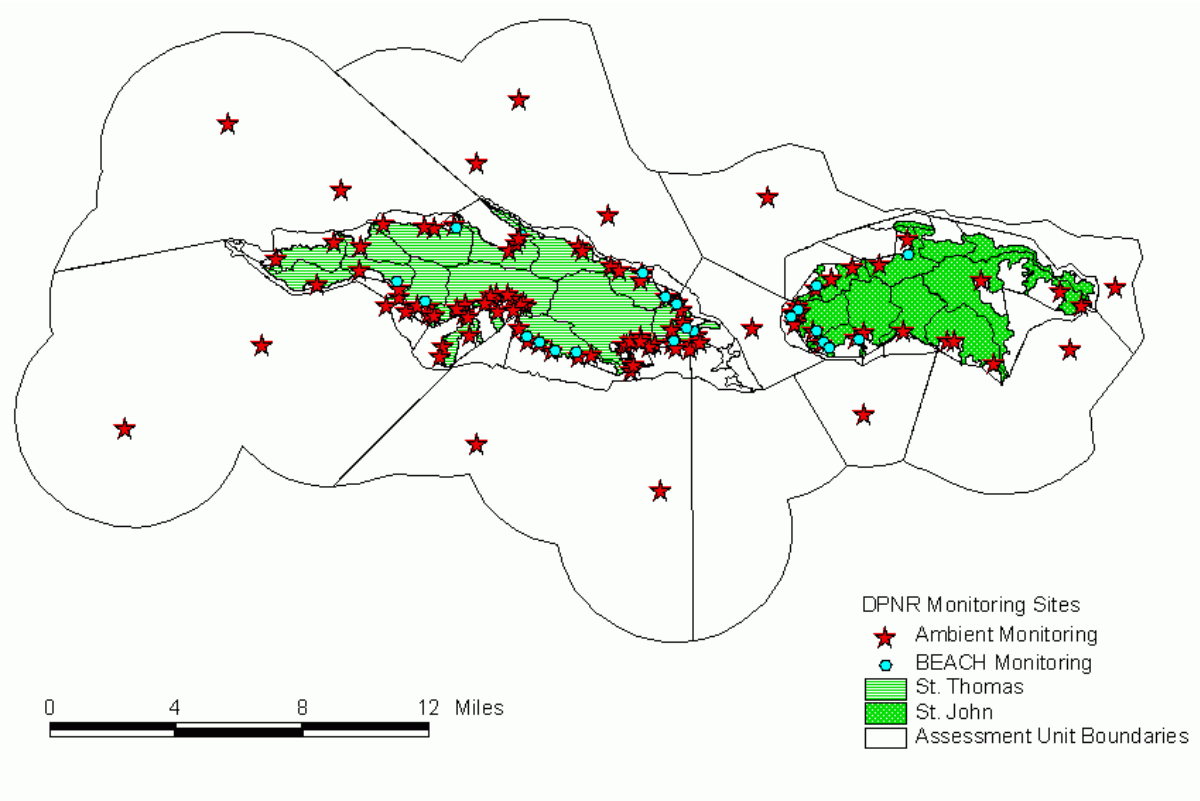


Figure III.A.2 St. Thomas/St. John Water Quality Monitoring Network



4. 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.

5. Fish tissue, sediment, and 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 of criteria for toxic chemicals (1996 VI 305(b)).

6. Quality assurance/quality control program

The US Virgin Islands DPNR-DEP's 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 defensible. During Fiscal Years 2010 and 2011 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 as the Laboratory Certification Officer for the Department.

7. Volunteer monitoring

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

8. Program evaluation

- A background analysis of ambient water quality is needed to support the adoption of specific criteria for toxic pollutants (1998 305(b) Report). As part of the 2004 US Virgin Islands Water Quality Standards revision, the national recommended criteria were adopted;

- 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 the 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;

- Stormwater regulations are being implemented within the TPDES permitting program.

B. Assessment Methodology

Purpose:
The Clean Water Act requires each state, territory and tribe to conduct water quality surveys to determine if its waters are healthy and have sufficient quality to meet their designated uses and attain water quality standards. A report on this water quality assessment is submitted every two years to US Environmental Protection Agency – Region 2. The report 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 Department of Planning and Natural Resources (DPNR-DEP) uses this format to more accurately and completely assess USVI's waterbodies.

Complete assessments include:

Identification of waterbody type.

All waters of the U.S. Virgin Islands shall meet generally accepted aesthetic qualifications and shall be capable of supporting diversified aquatic life. All waters within the jurisdiction of the United States of the Virgin Islands including all harbors, streams, lakes, ponds, impounding reservoirs, marshes, water-courses, water-ways, wells, springs, irrigation systems, drainage systems and all other bodies or accumulations of water, surface and underground, natural or artificial, public or private, situated wholly or partly within or bordering upon the United States Virgin Islands, including the territorial seas, contiguous zones, and oceans. Assessments of these "waters" shall be included in the U.S. Virgin Islands 2012 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 discussion in the 2012 Integrated Report.

Identification of waterbody classification and designated use.

According to the US Virgin Islands water quality standards, the waters of the Virgin Islands exist 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

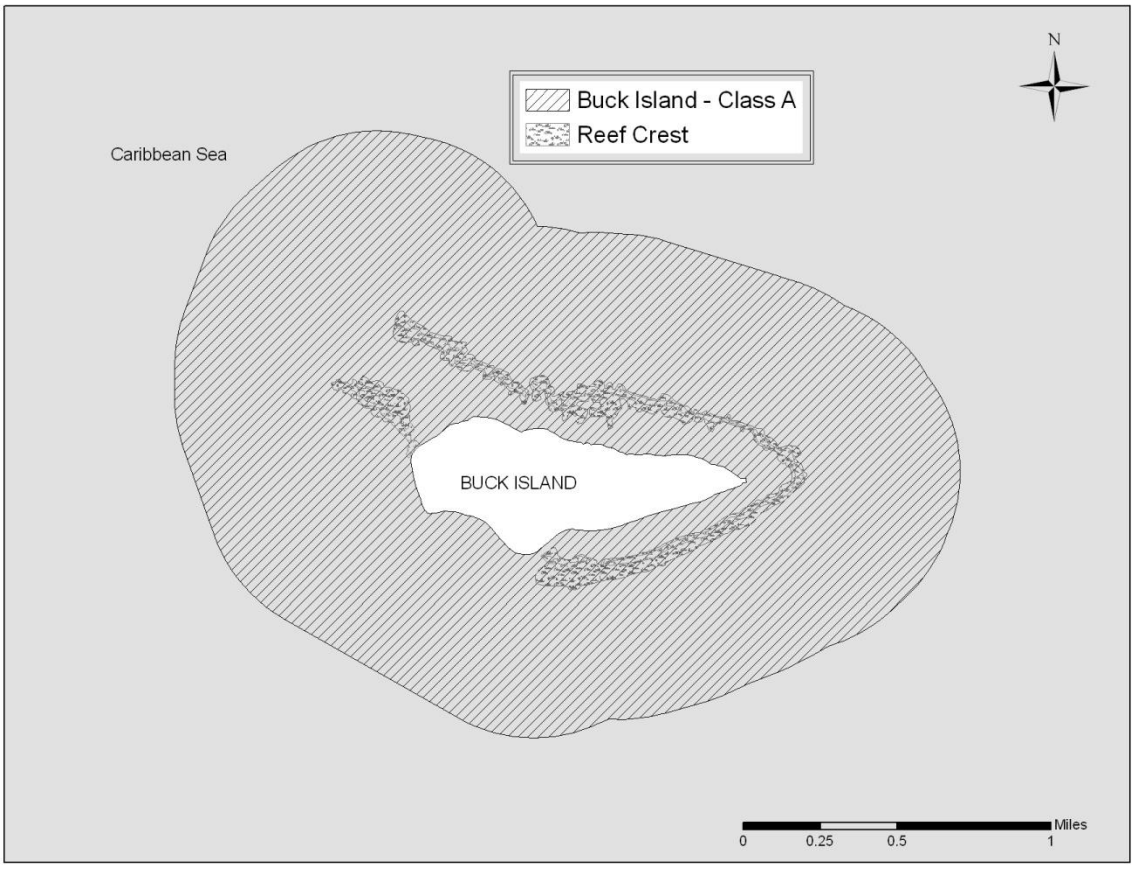
Best usage of waters: Preservation of natural phenomena requiring special conditions, such as the Natural Barrier Reef at Buck Island, St. Croix and the Under Water Trail at Trunk Bay, St. John. These are outstanding natural resource waters that cannot be altered except towards natural conditions. No new or increased dischargers shall be permitted.

Quality criteria: Existing natural conditions shall not be changed. The biological condition shall be similar or equivalent to reference condition for biological integrity. In no case shall Class B water quality standards be exceeded.

Legal Limits

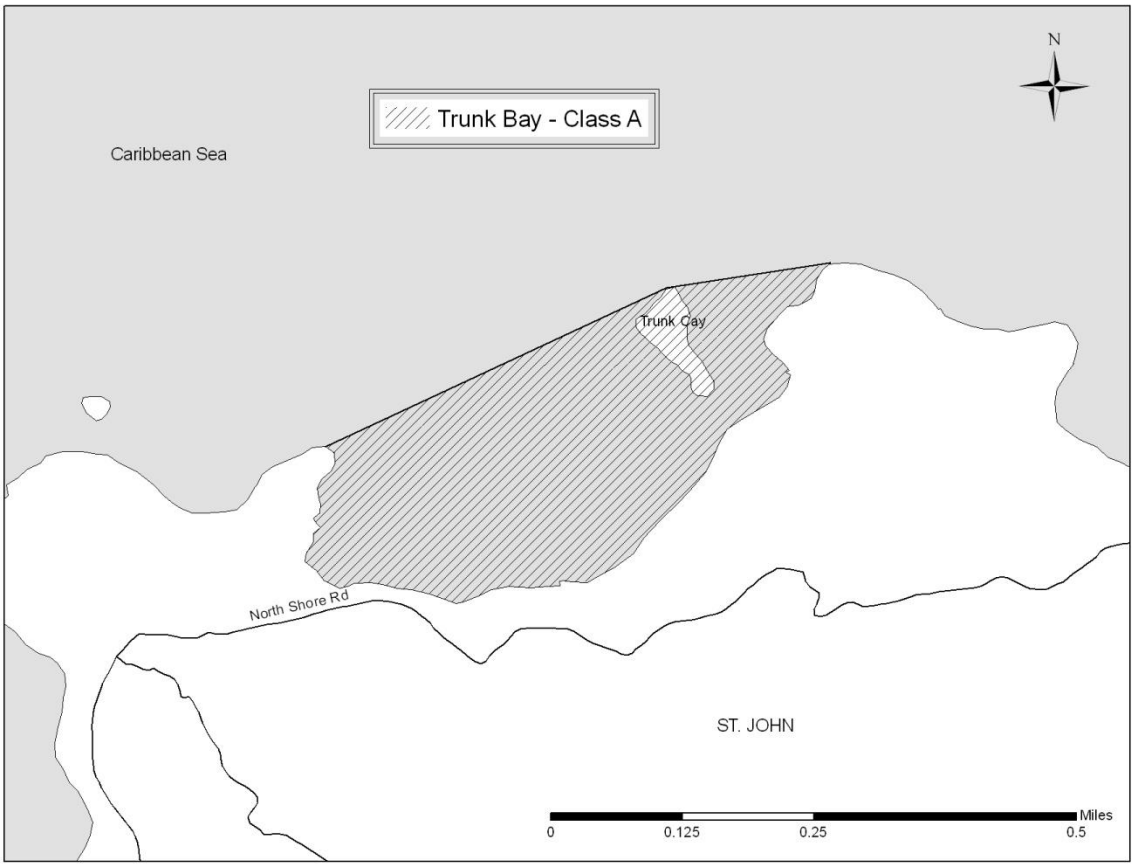
(1) Within 0.5 miles of the boundaries of Buck Island's Natural Barrier Reef, St. Croix.

Figure 1. Class A - Buck Island, St. Croix



(2) Trunk Bay, St. John.

Figure 2. Class A - Trunk Bay, St. John



Class "B" Waters.

Best usage of waters: For maintenance and propagation of desirable species of aquatic life (including threatened, endangered species listed pursuant to section 4 of the federal Endangered Species Act and threatened, endangered and indigenous species listed pursuant Title 12, Chapter 2 of the Virgin Islands Code) and for primary contact recreation (swimming, water skiing, etc.). This Class allows minimal changes in structure of the biotic community and minimal changes in ecosystem function. Virtually all native taxa are maintained with some changes in biomass and/or abundance; ecosystem functions are fully maintained within the range of natural variability.

(1) All other waters not classified as Class "A" or Class "C".

Legal Limits

(A) Those Class "B" waters not covered by color and turbidity criteria in section 186-3(b)(11) of this chapter include:

(i) St. Thomas waters-Mandahl Bay (Marina), Vessup Bay, Water Bay, Benner Bay, and the Mangrove Lagoon.
(ii) St. Croix 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.
(iii) All non-marine waters defined as all Virgin Islands waters shoreward of the mean high-tide line.

(B) All other Class "B" waters are covered by the color and turbidity criteria in section 186-3(b)(11)(B) of this subchapter.

Figure 3. Class B - St. Croix (only marine waters displayed)

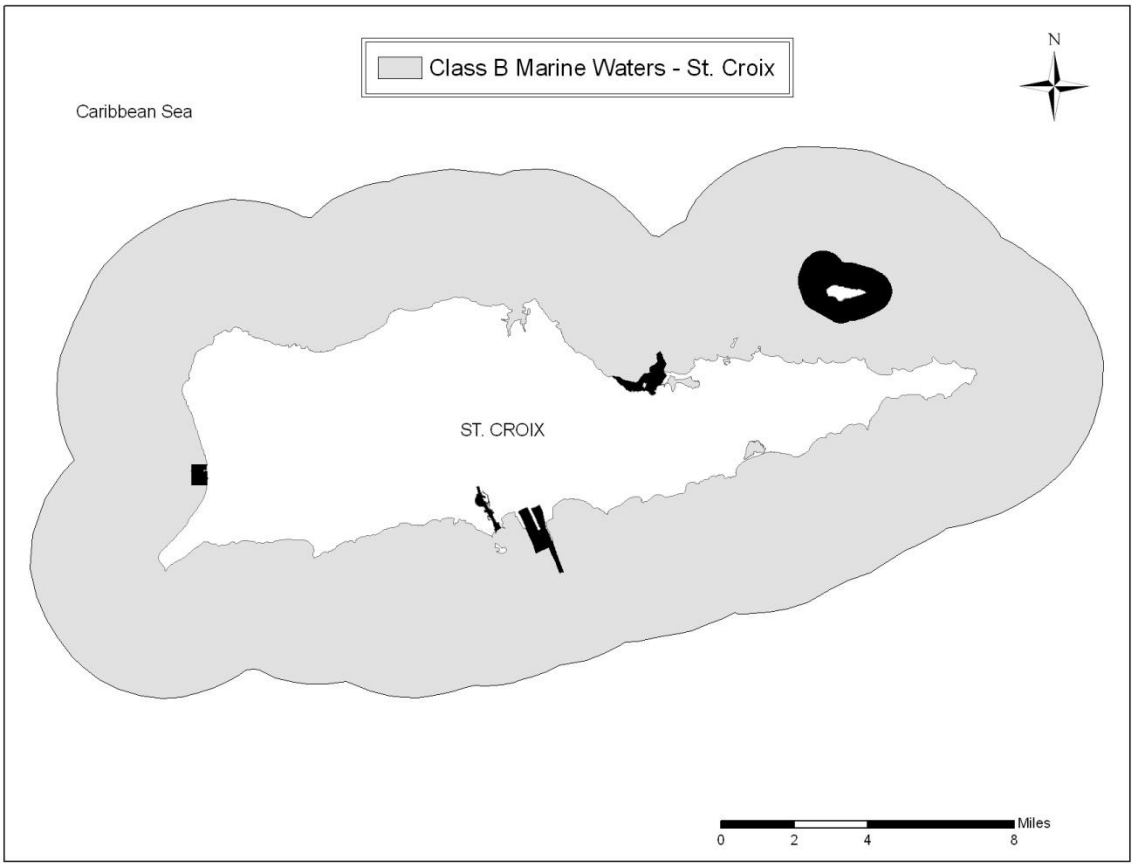
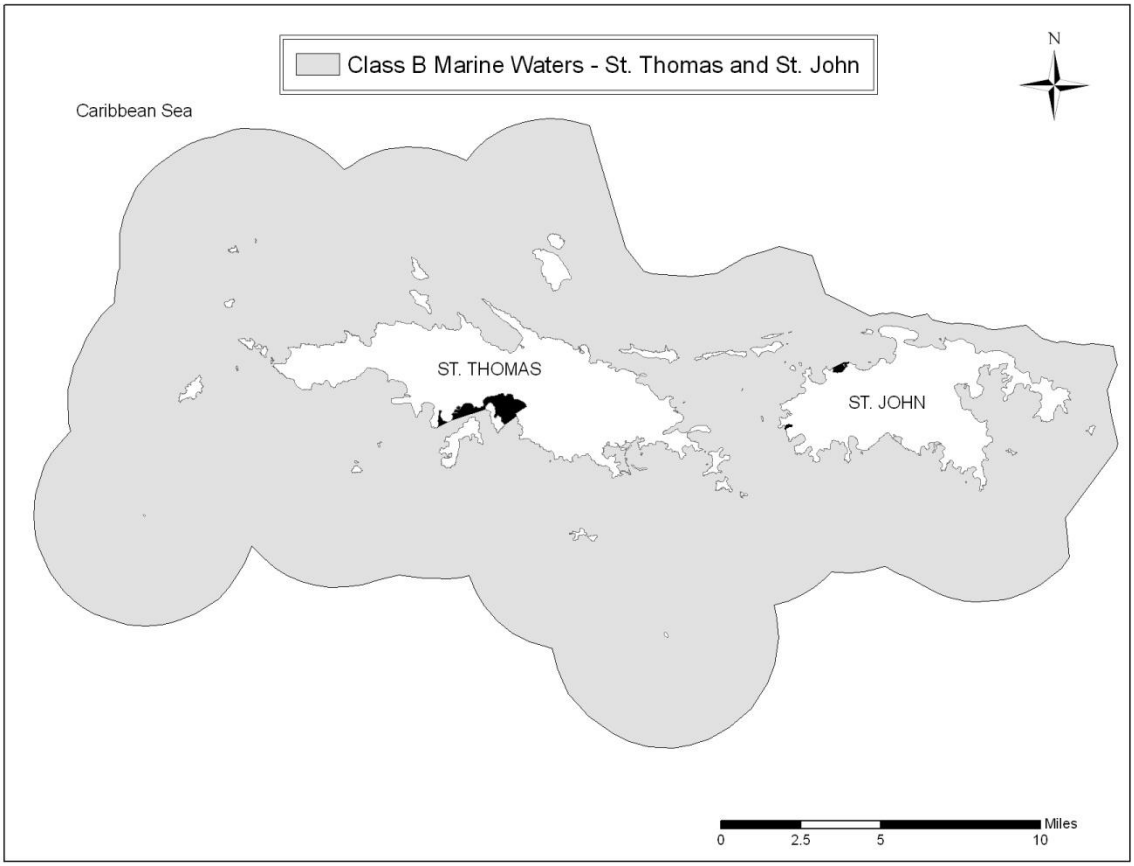


Figure 4. Class B - St. Thomas and St. John (only marine waters displayed)



Class "C" Waters

Best usage of waters: For maintenance and propagation of desirable species of aquatic life (including threatened and endangered species listed pursuant to section 4 of the federal Endangered Species Act and threatened, endangered and indigenous species listed pursuant Title 12, Chapter 2 of the Virgin Islands Code) and for primary contact recreation (swimming, water skiing, etc.). This Class allows for evident changes in structure of the biotic community and minimal changes in ecosystem function. Evident changes in structure due to loss of some rare native taxa; shifts in relative abundance of taxa (community structure) are allowed but sensitive-ubiquitous taxa remain common and abundant; ecosystem functions are fully maintained through redundant attributes of the system.

Legal Limits

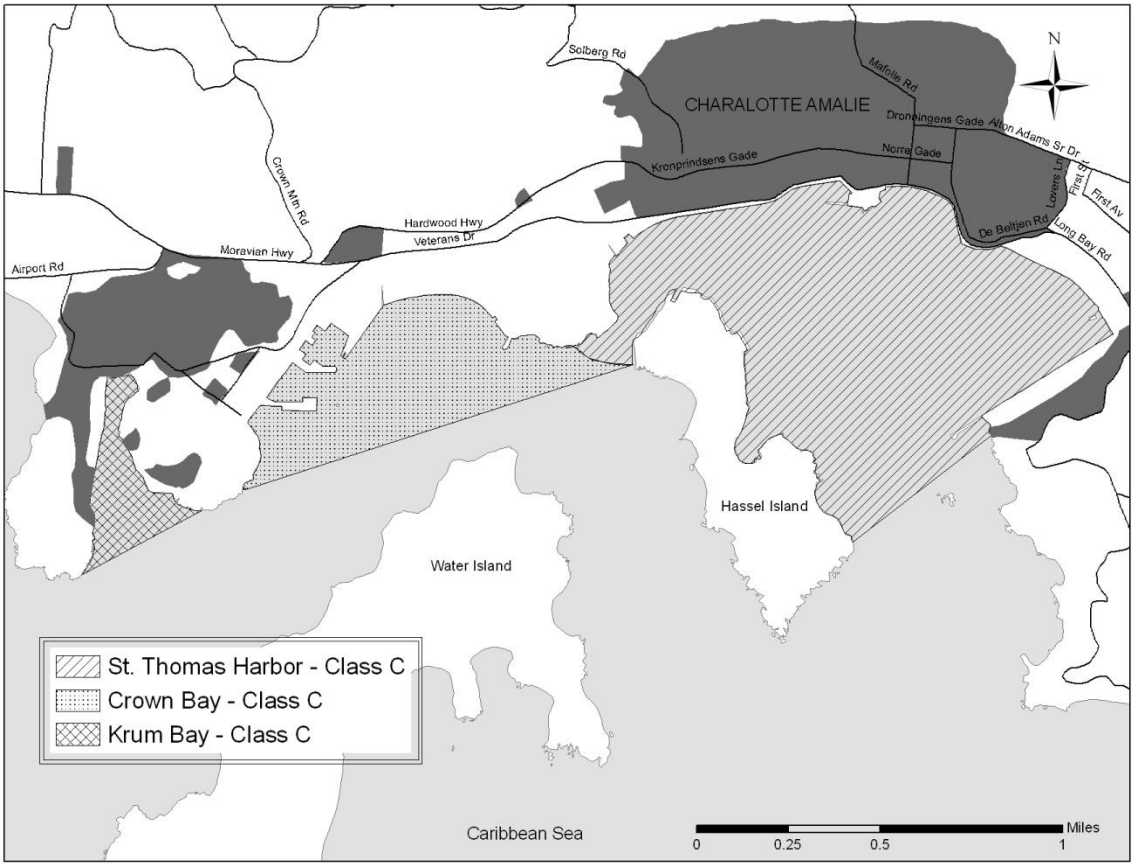
(1) St. Thomas:

(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.

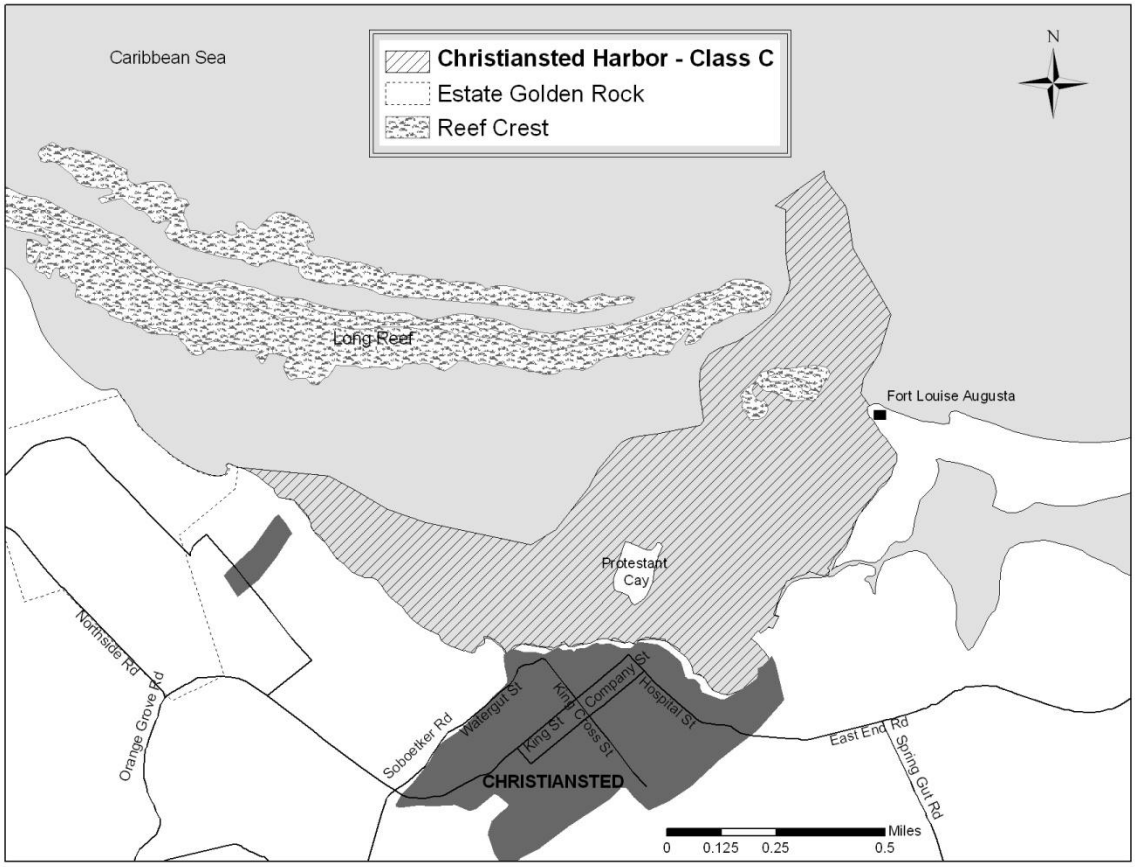
Figure 5. Class C - St. Thomas Harbor, Crown Bay and Krum Bay, St. Thomas



(2) St. Croix:

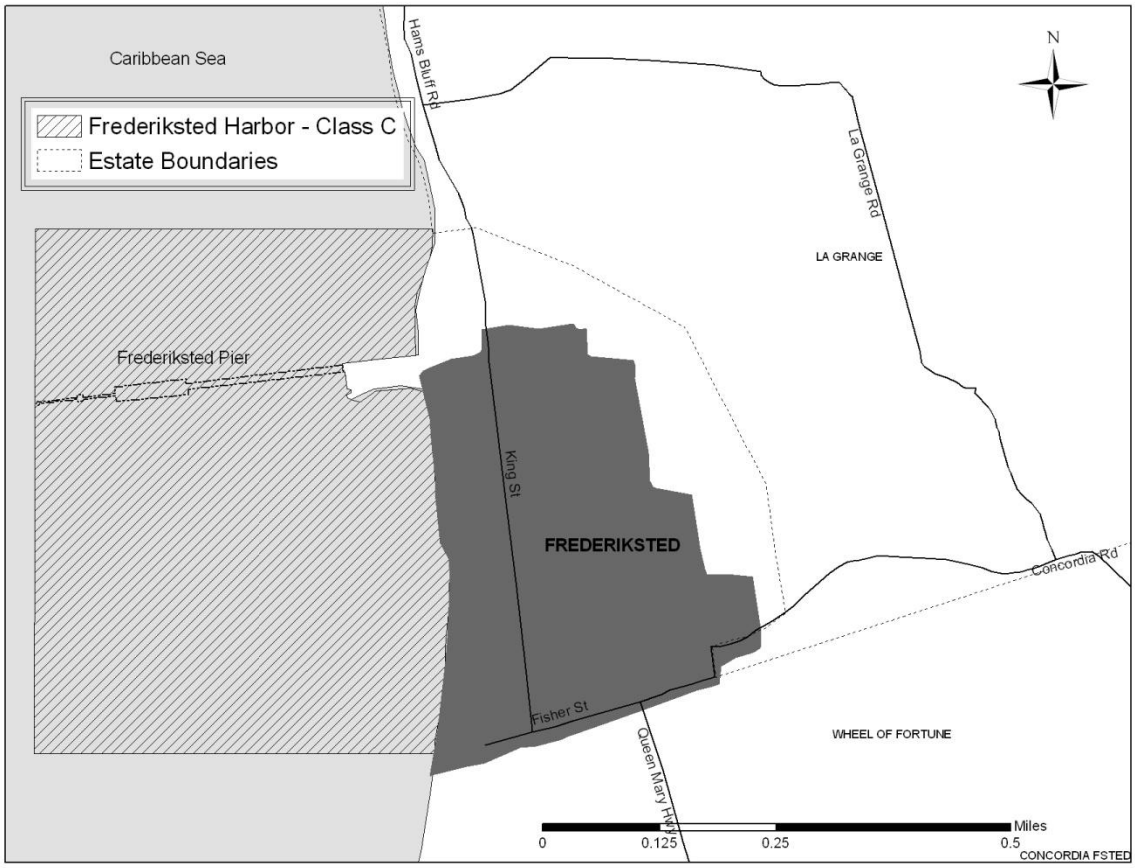
(A) Christiansted Harbor from Fort Louise Augusta to Golden Rock, along the waterfront and seaward to include the navigational channels and mooring areas.

Figure 6. Class C - Christiansted Harbor, St. Croix



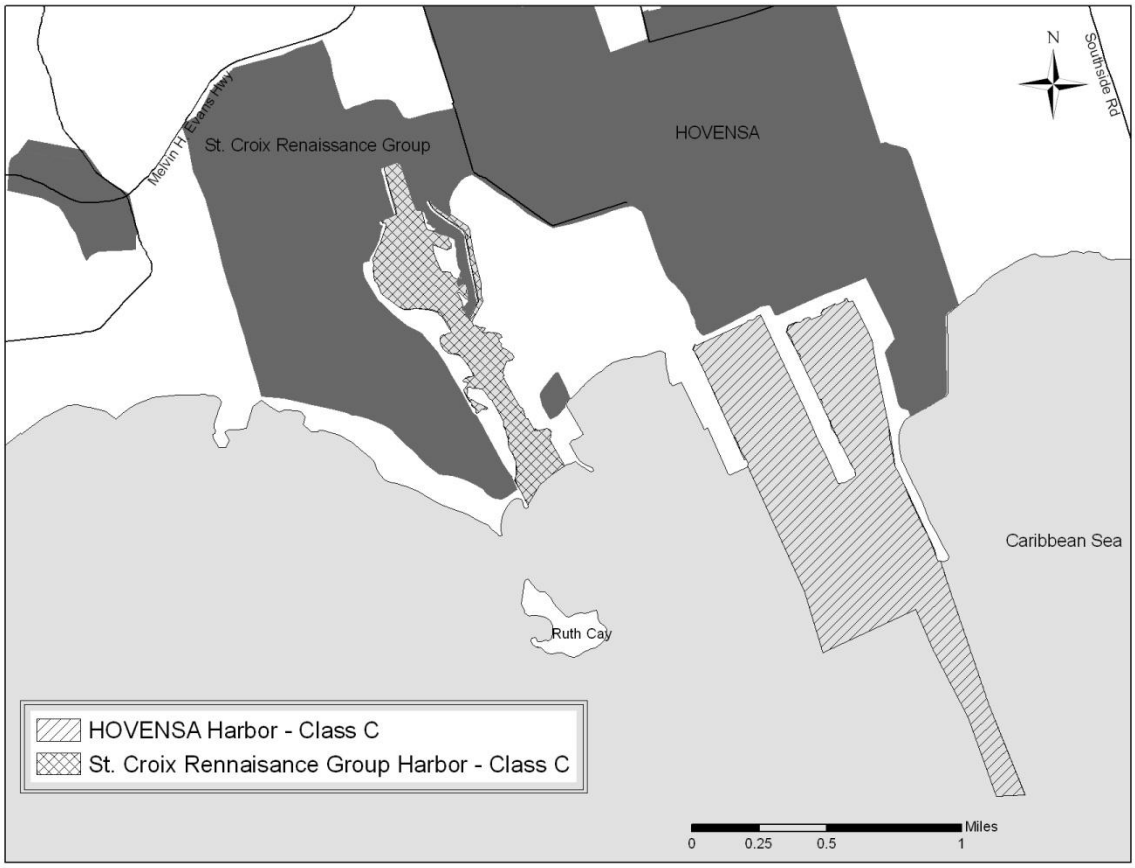
(B) Frederiksted Harbor from La Grange to Fisher Street and seaward to the end of the Frederiksted Pier.

Figure 7. Class C - Frederiksted Harbor, St. Croix



(C) Hess Oil Virgin Islands Harbor (alternatively named HOVENSA Harbor).
(D) Martin-Marietta Alumina Harbor (alternatively named Port Alucroix or St. Croix Renaissance Group Harbor).

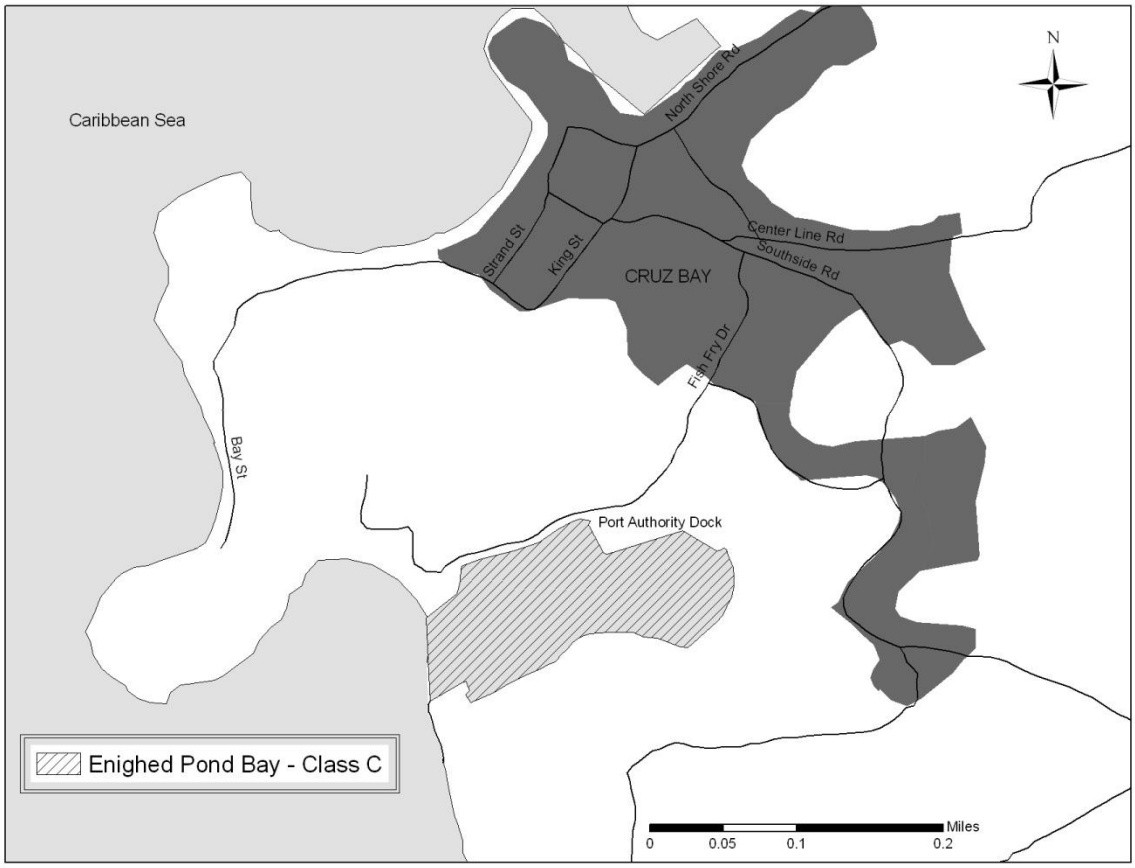
Figure 8. Class C - HOVENSA Harbor and St. Croix Renaissance Group Harbor,



(3) St. John:

(A) Enighed Pond Bay

Figure 9. Class C - Enighed Pond, St. John



Summary of Criterion Levels of Virgin Islands Water Quality Standards:

Class A

Quality criteria: Existing natural conditions shall not be changed. The biological condition shall be similar or equivalent to reference condition for biological integrity. In no case shall Class B water quality standards be exceeded.

Criterion	Class B	Class C
Dissolved Oxygen	Not less than 5.5 mg/l from other than natural conditions	Not less than 5.0 mg/l from other than natural conditions

pH	<8.3 Tolerable Limit >7.0 Normal range of pH must not be extended at any location by more than ±0.1 pH unit.	<8.5 Tolerable Limit>6.7 Normal range of pH must not be extended at any location by more than ±0.1 pH unit.
Temperature	Not to exceed 32° Celsius at any time, nor as a result of waste discharge to be greater than 1°C above normal.	Not to exceed 32° Celsius at any time, nor as a result of waste discharge to be greater than 1°C above normal.
Bacteria	A geometric (log) mean of 70fecal coliforms per 100 ml by MF or MPN count Not to exceed a geometric mean of 35 enterococci per 100 ml, not to exceed a single sample maximum of 104 per 100 ml at any time.	A geometric (log) mean of 200 fecal coliforms per 100 ml by MF or MPN count Not to exceed a geometric mean of 35 enterococci per 100 ml, not to exceed a single sample maximum of 104 per 100 ml at any time
Chlorine	The 4-day average concentration of Chlorine shall not exceed 7.5 ug/l. The 1-hour average concentration of Chlorine shall not exceed 13 ug/l	The 4-day average concentration of Chlorine shall not exceed 7.5 ug/l. The 1-hour average concentration of Chlorine shall not exceed 13 ug/l
Phosphorus	Total P shall not exceed 50 ug/L any coastal waters	Total P shall not exceed 50 ug/L any coastal waters
Suspended, colloidal or settleable solids	None from wastewater sources which will cause disposition or be deleterious for the designated uses shall be present in any waters.	None from wastewater sources which will cause disposition or be deleterious for the designated uses shall be present in any waters.
Oil and Floating substances	No residue attributable to waste water. No visible film; no globules of grease shall be present in any waters.	No residue attributable to waste water. No visible film; no globules of grease shall be present in any waters.

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	A secchi disc shall be visible at a minimum depth of one meter
Toxicity	The applicable numeric water quality standards for toxic pollutants to protect the designated uses of waters of the U.S. Virgin Islands shall be the Environmental Protection Agency's (EPA) national recommended Clean Water Act section 304(a) water quality criteria, EPA's Office of Water, Office of Science and Technology (4304T), 2006, which is incorporated by reference for: the protection of saltwater aquatic life from acute (criterion maximum concentration) and chronic (criterion continuous concentration) effects; and, the protection of human health from the consumption of organisms. The applicable criteria may be found at: http://www.epa.gov/waterscience/criteria/wqctable/index.html	

Biocriteria	The Territory shall preserve, protect, and restore water resources to their most natural condition. The condition of these waterbodies shall be determined from measures of physical, chemical, and biological characteristics of each waterbody class, according to its designated use. As a component of these measures, the Territory may consider the biological integrity of the benthic communities living within waters. These communities shall be assessed by comparison to reference conditions(s) with similar abiotic and biotic environmental settings that represent the optimal or least disturbed condition for that system. Such reference conditions shall be those observed to support the greatest community diversity, and abundance of aquatic life as is expected to be or has been historically found in natural settings essentially undisturbed or minimally disturbed by human impacts, development, or discharges. This condition shall be determined by consistent sampling and reliable measures of selected indicator communities of flora and/or fauna and may be used in conjunction with other measures of water quality. Waters shall be of a sufficient quality to support a resident biological community as defined by metrics based upon reference conditions. These narrative biological criteria shall apply to fresh water, wetlands, estuarine, mangrove, seagrass, coral reef and other marine ecosystems based upon their respective reference conditions and metrics.
General water quality criteria	These waters shall be free of substances attributable to municipal, industrial, or other discharges or wastes as follows: (1) Materials that will settle to form objectionable deposits. (2) Floating debris, oils, scum, and other matter. (3) Substances producing objectionable color, odor, taste, or turbidity. (4) Materials, including radionuclides, in concentrations or combinations which are toxic or which produce undesirable physiological responses in human, fish and other animal life, and plants. (5) Substances and conditions or combinations thereof in concentrations which produce undesirable aquatic life. (6) Exotic or aquatic nuisance species.

	All waters of the U.S. Virgin Islands shall meet generally accepted aesthetic qualifications and shall be capable of supporting diversified aquatic life. "Waters" of the U.S. Virgin Islands shall be defined, as follows, as in by Title 12, Chapter 7, Section I82(f) of the Virgin Islands Code; "Waters of the United States Virgin Islands" means all waters within the jurisdiction of the United States Virgin Islands including all harbors, streams, lakes, ponds, impounding reservoirs, marshes, water-courses, water-ways, wells, springs, irrigation systems, drainage systems and all other bodies or accumulations of water, surface and underground, natural or artificial, public or private, situated wholly or partly within or bordering upon the United States Virgin Islands, including the territorial seas, contiguous zones, and oceans."

** Information listed in the table above is from the USVI Water Quality Standards promulgated on June 11, 2010

Inventory of physical, chemical and microbiological data

The Division of Environmental Protection's Coastal Water Quality (Ambient) Monitoring Program is managed by the Water Quality Management Program (WQMP). Through the Coastal Water Quality Monitoring Program, ambient water quality is monitored on a quarterly basis, WQMP also monitors designated recreational beaches on a weekly basis through the Beach Water Quality Monitoring Program.

The inventory of physical, chemical and microbiological data used to develop 2012 Integrated Report and make water quality assessments are StoRet data extracts from fiscal years 2010-2011 from the Ambient and Beach Water Quality Monitoring Programs. The parameters used to perform the assessments are parameters which were analyzed by the Ocean Systems Laboratory. These parameters include: Fecal Coliform, Enterococci, Turbidity and Total Phosphorus.
The Assessment Database (ADB) is a valuable tool in storing information regarding designated uses for waterbodies. ADB is also useful in storing pollutant and stressor data pertinent to making accurate assessments and ADB also stores 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. However, there is no habitat assessment data available at this time. If data is available in the future it will be included in future water quality assessment reports.

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 had a negative impact on the water quality in the US Virgin Islands. It was determined that there were no visual data sources to be

reported on or included for this reporting cycle. If data is available it will be included in future reports.

Identify exceedences of water quality standards

The US Virgin Islands water quality standards set 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.

During this reporting cycle the parameters listed below were assessed in the following manner:

Parameter	Source Data Type	Assessment Method
Enteroccoci	Ambient	Shall not exceed single sample max of 104/100ml
	Beach	Shall not exceed geometric mean on quarterly basis
Fecal Coliform	Ambient	Shall not exceed single sample max of 70/100ml
Turbidity	Ambient Beach	Averaged on quarterly basis; shall not exceed 3NTU
Total Phosphorus	RARE	Shall not exceed 50 ug/l

Designated Use Attainment

The VI Water Quality Standards identify specific designated uses for the waters of the US Virgin Islands according to their waterbody classifications. Designated uses include:

- maintenance and propagation of desirable species of aquatic life (including threatened, endangered species listed pursuant to section 4 of the federal Endangered Species Act and threatened, endangered and indigenous species listed pursuant Title 12, Chapter 2 of the Virgin Islands Code)
- primary contact recreation (swimming, water skiing, etc.).

The Department uses both numeric and narrative criteria to protect designated uses. Numeric criteria are estimates of constituent concentrations that are protective of the designated uses. Narrative criteria are non-numeric descriptions of conditions to be attained/maintained or avoided.

Parameters for Designated Use Assessments

Designated Use	Data Requirements (Minimum Parameters Used For Assessments)
Maintenance and propagation of desirable species of aquatic life	pH DO Temperature Total Phosphorus Turbidity
Primary contact recreation	

Data gaps and error control

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 table below lists potential data gaps which DPNR intends to work on developing a data document in collaboration with EPA Region 2 in the near future. Any data gaps that are identified will be included in the multi-year monitoring strategy for resolution.

Potential Data Gaps for Which Assessment Methodologies May Need to be Developed
Beach closure data
Habitat assessment data
Toxicity and toxicant data
Wetland assessment data
Intermittent streams data
"Natural" levels relative to the DO and temperature standards
"Normal range" relative to pH standard
"Existing natural conditions" in Class A waters
Narrative criteria, as listed in Section 186-1(c) of the VI WQS Regulations
Biocriteria, as described in Section 186-1(b) of the VI WQS Regulations
Radioactivity data

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 based on the program's data quality objectives established in the Coastal Water Quality Monitoring (Ambient) and Beach Water Quality Monitoring Programs Quality Assurance Project Plans will be discarded. Evaluation of this reporting cycle's has determined that the following parameters be used to perform assessments and the subsequent table list parameters not used to make assessments:

Parameters	**Source Data Type**
Enteroccoci	Ambient
	Beach
Fecal Coliform	Ambient
Turbidity	Ambient Beach
Total Phosphorus	RARE

Parameters Not Used in This Reporting Cycle Assessments	**Source Data Type**
Dissolved Oxygen	Ambient
Turbidity (Multi-parameter Sonde)	Ambient
pH	Ambient
Temperature	Ambient

Natural Disasters

Hurricane season in the US Virgin Islands lasts from June through November each year. There was no sampling during this reporting cycle related to natural disasters. However, the following storm events occurred:

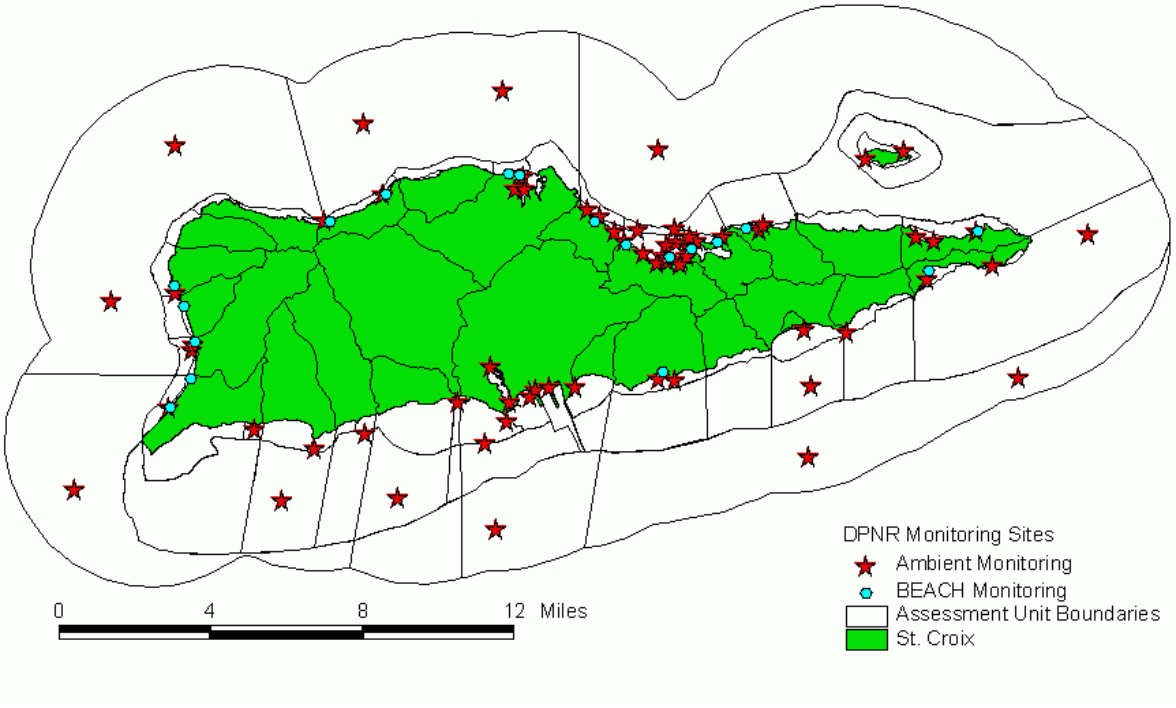
Hurricane Earl:
August 31, 2010 visual assessments conducted; no water quality samples were collected/analyzed

Tropical Storm Otto:
October 6, 2010 visual assessments conducted; no water quality samples were collected/analyzed

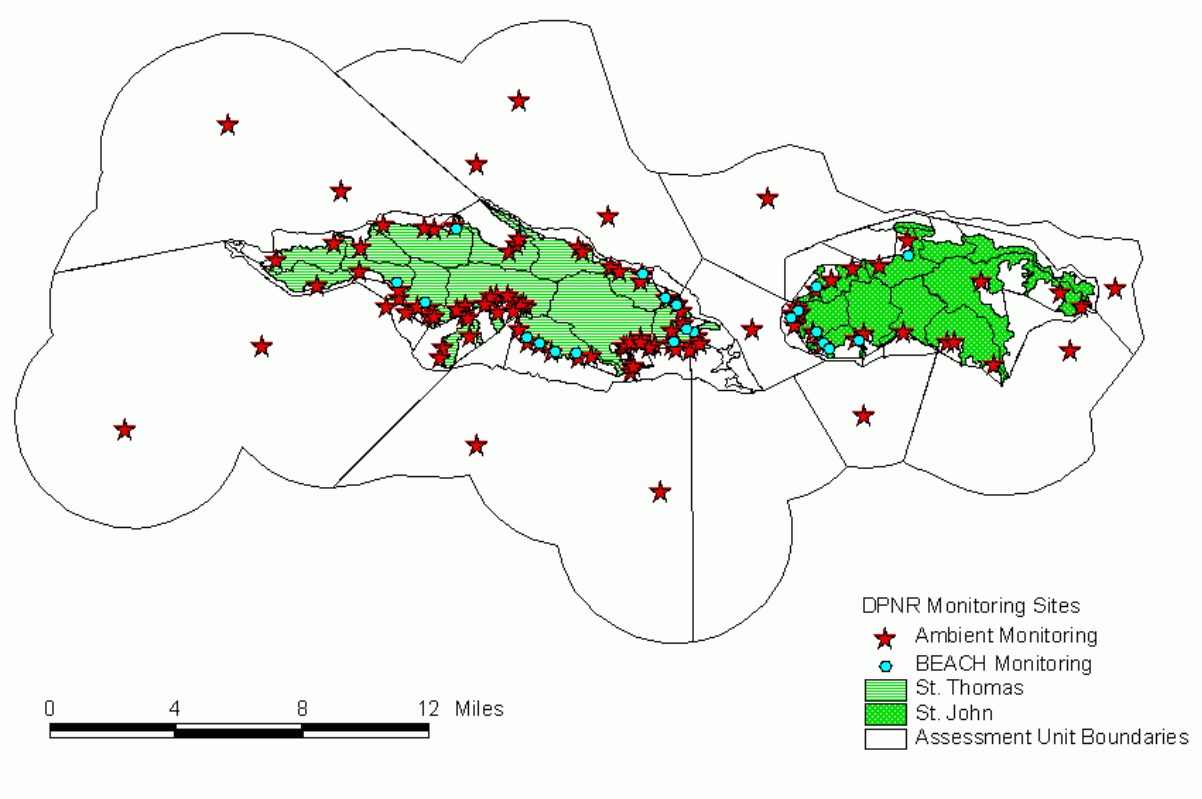
Evaluation of Internal Data

Due to issues with internal data collection, which included malfunctioning equipment, USEPA evaluated DPNR Basic Water Quality Monitoring Program data for FY2010 and 2011 and determined there could be no reliance on any DO, pH, turbidity and temperature data reported from the field. Therefore, DPNR was required to use only the beach monitoring data (enterococci and turbidity (analyzed at the lab); data received during the 2012 Integrated Report Data Solicitation Process announced on September 1, 2011; and Analytical Data for bacteria grab samples and turbidity (analyzed at the lab) to conduct assessments for the 2012 Integrated Report. The data used for assessments were uploaded to the StoRet Database via the Water Quality Exchange. The figures below display DPNR's monitoring locations for its Ambient and Beach Programs:

St. Croix Water Quality Monitoring Network



St. Thomas/St. John Water Quality Monitoring Network



DPNR evaluates all internal monitoring data to determine if the Data Quality Objectives outlined in the USVI Ambient Water Quality Monitoring Program Quality Assurance Project Plan are met i.e. compliance with the Relative Percent Difference (RPD) of 30 or less. Once the data is determined to meet the required objectives, for example the RPD, the data is used to conduct the assessments for the reporting cycle. The elements evaluated are as follows:

Precision and accuracy

The precision and accuracy of data are determined by particular actions of the analytical laboratory and field staff, which are outlined in the relative SOPs and QAPPs. WQM staff ensures timely and efficient calibration and maintenance of the multi-parameter sonde, in accordance with DPNR-DEP's YSI 6600 Sonde Operation and Maintenance - SOP. The WQM staff also assures that water samples and related field data are collected at the right locations. Once at the prescribed location staff makes every effort to record field data accurately and enter into the databases for uploading to EPA StoRet, in accordance with the WQX_Web Data Entry SOP. Staff collect field samples in a manner that would limit or prevent sample contamination and deliver samples to laboratory within sufficient time such that the samples can be analyzed within the correct holding time. Staff also fill out required field and lab submittal paperwork, which is also in accordance with the Data Collection and Sample Handling – Ambient Water Quality Monitoring SOP. After data is analyzed and results are received from the laboratory all documents are stored in accordance with Filing of Ambient Field Data Forms and Associated Paperwork SOP.

The precision of data is a measure of the reproducibility of the measurement when an analysis is repeated. The precision of selected chemical analyses will be examined by using standard solutions and comparison of duplicate analysis. Relative percent difference (RPD) will be calculated for field duplicate analysis to assess precision of field collection procedure. Laboratory precision will be determined by calculating RPD of results of "unknown" analysis and laboratory duplicate analysis. The acceptable RPD is 30 or less. The following is the formula used for calculation of RPD:

$$\mathbf{RPD = \{(C_1 - C_2)/[(C_1 + C_2)/2]\} \times 100}$$

RPD= Relative Percent Difference
C_1= Larger of two observed values
C_2= Smaller of two observe values

Representativeness

The representativeness of the data is mainly dependent on the sampling locations and the sampling procedures adequately representing the true condition of the sample site. Sampling station siting, and use of only approved/documented analytical methods will determine that the measurement data represent the conditions at the site, to the extent possible. It is well known that water flowing past a given location on land is constantly changing in response to inflow, tidal cycle, weather, etc. Sampling schedules will be designed with respect to frequency, locations and methodology in order to maximize representativeness, where possible and applicable.

Laboratory representativeness will be achieved by following analytical procedure and standard operating procedures, meeting holding times, and assessment and comparison of field duplicate samples.

Comparability

The comparability of data produced by and for DPNR is predetermined by the commitment of its staff and analytical laboratories to use standardized methods, where possible, including EPA approved analytical methods, or documented modifications thereof which provide equal or better results. These methods have specified units in which the results are to be reported.

Completeness

The completeness of data is basically a relationship of how much of the data is available for use compared to the total potential data before any conclusion is reached. Ideally, 100% of the data should be available. However, the possibility of data becoming unavailable due to laboratory error, insufficient sample volume, or samples broken in shipping must be expected. Also, unexpected situations may arise where field conditions do not allow for 100% data completeness. Failure to achieve 100% data completeness usually will result from the field crew's inability to sample at stations because of logistical barriers, such as insufficient depth, or adverse weather conditions. In the limited number of instances where these may be encountered, efforts will be made to relocate the station in an adjacent area or re-sample the station. In addition, established protocols for tracking samples during shipment and laboratory processing must be followed to minimize data loss following successful sample collection. The Department has various completeness goals: 100% for data collection and data usage, which directly correlates to a 100% goal for data used to make assessments. However, if less than 8-quarters of data are collected then the Department will not be able to de-list assessment units eligible for delisting.

It is the responsibility of the program manager to verify that the data are representative and completeness is achieved while the analytical data's precision, accuracy, and comparability are mainly the responsibility of the laboratory supervisor.

Data From Other Sources

DPNR will consider data received during its Data Solicitation period for the submission of the draft 303(d) Total Maximum Daily Load List. All data received will be 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 received after solicitation process 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.

The following agencies were contacted to request data during the Data Solicitation Period. The agencies were asked to submit all relative monitoring data for the monitoring period with the associated Quality Assurance Project Plan:

Contact Name	Title	Agency	Data Received
Kofi Boateng	Associate	UVI-CES	No data submitted

	State Director		
Jeffrey Potent	-	USEPA Region 2 (who was no longer in position)	No data submitted
Rafe Boufon	-	National Park Service	No data submitted
Barbara S.P. Moore	Director	NOAA/National Undersea Research Program	No data submitted
Eric Hawk	Section 7 Coordinator	National Marine Fisheries Service	No data submitted
Richard Nemeth, Ph.D.	Director	UVI-CMES	No data submitted
Pedro Diaz	-	USGS/GSA Center	No data submitted
Edwin Muniz	Supervisor	USFW/PR Field Office	No data submitted

*DPNR-DEP intends to add representatives from both the VI Department of Health and the National Resource Conservation Service to this list for the next reporting cycle.

Once received the QAPP and data would be evaluated to determine if DPNR's Data Quality Objectives were met. If the data is determined to be acceptable then the data would be used in the reporting cycle's assessments. A rationale for any decision to not use any existing and readily available data and information would also be included in the Integrated Report. DPNR, however, did not receive data from external sources during the data solicitation period for the FY2010 and 2011 reporting cycle.

DPNR also intends to develop a Standard Operating Procedure for the evaluation of secondary data which will clearly articulate acceptance criteria. That criteria once developed will be incorporated into the relative version of the Assessment Methodology.

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.

Island	# of Assessment Units (AUs)	AUs Monitored (% of Total)
St. Croix	**84**	**37 (44%)**
St. Thomas	**59**	**40 (68%)**
St. John	**33**	**13 (40%)**

* AUs not monitored were either missed during monitoring events or currently do not have monitoring locations within them

Assessment Unit ID	Assessment Unit Name & Class	Frequency/Parameters	Associated Monitoring Stations	Monitoring Frequency for Reporting Cycle
VI-STT-01	Botany Bay Class B	pH, Temperature, Dissolved Oxygen, Depth, Salinity, Secchi, Fecal Coliform/Enterococci Bacteria, Turbidity monitored Quarterly	STT-9 Botany Bay	**STT-9** --05/13/10: all parameters --03/8/11: all parameters --07/26/11: all parameters except pH monitored
VI-STT-02	Stumpy Bay Class B		STT-10 Stumpy Bay	**STT-10** --05/13/10: all parameters --03/8/11: all parameters --07/26/11: all parameters except pH monitored
VI-STT-03	Botany Bay subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STT-04	Santa Maria Bay Class B		STT-11 Santa Maria Bay	**STT-11** --05/13/10: all parameters --03/8/11: all parameters --07/26/11: all parameters except pH monitored
VI-STT-05	Caret Bay Class B		STT-12 Caret Bay	**STT-12** --05/13/10: all parameters --03/8/11: all parameters --07/26/11: all parameters except pH monitored
VI-STT-06	Neltjeberg Bay Class B		STT-13B Neltjeberg Bay	Not monitored
VI-STT-07	Dorothea Class B		STT-13 Dorothea	**STT-13** --05/13/10: all parameters --03/8/11: all parameters --07/26/11: all parameters except pH monitored

VI-STT-08	Hull Bay Class B		STT-14 Hull Bay, VI616865 Hull Bay	**STT-14** --05/13/10: all parameters --03/8/11: all parameters --07/26/11: all parameters except pH monitored **VI616865** --Enterococci/Turbidity monitored weekly
VI-STT-09	Dorothea Bay subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STT-10	Magens Bay Class B		STT-15, STT-15A, STT-15B Magens Bay, VI672756 Magens Bay	**STT-15, 15A and 15B** --05/13/10: all parameters --03/8/11: all parameters --07/26/11: all parameters except pH monitored **VI672756** --Enterococci/Turbidity monitored weekly
VI-STT-11	Northwest St. Thomas HUC14, offshore Class B		STT-OFF1 STT NW-1, STT-OFF9 STT NW-3	Not monitored
VI-STT-12	Lovenlund Bay Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STT-13	Mandahl Bay (Marina) Class B		STT-16B Mandahl Bay Entrance, STT-16C Mandahl Point Entrance	**STT-16B** --05/13/10: all parameters --03/09/11: all parameters --07/26/11: all parameters except pH monitored except pH monitored **STT-16C** –Not monitored
VI-STT-14	Tutu Bay		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.

VI-STT-15	Sunsi Bay Class B		STT-17B Sunsi Bay	**STT-17B** --05/13/10: all parameters --03/09/11: all parameters
VI-STT-16	Spring Bay Class B		STT-17A Spring Bay	**STT-17A** --05/13/10: all parameters --03/9/11: all parameters
VI-STT-17	Mandahl Bay subwatershed, offshore Class B		STT-16A Mandahl Bay, STT-18 Coki Point Bay , VI577932 Coki Point	**STT-16A** --05/17/10: all parameters --03/09/11: all parameters --07/26/11: all parameters except pH monitored **STT-18** --05/17/10: all parameters --03/09/11: all parameters --07/26/11: all parameters except pH monitored **VI577932** --Enterococci/Turbidity monitored weekly
VI-STT-18	Water Bay Class B		STT-19 Water Bay, VI591668 Water Bay	**STT-19** --05/13/10: all parameters --03/09/11: all parameters --07/20/11: all parameters except pH monitored **VI591668** --Enterococci/Turbidity monitored weekly
VI-STT-19	Smith Bay Class B		STT-20 Smith Bay, VI431925 Lindquist Beach	**STT-20** --05/13/10: all parameters --03/09/11: all parameters --07/20/11: all parameters except pH monitored **VI431925** --Enterococci/Turbidity monitored weekly
VI-STT-20	Smith Bay subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.

VI-STT-21	St. John Bay Class B		STT-21A St. John Bay, VI327776 Sapphire Beach	**STT-21A** --05/13/10: all parameters --07/20/11: all parameters except pH monitored **VI327776** --Enterococci/Turbidity monitored weekly
VI-STT-22	Red Bay Class B		STT-21B Red Bay	**STT-21B** --05/13/10: all parameters --03/22/11: all parameters --07/20/11: all parameters except pH monitored
VI-STT-23	Vessup Bay Class B		STT-22B Vessup Bay, USGS-50263000 Vessup Bay West	**STT-22B** --05/13/10: all parameters --03/22/11: all parameters --07/20/11: all parameters except pH monitored
VI-STT-24	Red Hook Bay Class B		STT-22A Red Hook Bay, USGS-50263500 Vessup Bay East, VI764950 Vessup Bay	**STT-22A** --05/13/10: all parameters --03/22/11: all parameters --07/20/11: all parameters except pH monitored **VI764950** --Enterococci/Turbidity monitored weekly
VI-STT-25	Great Bay Class B		STT-23 Great Bay, VI505006 Bluebeards Beach	**STT-23** --06/16/10: all parameters --07/20/11: all parameters except pH monitored **VI505006** --Enterococci/Turbidity monitored weekly
VI-STT-26	Red Hook Bay, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STT-27	St. James Islands, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.

VI-STT-28	Cowpet Bay Class B		STT-24 Cowpet Bay, STT-24A Cowpet Bay West	**STT-24, 24A** --06/16/10: all parameters --03/22/11: all parameters --07/20/11: all parameters except pH monitored
VI-STT-29	St. James Bay Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STT-30A	Northeast St. Thomas HUC14, offshore north Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STT-30B	Northeast St. Thomas HUC14, offshore south Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STT-31	Nazareth Bay Class B		STT-25B Secret Harbour, STT-26, STT-26A Benner Bay, VI389422 Secret Harbor	**STT-25B** – Not monitoring **STT-26** --06/16/10: all parameters --7/20/11: all parameters except pH monitored
VI-STT-32	Jersey Bay, offshore Class B		STT-25 Nazareth Bay	**STT-25** --06/16/10: all parameters --7/20/11: all parameters except pH monitored
VI-STT-33	Benner Bay Class B		USGS-50265900 Benner Bay South	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.

VI-STT-34	Benner Bay Lagoon Marina Class B		STT-27D Mangrove Lagoon, Near Lavida Marina, STT-27E Mangrove Lagoon, Near Compass Point, USGS-50265700 Benner Bay North	**STT-27D and STT-27E** --05/11/10: all parameters --03/22/11: all parameters --07/20/11: all parameters except pH monitored
VI-STT-35	Mangrove Lagoon Class B		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	**STT-27A, STT-27B and STT-27C** --05/11/10: all parameters --03/22/11: all parameters --07/20/11: all parameters except pH monitored

VI-STT-36	Frenchman Bay subwatershed, east Class B		STT-28A Bovoni Bay,STT-28B Bolongo Bay, VI951607 Bolongo Bay	**STT-28A** --06/16/10: all parameters; except DO --03/17/11: all parameters --07/19/11: all parameters except pH monitored **STT-28B** --06/16/10: all parameters; except DO, TSS, F. Coliform or Enterococci --03/17/11: all parameters --07/19/11: all parameters except pH monitored **VI891065** --Enterococci/Turbidity monitored weekly
VI-STT-37	Frenchman Bay Class B		STT-29A Frenchman Bay, VI891065 Frenchman's Bay	**STT-29A** --06/16/10: all parameters; except DO --03/17/11: all parameters --07/19/11: all parameters except pH monitored **VI891065** --Enterococci/Turbidity monitored weekly
VI-STT-38	Limetree Bay Class B		STT-29B Limetree Bay, VI776527 Limetree Bay	**STT-29B** --06/16/10: all parameters; except DO --03/17/11: all parameters --07/19/11: all parameters except pH monitored **VI776527** --Enterococci/Turbidity monitored weekly
VI-STT-39	Morningstar Bay Class B		STT-30 Morningstar Bay, VI937158 Morningstar Bay	**STT-30** --06/16/10: all parameters; except DO --03/17/11: all parameters --07/19/11: all parameters except pH monitored **VI937158** --Enterococci/Turbidity monitored weekly
VI-STT-40	Pacquereau Bay Class B		STT-31A Flamboyant Cove	**STT-31A** --06/16/10: all parameters; except DO --03/10/11: all parameters --07/19/11: all parameters except pH monitored

VI-STT-41	Frenchman Bay subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STT-42	Southeast St. Thomas HUC14, offshore Class B		STT-OFF8 STT South-3, STT-OFF5 STT North2	Not monitored
VI-STT-43	St. Thomas Harbor, inner Class C		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	**STT-31B** --05/12/10: all parameters --07/19/11: all parameters except pH monitored **STT-31C** --05/12/10: all parameters --03/17/11: all parameters --07/19/11: all parameters except pH monitored **STT-32A, 32B, 33A, 33B** --05/12/10: all parameters --03/17/11: all parameters --07/19/11: all parameters except pH monitored **STT-34 –** Not monitored **STT-35 and STT-36** --05/12/10: all parameters --03/10/11: all parameters --07/19/11: all parameters except pH monitored **STT-37** --03/10/11: all parameters --07/19/11: all parameters except pH monitored **STT-38** --05/12/10: all parameters --03/17/11: all parameters --07/19/11: all parameters except pH monitored

VI-STT-44	St. Thomas Harbor, outer Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STT-45	Gregerie Channel Class B		STT-1 Crown Bay, Near Outfall, STT-39 Water Isle, East Gregorie Channel	**STT-1** --05/12/10: all parameters --03/17/11: all parameters --07/19/11: all parameters except pH monitored **STT-39** --03/17/11: all parameters --07/19/11: all parameters except pH monitored
VI-STT-46	Sprat Bay Class B		STT-42 Water Island Sprat Bay	**STT-42** --06/16/10: all parameters except DO --03/10/11: all parameters
VI-STT-47	Hassel Island at Haulover Cut to Regis Point Class C		STT-2 Crown Bay, Near Tamarind Outlet, STT-3 Subbase	**STT-2 and STT-3** --05/12/10: all parameters --03/17/11: all parameters --07/19/11: all parameters except pH monitored
VI-STT-48	Water Isle Hotel, Beach Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STT-49	Druif Bay Class B		STT-40 Water Isle Hotel, Beach	**STT-40** --05/12/10: all parameters --03/10/11: all parameters --07/18/11: all parameters except pH monitored
VI-STT-50	Flamingo Class B		STT-41 Water Island Flamingo Bay	**STT-41** --05/12/10: all parameters --03/10/11: all parameters --07/18/11: all parameters except pH monitored
VI-STT-51	Krum Bay Class C		STT-4 Krum Bay	**STT-4** --05/12/10: all parameters --03/09/11: all parameters --07/18/11: all parameters except pH monitored

VI-STT-52	Lindbergh Bay Class B		STT-5A Lindbergh Bay East, STT-5B Lindbergh Bay West, STT-5C WAPA Outfall, VI514102 Lindberg Bay	**STT-5A and STT-5B** --05/12/10: all parameters --03/10/11: all parameters --07/18/11: all parameters except pH monitored **VI514102** --Enterococci/Turbidity monitored weekly
VI-STT-53	Cyril E. King Airport subwatershed, offshore Class B		STT-6C S.W. Road, Near Red Point Outfall	**STT-6C** --05/12/10: all parameters --03/09/11: all parameters --07/18/11: all parameters except pH monitored
VI-STT-54	Perseverance Bay, offshore Class B		STT-6B College Cove	**STT-6B** --05/12/10: all parameters --03/09/11: all parameters --07/18/11: all parameters except pH monitored
VI-STT-55	Brewers Bay Class B		STT-7A Brewers Bay, VI293962 Brewer's Bay	**STT-7A** --05/12/10: all parameters --03/09/11: all parameters --07/18/11: all parameters except pH monitored **VI293962** --Enterococci/Turbidity monitored weekly
VI-STT-56	Perseverance Bay Class B		STT-7B Perseverance Bay	**STT-7B** --05/12/10: all parameters --03/08/11: all parameters --07/18/11: all parameters except pH monitored
VI-STT-57	Fortuna Bay Class B		STT-8 Fortuna Bay	**STT-8** --05/12/10: all parameters --03/08/11: all parameters --07/18/11: all parameters except pH monitored
VI-STT-58	Fortuna Bay subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.

VI-STT-59	Northwest St. Thomas HUC14, offshore Class B		STT-6A Airport Runway, STT-OFF2 STT NW-1, STT-OFF11 STT SW-4	Not monitored
VI-STJ-01	Caneel Bay Class B		STJ-54 Caneel Bay, NPS-1 Caneel Bay, VI658467 Caneel Beach	**VI658467** --Enterococci/Turbidity monitored weekly
VI-STJ-02	Hawksnest Bay Class B		STJ-44B Hawksnest Bay, NPS-3 Hawksnest (middle beach), NPS-4 Hawksnest (Gibney Beach), VI255380 Oppenheimer	**VI255380** --Enterococci/Turbidity monitored weekly
VI-STJ-03	Trunk Bay Class A		STJ-44A Trunk Bay, NPS-5 Trunk Bay	Not monitored
VI-STJ-04	Hawksnest Bay subwatershed, offshore Class B		NPS-2 Henley Cay	Not monitored
VI-STJ-05	Cinnamon Bay Class B		STJ-44C Cinnamon Bay, NPS-6 Peter Bay, NPS-7 Cinnamon Bay	Not monitored
VI-STJ-06	Maho Bay/Francis Bay Class B		STJ-44D Francis Bay, NPS-8 Maho Bay, NPS-9 Francis Bay, VI536165 Big Maho Bay	**VI536165** --Enterococci/Turbidity monitored weekly

VI-STJ-07	Maho Bay subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STJ-08	Mary Point Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STJ-09	Leinster Bay Class B		NPS-10 Leinster Bay	Not monitored
VI-STJ-10	Minnebeck Bay Class B		NPS-11 Haulover Bay, NPS-30 Newfoundland Bay, NPS-31 Haulover East	Not monitored
VI-STJ-11	Newfound Bay Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STJ-12	North St. John HUC14, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STJ-13	Coral Harbor Class B		STJ-53 Coral Bay, NPS-15 Coral Bay Dock, NPS-16 Johnson Bay, VI823989 Johnson's Bay, STJ-56 Johnson Bay	**STJ-53 and 56** --06/16/10: all parameters except DO monitored --03/30/11: all parameters --07/28/11: all parameters except pH monitored **VI823989** --Enterococci/Turbidity monitored weekly
VI-STJ-14	Hurricane Hole Class B		NPS-13 Water Creek, NPS-14 Princess Bay	Not monitored

VI-STJ-15	Round Bay Class B		STJ-57 Round Bay	**STJ-57** --06/16/10: all parameters except DO monitored --03/30/11: all parameters --07/28/11: all parameters except pH monitored
VI-STJ-16	Coral Bay Class B		NPS-12 Long Point, STJ-58 Privateer Bay	**STJ-58** --06/16/10: all parameters except DO monitored --03/30/11: all parameters --07/28/11: all parameters except pH monitored
VI-STJ-17	Salt Pond Bay Class B		STJ-52 Salt Pond Bay, NPS-17 Salt Pond Bay	Not monitored
VI-STJ-18	Grootman Bay Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STJ-19	Great Lameshur Bay Class B		STJ-51 Great Lameshur Bay, STJ-50 Little Lameshur Bay, NPS-18 Great Lameshur Bay, NPS-19 Yowsi Point, NPS-20 Little Lameshur Bay	Not monitored
VI-STJ-20	Southeast St. John HUC14, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STJ-21	Genti Bay, nearshore Class B		STJ-49 Genti Bay, NPS-21 Reef Bay	Not monitored

VI-STJ-22	Genti Bay, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STJ-23	Fish Bay Class B		STJ-48 Fish Bay, NPS-22 Fish Bay	**STJ-48** --06/16/10: all parameters except DO monitored --03/30/11: all parameters --07/28/11: all parameters except pH monitored
VI-STJ-24	Fish Bay subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STJ-25	Rendezvous Bay Class B		STJ-47 Rendezvous Bay, NPS-23 Rendezvous Bay, VI204627 Klain Bay, VI402599 Hart Bay	**STJ-47** --06/16/10: all parameters except DO monitored --03/30/11: all parameters --07/28/11: all parameters except pH monitored **VI204627, VI402599** --Enterococci/Turbidity monitored weekly
VI-STJ-26	Chocolate Hole Class B		STJ-46 Chocolate Hole, NPS-24 Chocolate Hole,VI391298 Chocolate Hole	**STJ-46** --06/16/10: all parameters except DO monitored --03/30/11: all parameters --07/28/11: all parameters except pH monitored **VI391298** --Enterococci/Turbidity monitored weekly
VI-STJ-27	Rendezvous Bay subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.

VI-STJ-28	Great Cruz Bay Class B		STJ-45 Great Cruz Bay. NPS-25 Great Cruz Bay, VI779192 Great Cruz Bay	**STJ-45** --06/16/10: all parameters except DO monitored --03/30/11: all parameters --07/28/11: all parameters except pH monitored **VI779192** --Enterococci/Turbidity monitored weekly
VI-STJ-29	Turner Bay/Enighed Pond Class C		STJ-55 Turner Bay, NPS-26 Turner Bay	**STJ-55** --06/16/10: all parameters except DO monitored --03/30/11: all parameters --07/28/11: all parameters except pH monitored
VI-STJ-30	Cruz Bay Class B		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), VI309453 Cruz Bay	**STJ-43A,43B, 43C, 43D** --06/16/10: all parameters except DO monitored --03/30/11: all parameters --07/28/11: all parameters except pH monitored **VI309453** --Enterococci/Turbidity monitored weekly
VI-STJ-31	Great Cruz Bay watershed, offshore Class B		VI456779 Frank Bay	**VI456779** --Enterococci/Turbidity monitored weekly
VI-STJ-32	Southwest St. John HUC14, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.

VI-STJ-33	Pillsbury Sound Class B		STJ-OFF13 STJ West-4	Not monitored during this cycle.
VI-STC-01	Frederiksted, south Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-02	Frederiksted Harbor Class C		STC-28 Frederiksted Pier, STC-29 Frederiksted Public Beach, VI970611 F'sted (Fst. Target)	**STC-28 and 29** --07/27/10: all parameters --04/13/11: all parameters **VI970611** --Enterococci/Turbidity monitored weekly
VI-STC-03	Lagrange subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-04	Prosperity, nearshore Class B		VI252619 Rainbow (Prosperity)	**VI252619** --Enterococci/Turbidity monitored weekly
VI-STC-05	Prosperity subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-06	Sprat Hall Beach Class B		STC-30 Sprat Hall Beach, VI645288 Sprat Hall	**STC-30** --07/24/10: all parameters **VI645288** --Enterococci/Turbidity monitored weekly
VI-STC-07	Creque Dam/Butler Bay Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.

VI-STC-08	Hams Bay Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-09	Davis Bay Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-10	Hams Bluff Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-11	Northwest St. Croix HUC14, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-12	Cane Bay Class B		STC-32 Cane Bay, VI201013 Cane Bay	**STC-32** --07/14/10: all parameters --04/13/11: all parameters **VI201013** --Enterococci/Turbidity monitored weekly
VI-STC-13	Baron Bluff subwatershed Class B		STC-31 Davis Bay, VI398766 Davis Bay	**STC-31** --07/14/10: all parameters --04/13/11: all parameters except Enterococci, F. Coliform and TSS because bottle lost. **VI398766** --Enterococci/Turbidity monitored weekly
VI-STC-14	Belvedere Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.

VI-STC-15	Northside subwatershed Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-16	Salt River Lagoon, Marina Class B		STC-33 Salt River Marina, STC-33C Salt River Lagoon, Marina	**STC-33** --07/14/10: all parameters --04/28/11: all parameters except pH **STC-33C** – Site no longer monitored
VI-STC-17	Salt River Lagoon, Sugar Bay Class B		STC-33D Salt River Lagoon, Sugar Bay	Not monitored during this cycle
VI-STC-18	Salt River Bay Class B		STC-33A,B,E-J Salt River (Columbus Landing Beach), VI146901 Gentle Winds, VI558328 Columbus Landing	**STC-33A and 33B** --07/14/10: all parameters --04/28/11: all parameters except pH **STC 33E-J** – No longer monitored **VI146901** --Enterococci/Turbidity monitored weekly **VI558328** --Enterococci/Turbidity monitored weekly
VI-STC-19	Judith Fancy Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-20	Salt River Bay subwatershed, west Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-21	Salt River Bay subwatershed, east Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.

VI-STC-22	Northcentral St. Croix HUC14, offshore Class B		STC-OFF4 North-2, STC-OFF11 North-4	Not monitored during this cycle
VI-STC-23	St. Croix-By-the-Sea Class B		STC- 34 St. Croix-By-the-Sea, VI738082 Pelican Cove	**STC-34** --07/14/10: all parameters **VI38082** --Enterococci/Turbidity monitored weekly
VI-STC-24	Long Reef Backreef, west Class C		STC-48 Long Reef Backreef, west	**STC-48** --04/12/11: all parameters except pH
VI-STC-25	Princess subwatershed, offshore Class C		STC-35 Long Reef Forereef West	**STC-35** --07/14/10: all parameters

VI-STC-26	Christiansted Harbor Class C		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, VI572166 Condo Row (Princess), VI359239 Protestant Cay	**STC-37** --07/13/10: all parameters --10/28/10: all parameters **STC-40** --07/13/10: all parameters --10/27/10: all parameters --04/14/11: all parameters **STC-41, 42, 43, 44, 45, 46 and 47** --07/13/10: all parameters --10/27/10: all parameters --04/12/11: all parameters except pH **STC-49** --10/27/10: all parameters **VI572166 and VI359239** --Enterococci/Turbidity monitored weekly
VI-STC-27	Long Reef Forereef, east Class B		STC-36 Long Reef Forereef East, STC-35A LBJ (Pump Station) Outfall	**STC-36 and 35A** --07/14/10: all parameters
VI-STC-28	Altona Lagoon Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.

VI-STC-29	Christiansted Harbor, east Class C		STC-1 Lagoon Recreational Beach ,STC-39 Altona Lagoon Inlet, VI213332 New Fort Louise Augusta	**STC-1 and 39** --07/13/10: all parameters --10/27/10: all parameters --04/14/11: all parameters **VI213332** --Enterococci/Turbidity monitored weekly
VI-STC-30	Beauregard Bay Class B		STC-2 Ft. Louise Augusta Beach, STC-38 Christiansted Harbour Entrance-East, VI651587 Buccaneer	**STC-2** --07/13/10: all parameters --10/27/10: all parameters --04/14/11: all parameters **STC-38** --07/13/10: all parameters --10/28/10: all parameters **VI651587** --Enterococci/Turbidity monitored weekly
VI-STC-31	Buccaneer Beach Class B		STC-3 Buccaneer Hotel	**STC-3** --07/13/10: all parameters --10/27/10: all parameters --04/14/11: all parameters
VI-STC-32	Altona Lagoon subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-33	Punnett Bay Class B		VI610321 Shoy's	**VI610321** --Enterococci/Turbidity monitored weekly
VI-STC-34	Punnett Point, east Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-35	Tamarind Reef Lagoon (Southgate Lagoon) Class B		STC-4 Tamarind Reef Lagoon	**STC-4** --07/13/10: all parameters --10/28/10: all parameters --04/12/11: all parameters except pH
VI-STC-36	Green Cay Beach Class B		VI563397 Chenay Bay Beach	**VI563397** --Enterococci/Turbidity monitored weekly

VI-STC-37	Southgate subwatershed, offshore Class B		STC-5 Green Cay Beach	**STC-5** --07/13/10: all parameters --10/28/10: all parameters --04/12/11: all parameters except pH
VI-STC-38	Solitude Backreef Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-39	Teague Bay Class B		STC-8 Reef Club Beach, STC-9 St. Croix Yacht Club Beach, VI381319 Teague Bay (Reef)	**STC-8 and 9** --07/14/10: all parameters --10/28/10: all parameters --04/12/11: all parameters except pH **VI381319** --Enterococci/Turbidity monitored weekly
VI-STC-40	Teague Bay Backreef Class B		STC-10 Cramers Park, VI351774 Cramer's Park	**STC-10** --07/14/10: all parameters --10/28/10: all parameters --04/12/11: all parameters except pH **VI351774** --Enterococci/Turbidity monitored weekly
VI-STC-41	Buck Island Backreef Class A		STC-6 Buck Island Backreef, STC-7 Buck Island Anchorage	**STC-6 and 7** --07/14/10: all parameters --10/28/10: all parameters --04/14/11: all parameters
VI-STC-42	Buck Island Forereef Class A		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-43	Solitude and Teague Bay subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.

VI-STC-44	Northeast St. Croix HUC14, offshore Class B		STC-OFF8 North-3	Not monitored
VI-STC-45	Isaac Bay Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-46	Grapetree Bay Class B		STC-11B Isaacs Bay Forereef	**STC-11B** --07/28/10: all parameters --04/19/11: all parameters except pH
VI-STC-47	Turner Hole Backreef Class B		STC-12 Grapetree Beach, VI297470 Grapetree Beach	**STC-12** --07/28/10: all parameters --04/19/11: all parameters except pH **VI297470** --Enterococci/Turbidity monitored weekly
VI-STC-48	Turner Hole subwatershed, offshore Class B		STC-OFF5 East-2	Not monitored
VI-STC-49	Madam Carty Backreef Class B		STC-13B Robin Bay	**STC-13B** --07/28/10: all parameters --04/19/11: all parameters except pH
VI-STC-50	Madam Carty, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-51	Great Pond Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-52	Great Pond Bay Class B		STC-13A Great Pond Bay	**STC-13A** --07/28/10: all parameters --04/19/11: all parameters except pH

VI-STC-53	Great Pond Bay subwatershed, offshore Class B		STC-OFF13 SE-4	Not monitored
VI-STC-54	Leprey Valley Backreef Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-55	Leprey Valley subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-56	Bugby Hole Backreef Class B		STC-14A Halfpenny Bay - Manchenil, STC-14B Halfpenny Backreef, VI931289, Halfpenny	**STC-14A** --07/28/10: all parameters --04/19/11: all parameters except pH **STC-14B** --07/28/10: all parameters --04/19/11: all parameters except pH **VI931289** --Enterococci/Turbidity monitored weekly
VI-STC-57	Bugby Hole subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-58	Southeast St. Croix HUC14, offshore Class B		STC-OFF2 SE-1, STC-OFF10 SE-3	Not monitored
VI-STC-59	Canegarden Bay Class B		STC-15 Canegarden Bay	**STC-14B** --07/28/10: all parameters --04/19/11: all parameters except pH

VI-STC-60	Canegarden Bay, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-61	Hess Oil Virgin Islands Harbor Class C		STC-16 HOVENSA East Turning Basin, NW Corner, STC-17 HOVENSA West Turning Basin, NW Corner	**STC-16** --07/28/10: all parameters --04/19/11: all parameters except pH **STC-17** --07/28/10: all parameters --04/19/11: all parameters except pH
VI-STC-62	Limetree Bay Class B		STC-18 Limetree Bay Container Port	**STC-18** --07/27/10: all parameters --04/19/11: all parameters except pH
VI-STC-63	Martin-Marietta Alumina Harbor Class C		STC-19 Krause Lagoon Channel, STC-20 Alumina Plant Dock	**STC-19 and 20** --07/27/10: all parameters --04/19/11: all parameters except pH
VI-STC-64	Manning Bay/Estate Anguilla Beach Class B		STC-23 Public Dump	**STC-23** --07/27/10: all parameters
VI-STC-65	Hovensa, west Class B		STC-22A Treatment Plant (POTW) Outfall STC-21 Spoils Island (Ruth Island)	**STC-22A** --07/27/10: all parameters **STC-21** --07/27/10: all parameters --04/19/11: all parameters except pH
VI-STC-66	Hovensa subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-67	Southports St. Croix HUC14, offshore Class B		STC-OFF9 SW-3	Not monitored

VI-STC-68	Bethlehem subwatershed, inshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-69	Bethlehem subwatershed, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-70	Airport, nearshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-71	Airport, offshore Class B		STC-OFF6 South-2	Not monitored
VI-STC-72	Airport St. Croix HUC14, offshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-73	Diamond, nearshore Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-74	Enfield Green Beach/VIRIL Outfall Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-75	Diamond subwatershed, offshore Class B		STC-24B Rum Plant (VI Rum) Outfall	**STC-24B** --07/27/10: all parameters
VI-STC-76	Carlton Beach Class B		STC-25 Long Point	**STC-25** --07/27/10: all parameters

VI-STC-77	Long Point Bay Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-78	Long Point Bay subwatershed, offshore Class B		STC-OFF12 SW-4	Not monitored
VI-STC-79	Good Hope Beach Class B		STC-26 Good Hope Beach	**STC-26** --07/27/10: all parameters
VI-STC-80	Sandy Point, nearshore south Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-81	Sandy Point, offshore south Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-82	Sandy Point, nearshore west Class B		STC-27 Sandy Point Public Beach, VI896490 Dorsch Bay, VI907985 Stony Ground	**STC-27** --07/27/10: all parameters --04/13/11: all parameters **VI896490** --Enterococci/Turbidity monitored weekly **VI907985** --Enterococci/Turbidity monitored weekly
VI-STC-83	Sandy Point, offshore west Class B		There are currently no monitoring stations within this assessment unit.	Currently no monitoring stations within this assessment unit and therefore, no monitoring was conducted.
VI-STC-84	Southwest St. Croix HUC14, offshore Class B		STC-OFF3 SW-1	Not monitored

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 which was promulgated on June 11, 2010. The current use determinations are as follows:

§ 186-2. Class A

(a) **Best usage of waters:** Preservation of natural phenomena requiring special conditions, such as the Natural Barrier Reef at Buck Island, St. Croix and the Under Water Trail at Trunk Bay, St. John. These are outstanding natural resource waters that cannot be altered except towards natural conditions. No new or increased dischargers shall be permitted.

§ 186-3. Class B

(a) **Best usage of waters:** For maintenance and propagation of desirable species of aquatic life (including threatened, endangered species listed pursuant to section 4 of the federal Endangered Species Act and threatened, endangered and indigenous species listed pursuant Title 12, Chapter 2 of the Virgin Islands Code) and for primary contact recreation (swimming, water skiing, etc.). This Class allows minimal changes in structure of the biotic community and minimal changes in ecosystem function. Virtually all native taxa are maintained with some changes in biomass and/or abundance; ecosystem functions are fully maintained within the range of natural variability.

§ 186-4. Class C

(a) **Best usage of waters:** For maintenance and propagation of desirable species of aquatic life (including threatened and endangered species listed pursuant to section 4 of the federal Endangered Species Act and threatened, endangered and indigenous species listed pursuant Title 12, Chapter 2 of the Virgin Islands Code) and for primary contact recreation (swimming, water skiing, etc.). This Class allows for evident changes in structure of the biotic community and minimal changes in ecosystem function. Evident changes in structure due to loss of some rare native taxa; shifts in relative abundance of taxa (community structure) are allowed but sensitive-ubiquitous taxa remain common and abundant; ecosystem functions are fully maintained through redundant attributes of the system.

Ground Water Assessment

Groundwater Monitoring Program

WQM is not tasked with monitoring the groundwaters of the USVI. WQM has been informed by DPNR-DEP's Groundwater Program that the only groundwaters that are monitored throughout the Territory are those that are potable water sources. The monitoring is required through DPNR-DEP's Public Water Systems Supervision Program.

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 USVI uses partially supporting only as a measure of impairment severity. Severity is important in helping the USVI 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 for at least one applicable parameter associated with the attainment of the given 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.

Consideration will be taken in cases where a parameter falls within the degree of error of monitoring equipment; the data will be reviewed and if the value is within the instrumentation's degree of error it will be accepted. If after the instrument's degree of error is considered the parameter is still found to be an exceedence it will be considered as such.

1. Primary Contact Recreation

Microbiological Assessment

The use support is based on review of quarterly ambient and weekly beach data for single sample maximum allowable density of fecal coliform and enterococci bacteria, beach closing data and reported oil spills. Allowable limits are determined by the class of the water body. Class A requires that in no case shall Class B water quality standards be exceeded. For fecal coliform, Class B waterbodies should not exceed a geometric (log) mean of 70/100ml and 200 colonies/100mL in Class C waters. Likewise, for all classes of waters, a geometric mean of 35 enterococci per 100 ml., or a single sample maximum of 104 per 100 ml of enterococci should not be exceeded at any time The percent of total violations is evaluated as follows:

1. Fully Supporting: None of the Samples exceed a geometric mean of 70 or 200 colonies/100 ml in Class B and C waters for fecal coliform and 104 colonies/100 ml for enterococci.

2. Not supporting: Any of the Samples exceed a geometric mean of 70 or 200 colonies/100 ml in Class B and C waters for fecal coliform and 104 colonies/100 ml for enterococci.

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:

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

2. 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.

* Closure as stated above refers to the VI Department of Health or VI Waste Management Authority closing beaches due to immediate health risks or threats. While, restrictions refer to advisories which may recommend that the public avoid certain areas/beaches.

The Department of Planning and Natural Resources only issues administrative advisories. Beach closures would only be enforced for very serious threats to human health; these closures can only be implemented by the VI Department of Health or the VI Waste Management Authority. These serious threats are usually the related to bypasses or overflows of the municipal sewer system, which may result in raw sewage flowing onto beaches and into the nearshore/bathing areas. DEP has implemented a Beaches Environmental Assessment and Coastal Health (BEACH) Monitoring Program that takes Enterococci at select sites on a weekly basis. This data will be used in conjunction with data collected from the Ambient Monitoring Program.

Beaches which are listed as not suitable for fishing or swimming in the weekly Beach Program advisories have had samples collected which exceed the standard twice within that monitoring week. The raw data collected by the Beach Program at the program's 43 designated beached are assessed for compliance with standards on a quarterly basis.

Toxicant Assessment (Human Health and Aquatic Life)/ Toxicity Assessment

The applicable numeric water quality standards for toxic pollutants to protect the designated uses of waters of the U.S. Virgin Islands shall be the Environmental Protection Agency's (EPA) national recommended Clean Water Act section 304(a) water quality criteria, EPA's Office of Water, Office of Science and Technology (4304T), 2006. Those parameters can be found at the following website: <http://www.epa.gov/waterscience/criteria/wqctable/index.html>

The conditions for use support are as follows:

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

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

3. Not Supporting: Toxicants or toxicity noted in many tests and occurs frequently.

Currently DPNR-DEP does not collect any toxicity data and none was received during the data solicitation period. Therefore, no assessments were made based on toxicants or toxicity during this reporting period. DPNR-DEP will continue to review its criteria for these assessments and will work to improve upon the current criteria to ensure they are relevant to the assessment of human health.

Additionally, as DPNR-DEP works to expand the VI Water Quality Standards this section will continue to be amended.

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:

1. Fully Supporting: For any one pollutant or stressor, criteria exceeded in none of the measurements.

2. Not Supporting: For any one pollutant, criteria exceeded in any of measurements.

DPNR-DEP intends to continue to work towards developing expanded criteria for making assessments within this category. There were no assessments made for this category during this reporting cycle.

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 and the biological integrity of the benthic communities living within waters. These communities shall be assessed by comparison to reference conditions(s) with similar abiotic and biotic environmental settings that represent the optimal or least disturbed condition for that system. Such reference conditions shall be those observed to support the greatest community diversity, and abundance of aquatic life as is expected to be or has been historically found in natural settings essentially undisturbed or minimally disturbed by human impacts, development, or discharges.

Habitat assessment data is considered as follows:

1. 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).

2. 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.

3. 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 and inclusion of exotic or aquatic nuisance species

DPNR-DEP received no habitat assessment data for the 2010-2011 reporting cycle. As DPNR-DEP continues its ongoing efforts to improve the VI Water Quality Standards, criteria will be set for

reference conditions/sites which will assist in completing habitat assessments for various waterbody classes.

Conventional Assessment

Significant violations are determined for conventional parameters. Conventional parameters are evaluated using the number of exceedences of water quality standards.

The conventional parameters are:

- Dissolved Oxygen (not less than 5.5 mg/l from other than natural conditions)*;
- Temperature (not to exceed 32°C at any time, nor as a result of waste discharge to be greater than 1.0°C above natural conditions)*;
- Turbidity; and
- pH.

*The term "natural condition" for Dissolved Oxygen and Temperature will be addressed through work in collaboration with the Environmental Protection Agency (EPA) for Class B and C waters during the next Triennial Review of the WQS. During that process DPNR-DEP will outline how they will define reference sites and establish reference conditions. Once developed these criteria will be incorporated into this Assessment Methodology.

The conditions for use support for the conventional parameters are as follows:

1. Fully Supporting: For any one pollutant or stressor, criteria exceeded in none of the measurements.

2. Not Supporting: For any one pollutant, criteria exceeded in any of the measurements.

Biological Assessment

When available, DPNR-DEP may use data collected/received from biological monitoring projects. Upon identifying a source of data to apply towards a biological assessment, the conditions for use support, which will be evaluated in accordance with the narrative Biocriteria outlined in the VI Water Quality Standards, as follows:

1. 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.

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

3. 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 2010-2011 reporting cycle.

Listing Rules

Minimum Number of Samples: Unless described differently for a particular parameter, the minimum data set consists of eight samples. The Department believes that two years of data collected quarterly are adequate and represents the minimum dataset necessary for an adequate assessment. These recommendations are intended to ensure that existing water quality conditions are accurately portrayed by the data and that the results do not reflect transitional conditions. The Department will consider a data set which does not meet this minimum requirement on a case-by-case basis to determine if the data adequately characterizes the water quality conditions. Summer-only sampling for nutrients, pathogenic quality, and temperature may be acceptable since summer generally represents the critical condition for these parameters. If the Department determines that the data set adequately represents water quality conditions and there are at least two exceedences of the Surface Water Quality Standards, this limited data set will be used to determine that a use is not attained.

This methodology groups assessments as follows:

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

*These parameters were used in making the assessments used for listing during this reporting cycle

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 not all uses are supported.

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.

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 placed in Category 4 under the appropriate subcategory (4A, 4B, 4C), but TMDL is not needed.

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, it 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 placed 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 2012 303(d) Total Maximum Daily Load List.

De-listing
DPNR de-listed the following Assessment Units during the 2010-2011 reporting cycle.

AU ID	AU Name	Parameter(s)	Reason For Delisting
VI-STC-26	Christiansted Harbor	Fecal Coliform	TMDL approved on September 26,2007
VI-STC-26	Christiansted Harbor	Enterococci	TMDL approved on September 26, 2007
VI-STJ-15	Round Bay	Turbidity	Coral Bay AU previously mislabeled in 2010 IR Documents. This impairment actually occurred in VI-STJ-13
VI-STJ-15	Round Bay	pH	Coral Bay AU previously mislabeled in 2010 IR Documents. This impairment actually occurred in VI-STJ-13
VI-STT-10	Magen's Bay	Fecal Coliform	TMDL approved on September 26,2005
VI-STT-35	Mangrove Lagoon	Fecal Coliform	TMDL approved on September 26,2005
VI-STT-39	Morningstar Bay	Dissolved Oxygen	TMDL approved on September 03, 2010
VI-STT-40	Teague Bay Backreef	Dissolved Oxygen	TMDL approved on September 03, 2010
VI-STT-43	St. Thomas Harbor, Inner	Dissolved Oxygen	TMDL approved on September 03, 2010
VI-STT-43	St. Thomas Harbor, Inner	Enterococci	TMDL approved on September 03, 2010
VI-STT-43	St. Thomas Harbor, Inner	Fecal Coliform	TMDL approved on September 03, 2010
VI-STT-45	Isaac Bay	Dissolved Oxygen	TMDL approved on September 03, 2010
VI-STT-46	Grapetree Bay	Dissolved Oxygen	TMDL approved on September 03, 2010
VI-STT-47	Hassel Island at Haulover Cut to Regis Point	Enterococci	TMDL approved on September 03, 2010
VI-STT-47	Hassel Island at Haulover Cut to Regis Point	Dissolved Oxygen	TMDL approved on September 03, 2010
VI-STT-47	Hassel Island at Haulover Cut to Regis Point	Fecal Coliform	TMDL approved on September 03, 2010

VI-STT-49	Druif Bay	Dissolved Oxygen	TMDL approved on September 03, 2010
VI-STT-50	Flamingo	Dissolved Oxygen	TMDL approved on September 03, 2010
VI-STT-51	Krum Bay	Fecal Coliform	TMDL approved on September 03, 2010

C. Monitoring Strategy

The Water Quality Management Program was tasked with revising the Multi-Year Monitoring Strategy during FY2012, the new information will be included in the next Integrated Report. The current monitoring strategy addresses the integrated five categories and the assessment units delineated by Battelle (2003). 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 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 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.

On March 21, 2012, the Virgin Islands Department of Planning and Natural Resources released the 2012 303(d) List of Impaired Waterbodies for public comment. The final list consists of 87 assessment units listed for a variety of impairments. The 2012 303(d) List of Impaired Waterbodies is attached to this report as an Attachment.

D. Estuary and Coastal Assessment

1. 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.1. 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	Not Supporting	5
VI-STT-02	Stumpy Bay	0.0597	Not Supporting	5
VI-STT-03	Botany Bay subwatershed, offshore	1.309	Insufficient Information	3A
VI-STT-04	Santa Maria Bay	0.3617	Not Supporting	5
VI-STT-05	Caret Bay	0.0266	Not Supporting	5
VI-STT-06	Neltjeberg Bay	0.0562	Fully Supporting	1
VI-STT-07	Dorothea	0.0254	Not Supporting	5
VI-STT-08	Hull Bay	0.2049	Not Supporting	5
VI-STT-09	Dorothea Bay subwatershed, offshore	0.7673	Insufficient Information	3A
VI-STT-10	Magens Bay	1.6208	Not Supporting	5
VI-STT-11	Northwest St. Thomas HUC14, offshore	55.088	Fully Supporting	1
VI-STT-12	Lovenlund Bay	0.0228	Insufficient Information	3A
VI-STT-13	Mandahl Bay (Marina)	0.0131	Not Supporting	5
VI-STT-14	Tutu Bay	0.0414	Insufficient Information	3A
VI-STT-15	Sunsi Bay	0.0152	Not Supporting	5
VI-STT-16	Spring Bay	0.0102	Not Supporting	5
VI-STT-17	Mandahl Bay subwatershed, offshore	1.1379	Not 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	Not Supporting	5
VI-STT-22	Red Bay	0.0078	Not Supporting	5
VI-STT-23	Vessup Bay	0.0619	Not Supporting	5
VI-STT-24	Red Hook Bay	0.1772	Not Supporting	5
VI-STT-25	Great Bay	0.5593	Not 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	Not Supporting	5
VI-STT-29	St. James Bay	1.2439	Insufficient Information	3A
VI-STT-30A	Northeast St. Thomas HUC14, offshore north	42.927	Fully Supporting	1
VI-STT-30B	Northeast St. Thomas HUC14, offshore south	24.908	Insufficient Information	3A
VI-STT-31	Nazareth Bay	0.1793	Fully Supporting	1
VI-STT-32	Jersey Bay, offshore	1.2925	Not Supporting	5
VI-STT-33	Benner Bay	0.4187	Insufficient Information	3A
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	Not Supporting	5
VI-STT-37	Frenchman Bay	0.0195	Not Supporting	5
VI-STT-38	Limetree Bay	0.0065	Not Supporting	5
VI-STT-39	Morningstar Bay	0.0215	Not Supporting	5
VI-STT-40	Pacquereau Bay	0.0453	TMDL Established	4A
VI-STT-41	Frenchman Bay subwatershed, offshore	2.9233	Insufficient Information	3A
VI-STT-42	Southeast St. Thomas HUC14, offshore	50.939	Fully Supporting	1
VI-STT-43	St. Thomas Harbor, inner	0.7495	Not Supporting	5
VI-STT-44	St. Thomas Harbor, outer	1.2128	Insufficient Information	3A
VI-STT-45	Gregerie Channel	1.7072	TMDL Established	4A
VI-STT-46	Sprat Bay	0.3814	TMDL Established	4A
VI-STT-47	Hassel Island at Haulover Cut to Regis Point	0.2074	Not Supporting	5
VI-STT-48	Water Isle Hotel, Beach	0.0057	Insufficient Information	3A
VI-STT-49	Druif Bay	0.0331	Not Supporting	5
VI-STT-50	Flamingo	0.061	Not Supporting	5
VI-STT-51	Krum Bay	0.0754	Not Support	5
VI-STT-52	Lindbergh Bay	0.2612	Not Supporting	5
VI-STT-53	Cyril E. King Airport subwatershed, offshore	0.8499	Not Supporting	5
VI-STT-54	Perseverance Bay, offshore	0.4734	Not Supporting	5
VI-STT-55	Brewers Bay	0.1076	Not Supporting	5
VI-STT-56	Perseverance Bay	0.2114	Not Supporting	5
VI-STT-57	Fortuna Bay	0.0827	Not Supporting	5
VI-STT-58	Fortuna Bay subwatershed, offshore	0.6553	Insufficient Information	3A
VI-STT-59	Northwest St. Thomas HUC14, offshore	77.71	Fully Supporting	1
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	Unassessed	-
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	Unassessed (NPS Jurisdiction)	-
VI-STJ-08	Mary Point	0.4831	Unassessed (NPS Jurisdiction)	-
VI-STJ-09	Leinster Bay	0.6627	Unassessed (NPS Jurisdiction)	-
VI-STJ-10	Minnebeck Bay	1.4876	Unassessed (NPS Jurisdiction)	-

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	Not Supporting	5
VI-STJ-14	Hurricane Hole	0.7689	Insufficient Information	3A
VI-STJ-15	Round Bay	0.6015	Not Supporting	5
VI-STJ-16	Coral Bay	2.2337	Insufficient Information	3A
VI-STJ-17	Salt Pond Bay	0.1978	Unassessed (NPS Jurisdiction)	-
VI-STJ-18	Grootman Bay	0.1046	Unassessed (NPS Jurisdiction)	-
VI-STJ-19	Great Lameshur Bay	0.359	Unassessed (NPS Jurisdiction)	-
VI-STJ-20	Southeast St. John HUC14, offshore	24.319	Insufficient Information	3A
VI-STJ-21	Genti Bay, nearshore	0.0947	Unassessed (NPS Jurisdiction)	-
VI-STJ-22	Genti Bay, offshore	0.769	Unassessed (NPS Jurisdiction)	-
VI-STJ-23	Fish Bay	0.2103	Not Supporting	5
VI-STJ-24	Fish Bay subwatershed, offshore	0.1824	Unassessed (NPS Jurisdiction)	-
VI-STJ-25	Rendezvous Bay	0.4677	Not Supporting	5
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	Not Supporting	5
VI-STJ-30	Cruz Bay	0.0674	Not Supporting	5
VI-STJ-31	Great Cruz Bay watershed, offshore	0.5775	Not Supporting	5
VI-STJ-32	Southwest St. John HUC14, offshore	10.142	Insufficient Information	3A
VI-STJ-33	Pillsbury Sound	6.9399	Fully Supporting	1
VI-STC-01	Frederiksted, south	0.0451	Insufficient Information	3A
VI-STC-02	Frederiksted Harbor	0.035	Not Supporting	5
VI-STC-03	Lagrange subwatershed, offshore	0.375	Insufficient Information	3A
VI-STC-04	Prosperity, nearshore	0.1118	Not Supporting	5
VI-STC-05	Prosperity subwatershed, offshore	0.5129	Insufficient Information	3A
VI-STC-06	Sprat Hall Beach	0.0609	Not Supporting	5
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	Fully Supporting	1
VI-STC-12	Cane Bay	0.0613	Not Supporting	5
VI-STC-13	Baron Bluff subwatershed	0.3498	Not Supporting	5
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	Fully Supporting	1
VI-STC-18	Salt River Bay	0.3229	Not Supporting	5
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	Fully Supporting	1
VI-STC-23	St. Croix-By-the-Sea	0.0727	Not Supporting	5

VI-STC-24	Long Reef Backreef, west	0.1153	Not Supporting	5
VI-STC-25	Princess subwatershed, offshore	0.4343	Not Supporting	5
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	Not Supporting	5
VI-STC-30	Beauregard Bay	0.2145	Not Supporting	5
VI-STC-31	Buccaneer Beach	0.0166	Not Supporting	5
VI-STC-32	Altona Lagoon subwatershed, offshore	0.6812	Insufficient Information	3A
VI-STC-33	Punnett Bay	0.0576	Not Supporting	5
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	Not Supporting	5
VI-STC-37	Southgate subwatershed, offshore	2.2219	Not 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	Not Supporting	5
VI-STC-41	Buck Island Backreef	0.7675	Not Supporting	5
VI-STC-42	Buck Island Forereef	3.3497	Unassessed (NPS Jurisdiction)	-
VI-STC-43	Solitude and Teague Bay subwatersheds, offshore	18.822	Unassessed (NPS Jurisdiction)	-
VI-STC-44	Northeast St. Croix HUC14, offshore.	36.088	Unassessed (NPS Jurisdiction)	-
VI-STC-45	Isaac Bay	0.0853	Insufficient Information	3A
VI-STC-46	Grapetree Bay	0.0425	Not Supporting	5
VI-STC-47	Turner Hole Backreef	0.2772	Not Supporting	5
VI-STC-48	Turner Hole subwatershed, offshore	16.949	Fully Supporting	1
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	Fully Supporting	1
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	Not Supporting	5
VI-STC-57	Bugby Hole subwatershed, offshore	3.9	Insufficient Information	3A
VI-STC-58	Southeast St. Croix HUC14, offshore	24.146	Fully Supporting	1
VI-STC-59	Canegarden Bay	0.8542	Not Supporting	5
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	Not Supporting	5
VI-STC-63	Martin-Marietta Alumina Harbor	0.3228	Not Supporting	5
VI-STC-64	Manning Bay/Estate Anguilla Beach	0.0508	Not Supporting	5
VI-STC-65	HOVENSA, west	1.2865	Not Supporting	5
VI-STC-66	HOVENSA subwatershed, offshore	2.8305	Insufficient Information	3A
VI-STC-67	Southports St. Croix HUC14, offshore	8.1966	Fully Supporting	1
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	Fully Supporting	1

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	Not 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	Fully Supporting	1
VI-STC-79	Good Hope Beach	0.1876	Not Supporting	5
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	Not Supporting	5
VI-STC-83	Sandy Point, offshore west	0.4875	Insufficient Information	3A
VI-STC-84	Southwest St. Croix HUC14, offshore	18.347	Fully Supporting	1

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.

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

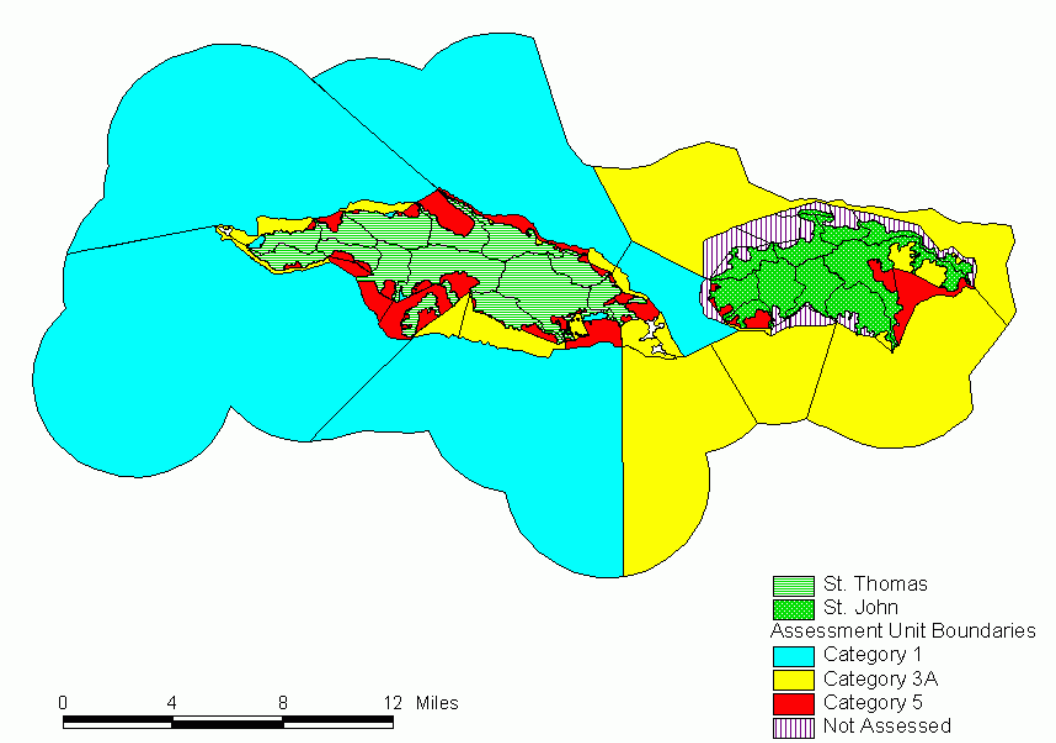
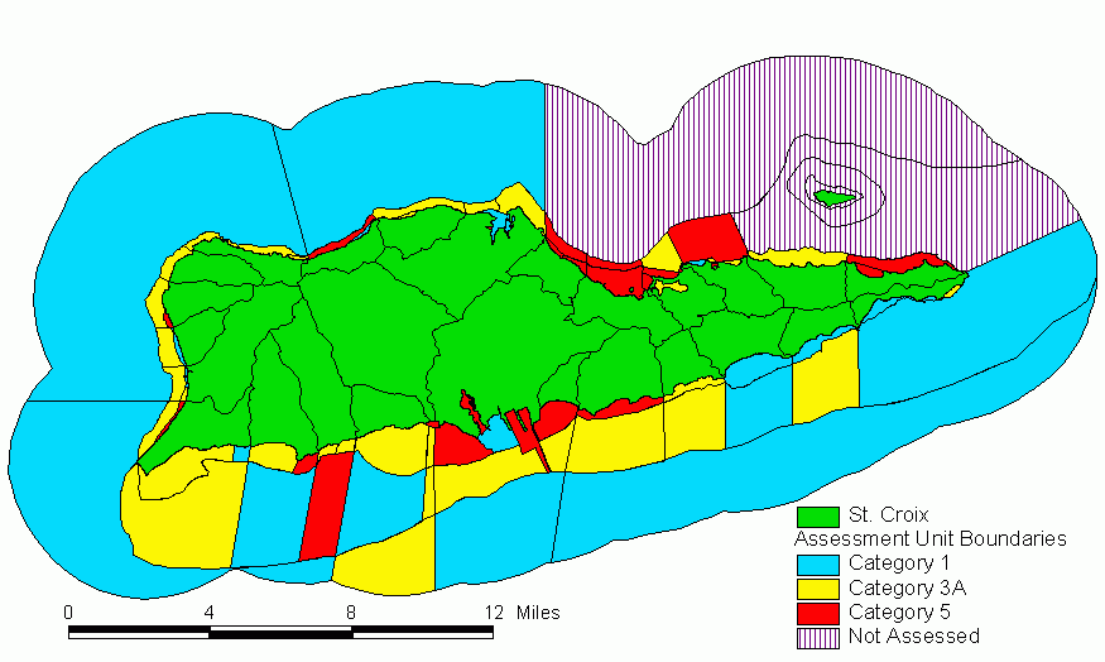


Figure III.C.2.b St. Croix Integrated Categories



Several assessment units were not assessed this cycle because certain areas fall within the jurisdiction of the National Park Service (refer to Attachment 1: 2012 303(d) List of Impaired Waterbodies for

greater detail). While the current assessment unit structure does not match perfectly with the waters under federal jurisdiction, Figures III.C.2.c and III.C.2.d illustrates these particular areas.

Figure III.C.2.c St. John Assessment Units Completely Under Federal Jurisdiction

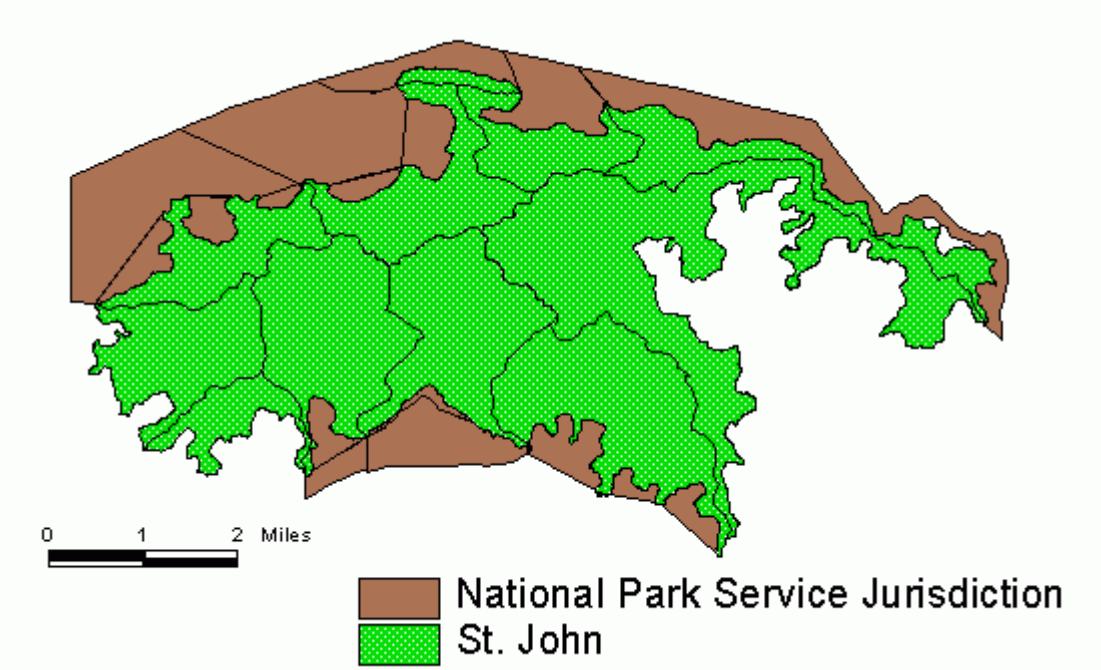
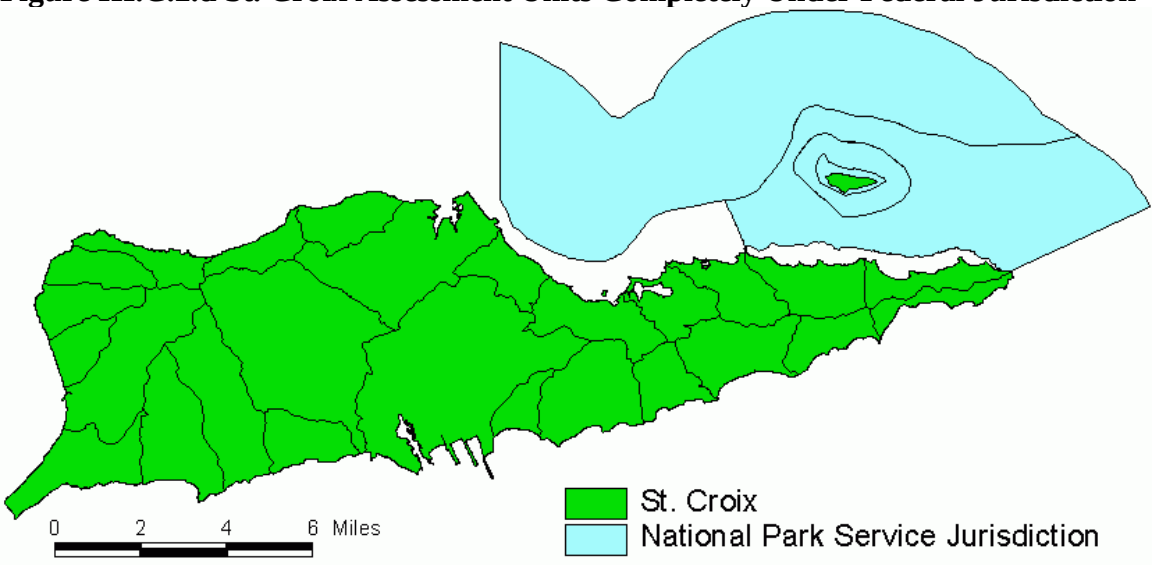


Figure III.C.2.d St. Croix Assessment Units Completely Under Federal Jurisdiction



3. Causes and Sources of Designated Use Impairment

a) Eutrophication

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

b) Case Studies

The Unified Watershed Assessment includes a detailed summary of existing conditions for the 18 Coastal Zone Management Areas of Particular Concern. These APC reports contain water quality reports for each APC.

E. 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 12 V.I.C. §903(b)(8) (2013), 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

There is currently no Wetlands Management Program in the US Virgin Islands, though wetlands form a part of several programs and there are policies and legal mandates for management of wetlands.

There is no clear picture of the current state of wetlands, particularly in terms of the environmental quality, species diversity and ecological integrity. That information gap results primarily from the absence of monitoring programs for wetlands or associated resources. The most extensive information is generated by resource assessments (e.g. survey of water birds or survey of salt ponds) that tend to be island specific and decades apart. Researchers from the University of the Virgin Islands also conduct occasional site-specific assessments.

F. 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 or storms) was conducted this cycle. There were, however, the following natural disasters during this reporting cycle:

- *Hurricane Earl:*
  August 31, 2010 visual assessments conducted; no water quality samples were collected/analyzed

- *Tropical Storm Otto:*
  October 6, 2010 visual assessments conducted; no water quality samples were collected/analyzed

❖ The BEACH program issues notices on a weekly basis for territorial beaches that are being monitored. Advisories are issued following discovery of enterococci impairments.

IV. GROUNDWATER ASSESSMENT

In the VI, 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
2) Fractured volcanic bedrock
3) Alluvial deposits

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.

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.

A. Permitting

The Ground Water program manages the installation of groundwater wells and groundwater withdrawals through a permitting system under 12 V.I.C. § § 151-166 (2013) . 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
St. Croix*	723
St. Thomas	183
St. John	39

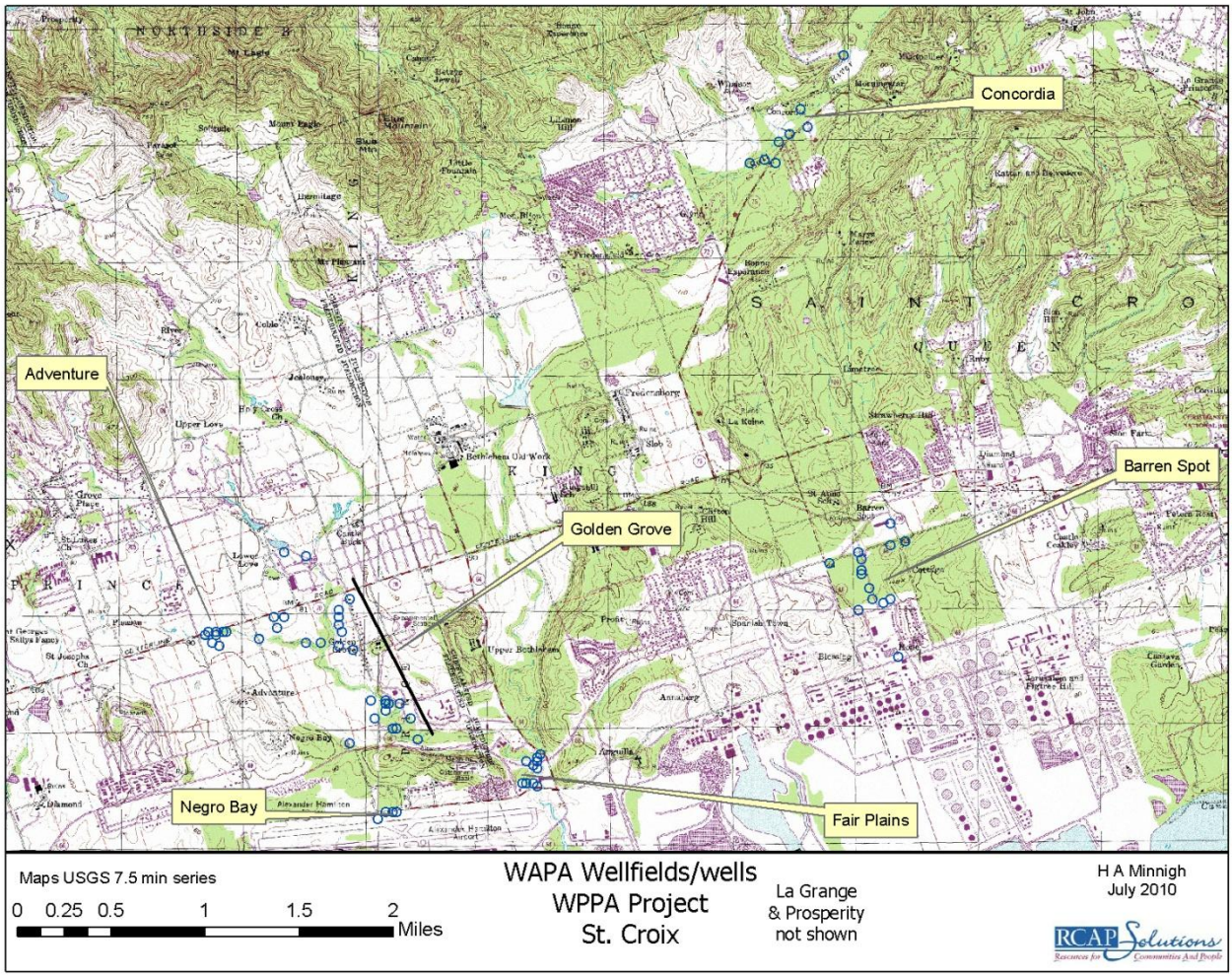
* Excluding HOVENSA groundwater monitoring and product recovery wells, regulated by RCRA Part B operating permit.

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 2010 through September 2011	Approved: 71 Rejected: 0 Total: 71	Approved: 23 Rejected: 0 Total: 23	Approved: 21 Rejected: 0 Total: 21	Approved: 7 Rejected: 0 Total: 7

DPNR-DEP has identified seven "Key Themes" to guide groundwater management activities over the next decade:
1) Clarifying "Whose Water is it?"
2) Recognizing the Connections between Groundwater and Surface Water
3) Evaluating and Managing Threats to Groundwater Quality
4) Linking Land Use Planning and Groundwater Protection
5) Developing a Comprehensive Approach to Groundwater Quantity
6) Addressing Water Use and Conservation Issues
7) Collecting Long-Term Groundwater Data to Address Long-term Problems

1. Virgin Islands Water and Power Authority (WAPA)
The "major" water supplier in the VI is the Virgin Islands Water and Power Authority (WAPA). Ground water has the potential to contribute 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). No ground water is used in the WAPA distribution system on St. Thomas and St. John at the present time; however, the authority has previously investigated the use of ground water in the Sugar Estate, St. Thomas and Estates Adrian and Carolina, St. John, to augment the desalinated water supply.



WAPA : St. Croix

On St. Croix, WAPA's principal water supply comes from desalination units, which are capable of producing about 3 MGD(storage capacity =40 MG). 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.

WAPA : St. Thomas

On St. Thomas, WAPA provides desalinated water for distribution (approximately 2.2 MGD (storage capacity =40 MG)). Although WAPA used several wells in the vicinity of the St. Thomas Hospital in Sugar Estate from 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's 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 these wells in the Sugar Estate area, but to date, the 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. Additionally, several wells were drilled on St. John under the EGWS program described above, but to date, with the exception of one well in Estate Carolina, the wells have not been put into production. The Estate Carolina WAPA well was put on line in the spring of 1994 as supplemental water supply for the eastern portion of St. John. The well provides mineral-rich water (TDS of approximately 2500 ppm) from a shallow, unconsolidated material aquifer, which is pumped into pressure tanks to meters for non-potable use only.

2. 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. In addition to drinking water quality monitoring parameters, these systems must monitor their well water for Total Dissolved Solids.

Table IV.A.3 Overview of VI Public Water Systems Utilizing Groundwater

Island	Number of Water Systems Utilizing Groundwater				
	Community	**Non-Transient, Non-Community**	**Transient, Non-Community**	**Bottled Water Plant**	**Total**
St. Croix	9	4	10	1	**24**
St. Thomas	2	4	13	4	**23**
St. John	0	1	2	1	**4**

Wellhead protection is vital to the long-term quality of life in the VI as the population increases. Fresh water is an especially valuable resource in the VI. 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 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.

B. Wellhead Protection Actualization Assessment

The Territory does not at this time have a formal Wellhead Protection Plan (WHPP). There is a Wellhead Protection Final Report which was intended to form the nexus for a WHPP. It is anticipated that a WHPP be developed following the US EPA example ordinance[2]. The categories of

[2] The model is available at http://www.epa.gov/nps/ordinance/mol7.htm#groundwater.

permitted and non-permitted activities around wellheads[3] contained in the model ordinance will be used. See Table , below for examples of the most common problems in St. Croix.

Table IV.B.1 Non-Permitted uses in Zone 1	
Automobile body/repair shop	1
Gas station	2
Fleet/trucking/bus terminal	3
Dry cleaner	4
Electrical/electronic manufacturing facility	5
Machine shop	6
Metal plating/finishing/fabricating facility	7
Chemical processing/storage facility	8
Wood preserving/treating facility	9
Junk/scrap/salvage yard	10
Mines/gravel pit	11
Irrigated nursery/greenhouse stock	12
Confined animal feeding operations	13
Land divisions resulting in high density (>1 unit/acre) septic systems	14
Equipment maintenance/fueling areas	15
Injection wells/dry wells/sumps, except for single-family residences directing gutter downspouts to a drywell	16
Underground storage tanks, (except those with spill, overfill, and corrosion protection requirements in place)	17
All other facilities involving the collection, handling, manufacture, use, storage, transfer or disposal of any solid or liquid material or waste having potentially harmful impact on groundwater quality including illegal disposal of solid waste on the surface not directly associated with a facility	18
All uses not permitted in the underlying zone district	19

In Table IV.B.1, note that the sequential numbers are not intended as rankings; these numbers will be used to reference the specific threats in the database under development.

1. *Time of Travel Buffers*

[3] Actually, in Zone 1, which for St. Croix is the 20-yr TOT radius.

It is abundantly clear that essentially none of the existing priority wells, vendors, WAPA or large user, will meet any of the Time-of-Travel (TOT) suggested , either of the Model Ordinance, which uses 1,000 feet radius (as typical of a 6-month TOT) or in the calculations which are both more rigorous and locally calculated but give 20-yr TOT's radii of approximately 1,400 feet or less with most around 1,000 feet. Examples of these buffers are provided at Figure IV.C. and Figure IV.C.29. On the La Grange TOT illustration (Figure IV.C.) the primary threats are the number of residences, all with on-site wastewater treatment as well as solid waste, industrial waste and stored or abandoned equipment. For Negro Bay wells (Figure IV.C.29) the primary threats are solid waste (informal dumps) and possible spills from the National Guard facility and the several warehousing facilities to the North. Negro Bay and New Golden Grove are probably the best-sited wellfields on St. Croix from the standpoint of nearby risks; i.e., risks within the TOT wellhead protection area.

2. Flooding

All of the WAPA and vendor production wells and many of the large users' wells are located in flood hazard areas (see Figure IV.C.28). Most WAPA wells are protected from inundation by reinforced concrete (RC) platforms and risers; an example is at Figure IV.C.10. These are typical of the wells inherited by WAPA from DPW and those developed by the Authority since. A much rarer WAPA well is at Figure IV.C.11 where the casing is continued to about 3' above a platform but without the RC riser. This may be typical of wells developed by private owners and leased to WAPA.

A number of vendors and smaller users near WAPA production wells are notably susceptible to flooding or entry of contaminants through inadequate siting or poorly sealed or unsealed well heads. Illustrations of these are at Figure IV.C.12 through Figure IV.C.10.

3. Particular threats – poor siting or construction

There are a number of egregiously poor sites with wells; poor either because of sites selected and developed or because of poor or mismanagement of the wellhead area or areas adjacent. Since much of this development occurred before there was concerted effort to control development and manage wellhead impact areas there is little that can be done at this point. Some ideas are discussed below in the section - Suggestions for Interim Measures. Often, in the case of adjacent problems, the well owner or operator has little or no control over the use of that area. An example of poor siting is at Figure IV.C.16; this is a shallow well with a compromised seal and subject to overland flows that could include significant amounts of diesel and material from the road.

An example of poor site management (and a very poor well seal) is at Figure IV.C.20 and Figure IV.C.21. While the fuel tank might not exceed the minimum to require containment, it is directly adjacent to a well. In addition, the wellhead is very poorly sealed.

Another example is at Figure IV.C.22 and Figure IV.C.23. Figure IV.C.23 is the cut-off well pipe and conduit for what was a production well at this site. This well is within 10 feet of a well in production for a water vendor and is, as may be seen, completely unprotected.

4. Summary

The most common threat to wells and well recharge areas are the ubiquitous aggregations of household, construction and mechanical solid waste. However, it is apparent that the efforts of the Waste Management Authority have borne fruit; much of this material no longer occurs with the density nor is it as common as it was previously. Exceptions are piles of waste on private property (see Figure IV.C.24 and Figure IV.C.25).

It is important to note that few of these threats to groundwater are the result of intentional misconduct or malfeasance. More typically, they are the result of a lack of understanding of the possible consequences of action or inaction. DPNR will schedule some community consciousness-raising meetings, utilizing some school time for students, for example. In addition, reminding landowners and agencies of responsible land management and the fragility of the groundwater resource in the Territory might also pay dividends.

5. Suggestions for Interim Measures

The following suggestions assume that more staff time and effort will be available for implementing the permit program. While many wells had permits most have expired and many do not meet minimum requirements for permitting. For example, it is believed that most residential wells do not have meters and many commercial wells also do not have meters – or functioning meters – and reporting and permit renovation is not done. In addition, there are a number of large production wells that are not and have never been permitted.

a. Educate Licensed well drillers

DPNR-DEP issues well drillers licenses. DPNR-DEP will use the opportunity to focus educational efforts on the single entity (well drillers) that would touch every new well. If permitted well drillers were responsible for acquiring permits for wells a body of knowledgeable persons would be dealing with DPNR-DEP in the siting and development of new wells.

b. Individual existing wells

At least some effort should be made to assist owners and operators of production wells to reduce threats in the areas of their wellheads. The adoption of a wellhead protection plan should help resolve this, but in the interim assistance in the form of consumer education and assistance with enforcement of Territorial regulations on unpermitted solid waste sites, illegal dumping and storage and handling of liquids, toxic and hazardous materials could provide some relief for owners of wells subject to surface and sub-surface threats.

c. Relief for owners of permitted wells

The Territory should begin to ensure that all permits are current and that permit holders understand their responsibilities in ensuring the viability of groundwater resources in USVI. As part of this effort DPNR-DEP could provide assistance with cataloguing specific threats to permitted wells and provide permittees with an understanding of the possible effects of those threats to their water quality and a record of the then-current state at the time of renovation. In addition, DPNR-DEP could provide permittees with measures they can undertake to eliminate, reduce or manage those risks. As an incentive to renovating permits DPNR-DEP could provide well owner/permittees a specific time period to deal with threats under their control with no penalties.

C. WAPA wells

WAPA wells to remain in service

The WAPA wells that are to remain in service are shown at Table, below. WAPA has not used any groundwater since about April of 2010 since the RO unit at Richmond came on-line. The wells to be retained will be secured and stand-by power will be provided. As part of the work in this project the possibility of distributing normal power from a central location, probably the Fairplains Pump Station, will be considered and reported. This will ease the provision of stand-by power since a single large generator located at or near the central location could be provided and power distributed using the same network used for normal power. Individual costs are not provided at this time, though approximate costs will be part of the final report following consultations with WAPA on the form and generality of security and service-assurance techniques. All these wells use the Fair Plains pump station.

Table IV.C.1 Primary WAPA Wells

Well#[4]	Well Name	GPM	SWL[5]	Depth
9	Bethlehem	40	38.1	114.2
10	Bethlehem	40	27.6	121.3
5A	Negro Bay	10	52.7	110.5
5	Negro Bay	25	59.3	114.9
6	Negro Bay	20	65.3	130.1
7	Negro Bay	35	58.6	115.1
6	New Golden Grove	35	59.3	114.9
7	New Golden Grove	35	63.3	130.1
8	New Golden Grove	37	52.7	110.5
15A	New Golden Grove	40	62.1	122.5

Output of these wells, as reported by WAPA in 2010, sums to about 0.5 MGD (24-hr day, or 0.25/12 hr day). It remains to be seen if these will improve with reduced WAPA usage. DPNR-DEP has recommended placing well-level meters in at least one well in Negro Bay and one in New Golden Grove. Historical data for static water levels[3] in St. Croix are shown at Figure IV.C.26 and Figure IV.C.27. As may be seen Negro Bay and New Golden Grove show the best levels.

Half a million gallons per day would approximate around 20-25% of normal production. In the event that these wells would become the sole source in the event of a weather or geologic event interrupting normal service WAPA and St. Croix could probably maintain minimal service for several weeks. The risk of such an event and the value of additional emergency production must be considered.

[4] These numbers will be standardized; at least two methods are currently in use.
[5] Standing Water Level.

WAPA Wells not now scheduled for service beyond 2010

These are shown in Table . These are mostly wells that were developed and owned by others and WAPA has or will let leaseholds lapse. Owners will be advised that these wells must either be permitted and comply with construction and protection norms or abandoned and closed properly. WAPA-owned wells will be subject to the same requirements.

Table IV.C.2 WAPA Wells not intended for service after 2010

Well#	Well Name	GPM	SWL	Depth
18	Adventure	7	25.6	88.2
19	Adventure	10	35.6	100.2
20	Adventure	14	33.6	97.6
5	Adventure	25	31.5	103.3
6	Adventure	13	39.3	99.2
8	Adventure	13	25.7	85.9
1	Fairplain	10	27.1	86.7
1	Old Golden Grove	10	29	91.3
15	Old Golden Grove	12	33.5	94.5
16	Old Golden Grove	13	35.7	86.7
21	Old Golden Grove	14	28.7	91.4

In addition to the wells and well fields above, the following well fields (see Table , below) have been in production or were developed at one time and will be visited and checked for WHPP compliance. Those that have reverted to private hands will be noted and DPNR will schedule dates for closing or rehabilitation, sanitary seal acceptability and security. A priority schedule will be developed.

Table IV.C.3 WAPA Well Fields not intended for service after 2010

Field Name	Number of Wells/
Prosperity	Name used for La Grange and Mahogany Road wells at one time
Mahogany Road	4 All require proper closure or improved protection and seals if owner wants to continue use.
La Grange	2 Operated by Crystal Springs at this point.
Old Golden Grove	4

Field Name	Number of Wells/
Barren Spot	9
Adventure	9 All are acceptable; will need improved security if owner desires to use these.
Concordia	5

Wells selected by the amount of water pumped.
The amount of pumpage is generally uncertain and our cut-off is 6,000 gallons per day (gpd, ~2MG per year). The first priority for these wells will be to verify the production numbers.

It is known that a number of these wells belong in the high-risk category, in addition. For example, several of these wells are known to be located in parking lots though they are not precisely located. These are shown at **Error! Reference source not found.** In general, these have the same threats as do the WAPA wells, with the added problem that they can be very near unsewered population centers.

Wells prioritized by risk.
Risk is used as an analog for the population served or affected by this source and is estimated by:

a. Type of purveyor
    i. Water Source (vendors, standpipe)
    ii. Bottled Water vendor or source
    iii. Condominiums
    iv. Apts
    v. Hotels
b. Population served
    i. Total for Condos, Apts and Hotels
    ii. NT for others

There are a total of approximately 60 wells in addition to the WAPA wells, or about 140 wells in all. These are listed in Table IV.C.5.

Figure IV.C.10. WAPA well with typical platform and riser.

Figure IV.C.11. Untypical WAPA well.

Figure IV.C.12. Cover of well in parking lot.

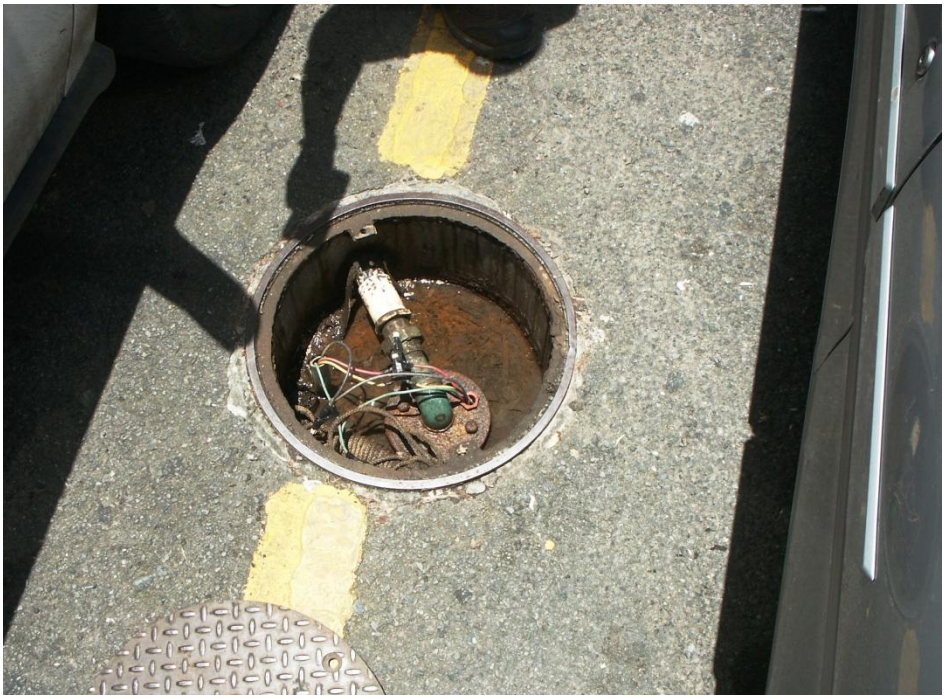


Figure IV.C.13. Wellhead in sump condition with open sanitary seal (rope and flexible conduit for pump).

Figure IV.C.14. Well with possible surface sources of contamination; note ditch from cistern/wastewater overflow and dumpster.

Figure IV.C.15. Wellhead with compromised sanitary seal and cut in casing.

Figure IV.C.16. Francis Water Delivery well site. Google Earth.

Figure IV.C.17. Francis Water Site; 1 is well house, 2 is oil tank and ditch.

Figure IV.C.18. View from North, near well house. Note slope towards well.

Figure IV.C.19. Well head and pump, shallow Francis Water Delivery well.

Figure IV.C.20. Laundromat well without effective seal.

Figure IV.C.21. Diesel tank without containment adjacent to well.

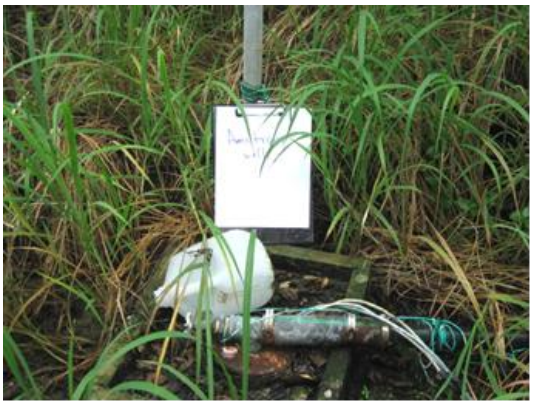
Figure IV.C.22. Production well for vendor; note the galvanized cover.

Figure IV.C.23. What's under the cover; this abandoned well is adjacent to a production well providing potable water.

Figure IV.C.24. Trash near Bethlehem Ghut and wells.

Figure IV.C.25. Abandoned Caustic tank near Bethlehem Ghut and wells.

Figure IV.C 17 Improvement of the GWP during FY-11



The initial inspection well has no meter, no wellhead protection and no sanitary condition around the well.

The follow-up compliance inspection the mater and wellhead protection were in place, and the surrounding areas of the well were clean.

The initial inspection well has no meter and the seal of the well was open.

The follow-up compliance inspection a meter was place and the well seal in correct way.

The initial inspection well has no meter.

The follow-up compliance inspection a meter was place.



The initial inspection show inactive wells that not were seal and abandon properly.



The follow-up compliance inspection all the wells were seal and abandon properly.

Areas that Need to Be Monitor for Improvement

A monotoring complaince inspection that verify the proper contruction of the well.

The enforcement of the proper abandonment of the inactive wells.

The enforcement of the proper capping and sealing of the wells to prevent wasteful use of the water

The enforcement of the wellhead protection to prevent the contamination of the groundwater.

Table IV.C.4. Wells Selected By Daily Appropriation

Property Owner	Pump Rate (GPD)
HOVENSA LLC	599999
THE BUCCANEER HOTEL	520000
FIRST AMERICAN DEVELOPMENT GROUP	315000
CARAMBOLA BEACH RESORT & SPA	200000
VIRGIN ISLANDS RUM INDUSTRIES LTD	142000
SEVEN SEAS WATER CORP.	120000
GRAPE TREE SHORES, INC. (Divi Carina)	100000
LOCKHART, HERBERT	100000
CARLOS TRADING, LLC	100000
CROWN MOUNTAIN WATER	80000
AASA WATER SUPPLY	75000
CONTRANT RESORT/ MAHOGANY RUN GOLF COURSE	75000
US ENVIRONMENTAL PROTECTION AGENCY (Remediation Site)	72000
HARBORVIEW APARTMENTS	70000
DVERGSTEN COMPANY, INC	70000
HARBORSIDE CORP/ BOLONGO BAY BEACH RESOT	65000
CHARLES O SCHUSTER TRUST	60000
COUNTRY WATER	60000
MCM TRUCKING	60000
SOUTHGATE GARDENS, INC	60000
GRENMA,INC. DBA PEPPERTREE TERRANCE	60000
VIRGIN WATER, INC.	56000
Krystal Spring LLC Water Delivery	50000
AQUARION SYSTEM, INC.	50000
REYNOLDS, TIMOTHY & KAREN	50000
EGLIN, GENE	50000
VIRGIN BEVERAGES RIXSKIS, INC	50000
O'NEIL, RAYMOND & CANTON, REUBEN	50000
SAPPHIRE BAY CONDO. WEST	45000

VIRGIN ISLANDS PORT AUTHORITY	45000
COUNTRY DAY SCHOOL	40000
HEAVY MATERIAL, LLC	40000
SCHEUER, WALTER	36000
WESTIN ST. JOHN HOTEL CO.	35000
ST. CROIX DAIRY PRODUCTS, INC.	30000
SCHNELL, DONALD	30000
LOFTUS, NOEL	30000
La Reine Laundry	30000
CARIBBEAN HYDRO-TECH INC	30000
COFFELT, GORDON L.	30000
MARCOS WATER	30000
TUTU PARK LTD	28000
Sunny Isle Laundry	25000
Castle Coakley Laundry	25000
RELIANCE LOVENLUND ASSOCIATES, LLLP	24000
UNITED CORPORATION	24000
VIRGIN ISLANDS NATIONAL PARK	22500
Krystal Spring LLC Water Delivery	20000
AMERICAN YACHT HARBOR	20000
SOOKRAM, SIEWDATH	20000
LITTLE ST. JAMES, LLC/EPSTEIN JEFFREY	20000
CHENAY BAY BEACH RESORT	20000
COAKLEY BAY CONDOMINIUMS	20000
ST. THOMAS DAIRIES/ TRANS-CARIBBEAN CORP.	20000
VIRGIN ISLANDS NATIONAL PARK	19000
GINN LA USVI GULF, LLLP	18400
BATES TRUCKING & TRASH REMOVAL, INC	18000
MARSH, GENEVIEVE	15000
VIRGIN ISLANDS MONTESORRI SCHOOL	15000
SUGAR ESTATE ASSOCIATES	15000
FELIX, EMMANUEL	15000
UNIVERSITY OF THE VIRGIN ISLANDS	15000

SWEET LIME VILLAGE HOMEOWNERS ASSOC	14400
ST. CROIX MUTUAL HOMES	14000
VIRGIN ISLANDS DEVELOPMENT CORP.	13000
LE BLEU WATER INC	13000
PARRIS, JOHN JR.	12000
YARD CARE LLC/ PC LANDSCAPING	12000
RELIANCE HOUSING SERVICES, LLC	10000
MATTHIAS, DOUGLAS	10000
LIBURD, ALMANDO	10000
BERRY, CRYSTALIA	10000
ROSS ESTATES INC.	10000
EMERALD BEACH CORPORATION	10000
SAINT JOHN LAND INVESTMENT, LTD.	8640
BRUGAL RUM & CO	7500
CANDLE REEF II ASSOCIATION	6000
ISAAC, FERNANDO & LEIDA	6000
DEPARTMENT OF EDUCATION	6000
MAHARAJ, PREMA	6000
WEEDEN, DONALD	5100
CANTON, MARIO	5000
ROLLER, HUGO	5000
BEER, BENJAMIN	5000
WATERGATE VILLAS WEST ASSOCIATION	5000
BURNNETT TOWERS CONDO.	5000
CALEDONIA SPRINGS	5000
COHEN, LAURENCE B. & WENDY H.	4500
STEWART, DOUG	4500
Heavy Material VI LLC	4500
DEPARTMENT OF AGRICULTURE	4500
WINDWARD PASSAGE HOTEL	4320
SOLOMON'S PLAZA, INC.	4000
CALLSEN, KATHRYN O.	4000
ST. CROIX AMERICAN YOUTH SOCCER ORGANIZATION	4000
GENTLE WINDS CONDOMINIUM	3600

ASSOCIATION, INC	
FRANCIS, EDWARD SLIM	3000
COLONY COVE ASSOCIATION	3000
DEWOLFE, HOWARD/BOTANICAL GARDENS,INC	3000
TURNBULL, WALLACE	3000
J.B. JONES FARMS	2500
ROHN, LEE	2500
LAPLACE, LARRY	2500
LAPLACE, LARRY	2500
RHF LOVENLUND ASSOCIATES, LTD.	2500
BOSCHULTE, JAMES	2500
FRANCIS WATER	2200
LUTHERAN SOCIAL SERVICES (QUEEN LOUIS HOME)	2000
BRADY, JOHN	2000
SCHUSTER, ELLEN	2000
FARBER, NADIA	2000
WHARFSIDE VILLAGE	2000
MARSH, RUPERT	2000
RUTNIK, ANDREW	2000
CARIBBEAN MINI GOLF	2000
B&W REALITY INVESTMENT LTD.	2000
MAYNARD, PAUL V.	2000
VIRGIN ISLAND DEPARTMENT OF PUBLIC WORKS	2000
GOOD HOPE COMMUNITY TOWN HOUSE	1800
FREDERICK, HUBERT	1500
RICHARD & LAURIE WOOD TRUST U/T/D	1500
TK PROPERTIES, INC.	1500
DEPARTMENT OF AGRICULTURE	1500
STEVENS, CARLTON L.	1500
EMANUEL, DESMOND	1500
ESTATE CARLTON CONDOMINIUM	1500
DEPARTMENT OF AGRICULTURE	1400
SOUTHGATE FARM, INC.	1200
GONZALEZ, DEMETRIUS	1000

ARRENDELL, VINCENT A.	1000
GEORGE, CLINTON	1000
THE GOLDEN TWIN APARTMENT	1000
KEMBA MASSOMA & ANA KAZA	1000
WALLACE, LEOPOLD	1000
RUDOLPH A. JR. - PIMPY'S	1000
MASSAC, CHRISTOPHER KEITH	1000
LAKE, GEORGE	1000
CHARLES, MICHEL	1000
BOYLAN, JEFF	1000
PACHECO, RAFTER & RUBY	1000
K & C DEVELOPMENT, LLC	1000
LARCHEVEAUX, ARCHIBALD	1000
THOMAS, RUDOLPH	1000
CARIB BEACH RESORT	1000
ELMOUR, MARTIN	1000
FRANCIS, WINSTON S.	1000
SUNNY ISLE DEVELOPERS LLC	1000
THE M.K. ARMSTRONG TRUST	1000
ISLAND MEDICAL CENTER	1000
PETERSEN, LUISA	1000
LORRAINE ASSOCIATES	1000

Table IV.C.5. Wells selected by risk to populace				
System Name	**Class**	**Category**	**Source**	**Findings**
Aqua-Mist	TNC	Water Bottler	R/GW	Purchased water for bottling. Well now only serves Laundromat on site; unable to access well, owner is finding keys.
Francis Water Service Delivery & Sales	TNC	Water Source	GW	Out of service; well requires work and better protection.
Francis Purified Water	BW	Bottled Water	GW	Out of service; well requires work and better protection.
Bates Trucking	TNC	Water Source	R/GW	Well is sited with many areal threats. Site housekeeping is notably good.
Caledonia Spring	TNC	Bottled Water	R	Well out-of-service and with acceptable surface closure. Bottling RO water purchased from others.
Country Water	TNC	Water Source	GW	Nominally this well is also treated by RO. Not verified through site and well visited. Distribution lines from abandoned well need to be blanked and some concerns with cistern.
Crystal Springs	TNC	Water Source	GW	Uses former WAPA La Grange well. Well is nearly acceptable; numerous areal threats.
Marcos Trucking	TNC	Water Source	R/GW	Wells difficult to verify; encased in RC structures. Fuel stored on-site next to subsurface electrical service. Site housekeeping particularly good.
Carlton Gardens	TNC	Water Source	GW	1-D Estate Carlton
Emmanuel's Service	TNC	Water Source	R/GW	Unprotected abandoned well adjacent to production well; surface threats. Owner is particularly responsive.
Galloway's Delivery	TNC	Water Source	R/GW	Out-of-service. Well is well-sited and seal is acceptable. Significant areal threats.
Schuster Water Delivery (Blue Mountain Water)		Water Source/ Bottled Water		Particularly good seals and siting on 2 wells in service. A third well under development (or rehabilitation) is open and needs attention. Significant areal threats.
Southgate Gardens	TNC	Water Source	GW	Unable to access; will continue. It is thought that Seven Seas is serving most of their former customers.
United Corp. Standpipe	TNC	Water Source	R/GW	Wells for shopping center need proper sanitary seals. Located in sump conditions and need to be reviewed for this.
Carino's Water Service	TNC	Water Source	GW	Out-of-service; now operated by Paradise Purification
Unknown vendor		Water	GW	Near USVI National Guard at corner of MG Jean

Table IV.C.5. Wells selected by risk to populace				
System Name	**Class**	**Category**	**Source**	**Findings**
		Source (supplies some water for bottlers)		Augustine Romney Memorial Drive. Not able to enter, but significant threat from heavy use for livestock on site.
Paradise Purification	BW	Bottled Water	W/GW	Shallow well nominally out of service. Well and seal are acceptable but significant areal threats.
Divi Carina Bay Resort	NTNC	Hotel	GWR	
Sunny Isle Shopping Center	NTNC	Corp	R/GW	Wells not all seen; to date are well done and seals are acceptable.
Lorraine Village	C	Apt	R/W/GW	20 & 21-A Estate Plessen
Buccaneer Hotel (replicate of use table)	NTNC	Hotel	R/GW	Estate Shoy
Diamond Cinema	NTNC	Corp	R/GW	Plot# 93A Estate Diamond
Med-Isle I	NTNC	Corp	R/W/GW	29D Estate Diamond-Suite 47
Village Mall	NTNC	Corp	R/WGW	113 Estate Barren Spot
St. Croix Mutual Homes #14/15	C	Apt	R/W/GW	Well protected and seal acceptable.
St. Croix Mutual Homes #22/23	C	Apt	R/W/GW	Well protected and seal acceptable.
St. Croix Mutual Homes #36	C	Apt	R/W/GW	Well protected and seal acceptable.
St. Croix Mutual Homes #44/45	C	Apt	R/W/GW	Not served by wells
St. Croix Mutual Homes #54/55	C	Apt	R/W/GW	Not served by wells.
Queen Louise Home*	C	Corp	R/GW	71 Estate Concordia

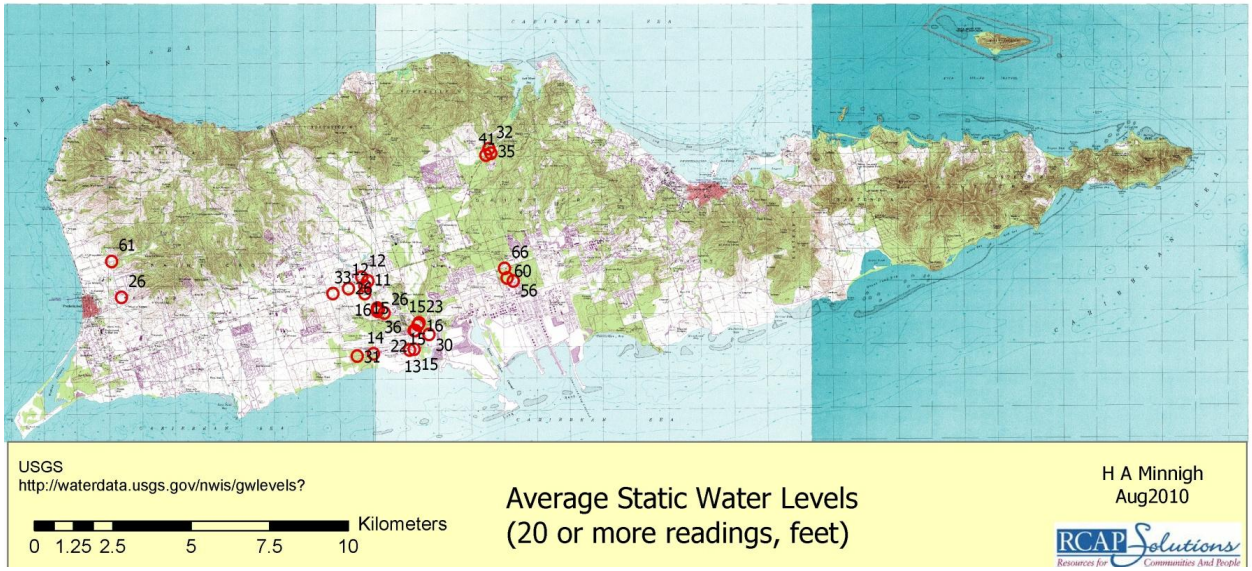


Figure IV.C.26. Average Static Water levels in wells on St. Croix.

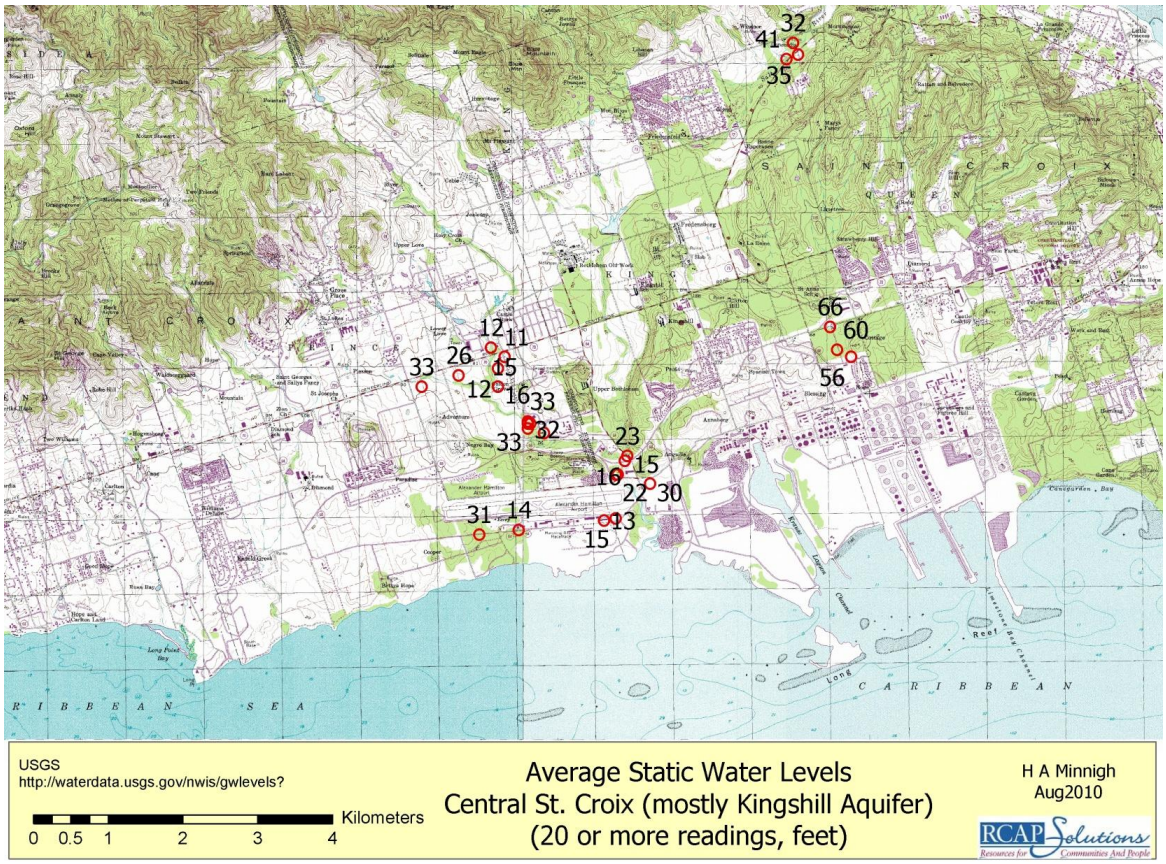


Figure IV.C.27. Static water levels, central St. Croix.

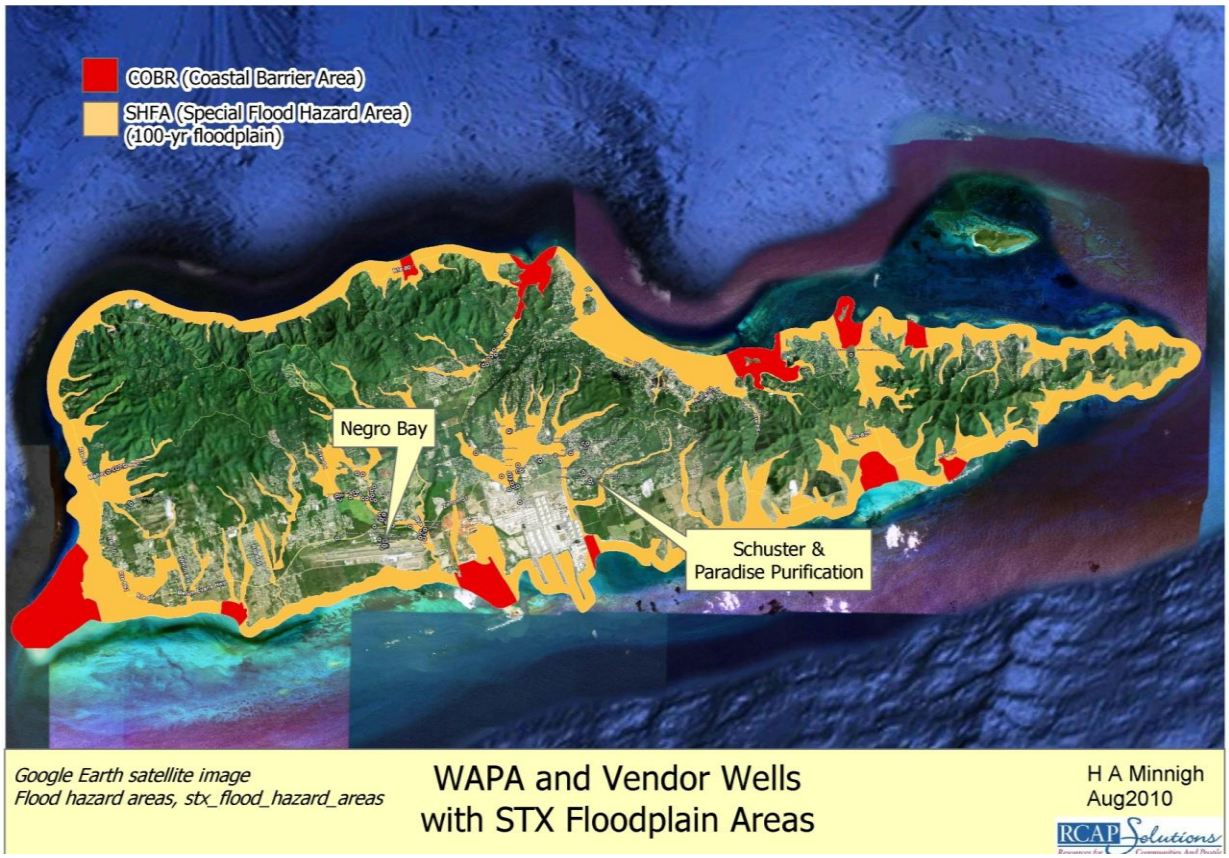


Figure IV.C.28. Flood Risks and Production Wells

Figure IV.C.21. Wellhead Protection Zone, La Grange

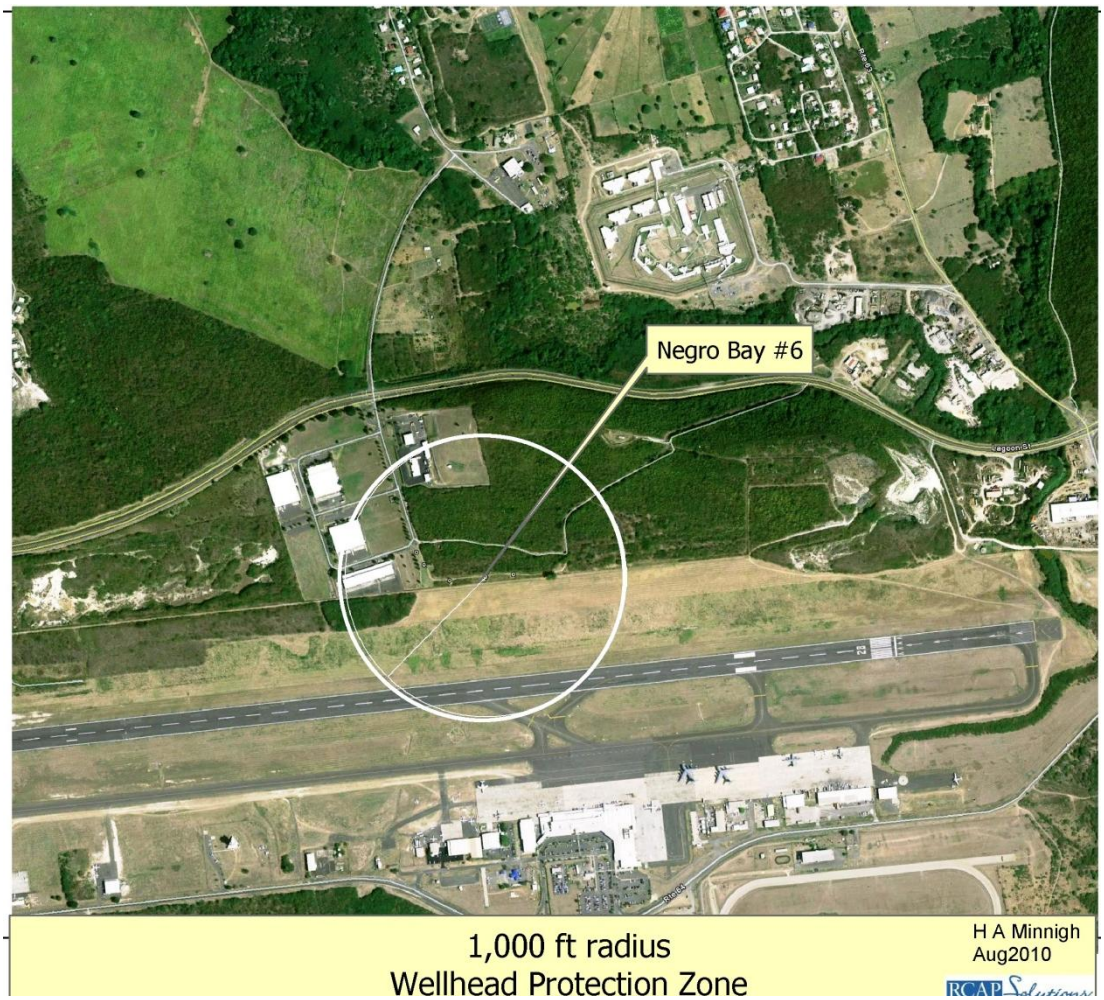


Figure IV.C.29. Wellhead Protection Zone, Negro Bay #6

Appendix 1: 2012 303(d) List of Impaired Waters

AU ID	AU Name	Associated Monitoring Stations	Priority	Class	Impairment	Source	Years Impaired	Tentative Year of TMDL Completion
VI-STC-02	Frederiksted Harbor	STC-28 STC-29 VI970611	Low	C	Dissolved Oxygen Turbidity	Urban Runoff/Storm Sewers Highway/Road/Bridge Runoff (Non-construction Related)	2010 2012	2016
VI-STC-04	Prosperity, nearshore	VI252619	Low	B	Turbidity	Erosion and Sedimentation	2010	2016
VI-STC-06	Sprat Hall Beach	STC-30 VI645288	Low	B	Phosphorus Turbidity Dissolved Oxygen	Unknown	2010 2012	2016
VI-STC-12	Cane Bay	VI201013	Low	B	Turbidity	Erosion and Sedimentation	2010 2012	2020
VI-STC-13	Baron Bluff subwatershed	STC-31 VI398766	Low	B	Enterococci Dissolved Oxygen Turbidity	Impacts from Resort Areas	2010 2012	2020
VI-STC-16	Salt River Lagoon, Marina	STC-33 STC-33C	Low	B	Enterococci Fecal Coliform Turbidity	Erosion from Derelict Land (Barren Land) Other Marina/Boating On-vessel Discharges Residential Districts	2010 2012	2016
VI-STC-18	Salt River Bay	STC-33A STC-33B VI146901 VI558328	Low	B	Turbidity Fecal Coliform	Land Development Erosion and Sedimentation Urban Runoff/Storm Sewers	2010 2012	2016
VI-STC-23	St. Croix-By-the-Sea	STC-34 VI738082	Low	B	pH Turbidity	Urban Runoff/Storm Sewers Erosion and Sedimentation	2010 2012	2023
VI-STC-24	Long Reef Back	STC-48	Low	B	Enterococci	Municipal Point Source Discharges	Prior to	2023

	reef, west						2010	
VI-STC-25	Princess subwatershed, offshore	STC-35	Low	B	Turbidity	Unknown	2012	2023
VI-STC-26	Christiansted Harbor	STC-40 STC-41 STC-42 STC-43 STC-46 STC-47 VI572166	Low	C	Turbidity	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	2010 2012	2023
VI-STC-27	Long Reef Forereef, East	STC-35A STC-36	Low	B	Turbidity pH	Marina/Boating Sanitary On-vessel Discharges Discharges from Municipal Combined Storm Sewer Systems	Prior to 2010	2023
VI-STC-29	Christiansted Harbor, East	STC-1 STC-39 VI213332	Low	C	Dissolved Oxygen Turbidity	Erosion and Sedimentation	2010 2012	2023
VI-STC-30	Beauregard Bay	STC-2 STC-38 VI651587	Low	B	Secchi Depth Turbidity Fecal Coliform	Urban Runoff/Storm Sewers Erosion and Sedimentation	2010 2012	2023
VI-STC-31	Buccaneer Beach	STC-3	Low	B	Dissolved Oxygen Secchi Depth Turbidity Fecal Coliform	Highways, Roads, Bridges, Infrastructure (New Construction)	2010	2025
VI-STC-33	Punnett Bay	VI610321	High	B	Turbidity	Land Development Erosion and Sedimentation	2010 2012	2014
VI-STC-35	Tamarind Reef Lagoon (Southgate Lagoon)	STC-4	High	B	Dissolved Oxygen Fecal Coliform Secchi Depth	Marina/Boating Sanitary On-vessel Discharges	Prior to 2010	2014

					Turbidity	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		
VI-STC-36	Green Cay Beach	VI563397	High	B	Turbidity	Package Plants (Small Flows) Erosion and Sedimentation	2010 2012	2014
VI-STC-37	Southgate Subwatershed, Offshore	STC-5	High	B	Dissolved Oxygen Fecal Coliform Enterococci Turbidity	Marina Boat Maintenance Marina/Boating Sanitary On-vessel Discharges Non-Point Source	2010	2014
VI-STC-39	Teague Bay	STC-8 STC-9 VI381319	Low	B	Dissolved Oxygen Turbidity pH Fecal Coliform	Highway/Road/Bridge Runoff (Non-construction Related)	2010 2012	2027
VI-STC-40	Teague Bay Backreef	STC-10 VI351774	Low	B	Turbidity pH Fecal Coliform	Highways, Roads, Bridges, Infrastructure (New Construction) Marina/Boating Sanitary On-vessel Discharges	2010 2012	2027
VI-STC-41	Buck Island Backreef	STC-6 STC-7	Low	A	Turbidity	Unknown	2012	2027
VI-STC-46	Grapetree Bay	STC-11B	Low	B	Dissolved Oxygen	Erosion and Sedimentation	Prior to 2010	2029
VI-STC-47	Turner Hole	VI297470	Low	B	Turbidity	Erosion and Sedimentation	2010	2029

	Backreef						2012	
VI-STC-56	Bugby Hole Backreef	STC-14A STC-14B VI931289	Low	B	Phosphorus Turbidity	Highway/Road/Bridge Runoff (Non-construction) Land Development	2010 2012	2031
VI-STC-59	Canegarden Bay	STC-15	Low	B	Phosphorus Turbidity	Erosion and Sedimentation	2010	2031
VI-STC-61	Hess Oil Virgin Islands Harbor	STC-16 STC-17	Low	C	Phosphorus Temperature Dissolved Oxygen Turbidity	Marina Boat Maintenance Major Industrial Point Source	2010	2031
VI-STC-62	Limetree Bay	STC-18	Low	B	Fecal Coliform	Unknown	Prior to 2010	2031
VI-STC-63	Martin-Marietta Alumina Harbor	STC-19 STC-20	Low	C	Dissolved Oxygen Phosphorus	Unknown	Prior to 2010	2031
VI-STC-64	Manning Bay/Estate Anguilla Beach	STC-23	Low	B	Phosphorus Fecal Coliform Turbidity	Highway/ Road/ Bridge Runoff (Non-construction Related) Municipal Point Source Impacts from Inadequate Industrial/ Commercial Pretreatment	2010	2031
VI-STC-65	HOVENSA West	STC-21 STC-22A	Low	B	Enterococci Fecal Coliform Phosphorus	Municipal Point Source Discharges	Prior to 2010	2031
VI-STC-75	Diamond Subwatershed, Offshore	STC-24B	Low	B	Dissolved Oxygen Turbidity Phosphorus Enterococci Secchi Depth Toxicity	Industrial Point Source Discharge	2010	2017
VI-STC-76	Carlton Beach	STC-25	Low	B	Dissolved Oxygen Turbidity	Industrial Point Source Discharge	Prior to 2010	2017
VI-STC-79	Good Hope Beach	STC-26	Low	B	Turbidity	Erosion and Sedimentation	2010 2012	2017
VI-STC-82	Sandy Point, Nearshore West	STC-27 VI896490 VI907985	Low	B	Turbidity Dissolved Oxygen	Erosion and Sedimentation	2010 2012	2017

VI-STJ-01	Caneel Bay	STJ-54 NPS-1 VI658467	Low	B	Dissolved Oxygen Turbidity	Unknown	Prior to 2010	2018
VI-STJ-02	Hawksnest Bay	STJ-44B NPS-3 NPS-4 VI255380	Low	B	Dissolved Oxygen Turbidity	Erosion and Sedimentation	2010 2012	2018
VI-STJ-03	Trunk Bay	STJ-44A NPS-5	Low	A	Dissolved Oxygen	Unknown	Prior to 2010	2018
VI-STJ-05	Cinnamon Bay	STJ-44C NPS-6 NPS-7	Low	B	Dissolved Oxygen	Unknown	Prior to 2010	2018
VI-STJ-06	Maho Bay/Francis Bay	STJ-44D NPS-8 NPS-9 VI536165	Low	B	Dissolved Oxygen Turbidity	Unknown	2010	2018
VI-STJ-13	Coral Harbor	STJ-53 STJ-56 NPS-15 NPS-16 VI823989	High	B	Turbidity pH	Unknown	2010 2012	2014
VI-STJ-15	Round Bay	STJ-57 NPS-22	High	B	Enterococci	Unknown	2012	2014
VI-STJ-23	Fish Bay	STJ-48	Medium	B	pH Turbidity	Unknown	2010	2015
VI-STJ-25	Rendezvous Bay subwatershed, offshore	STJ-47 NPS-23 VI204627 VI402599	Medium	B	Turbidity pH Fecal Coliform Enterococci	Unknown	2010 2012	2015
VI-STJ-26	Chocolate Hole	STJ-46 NPS-24 VI391298	Medium	B	Dissolved Oxygen pH Turbidity	Other Marina/ Boating On- vessel Discharges, Non-Point Source	2010 2012	2015
VI-STJ-28	Great Cruz Bay	STJ-45 NPS-25 VI779192	Low	B	Turbidity Dissolved Oxygen pH	Illegal Dumping, Non-Point Source On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	2010 2012	2021

						Other Marina/ Boating On- vessel Discharges Other Recreational Pollution Sources		
VI-STJ-29	Turner Bay/Enighed Pond	STJ-55 NPS-26	Low	B	Turbidity	Municipal Point Source Discharges	Prior to 2010	2021
VI-STJ-30	Cruz Bay	STJ-43A STJ-43B STJ-43C STJ-43D NPS-27 NPS-28 NPS-29 VI309453	Low	B	Fecal Coliform Turbidity Secchi Depth Dissolved Oxygen pH Enterococci	Commercial Ferries Marina Fueling Operations Other Marina/Boating On-vessel Discharges Other Recreational Pollution Sources	2012	2021
VI-STJ-31	Great Cruz Bay Watershed, Offshore	VI456779	Low	B	Turbidity	Erosion and Sedimentation	Prior to 2010	2021
VI-STT-01	Botany Bay	STT-9	Low	B	pH Enterococci	Highways, Roads, Bridges, Infrastructure (New Construction)	2010	2019
VI-STT-02	Stumpy Bay	STT-10	Low	B	Turbidity pH	Unknown	Prior to 2010	2019
VI-STT-04	Santa Maria Bay	STT-11	Low	B	Dissolved Oxygen pH Turbidity	Post-development Erosion and Sedimentation	2010	2019
VI-STT-05	Caret Bay	STT-12	Low	B	Turbidity Dissolved Oxygen pH	Unknown	Prior to 2010	2022
VI-STT-07	Dorothea	STT-13	Low	B	Turbidity Dissolved Oxygen pH	Unknown	2010 2012	2022
VI-STT-08	Hull Bay	STT-14 VI616865	Low	B	Dissolved Oxygen pH Turbidity	Other Marina/Boating On-vessel Discharges Other Recreational Pollution Sources	2010 2012	2022
VI-STT-10	Magen's Bay	STT-15 STT-15A STT-15B	Low	B	Turbidity Dissolved Oxygen pH	Highways, Roads, Bridges, Infrastructure (New Construction)	2010 2012	2022

		VI672756			Enterococci	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)		
VI-STT-13	Mandahl Bay (Marina)	STT-16B STT-16C	Low	B	Enterococci Fecal Coliform Dissolved Oxygen pH Secchi Depth Turbidity	Other Marina/ Boating On- vessel Discharges Other Recreational Pollution Sources Changes in Tidal Circulation/ Flushing	2010 2012	2016
VI-STT-15	Sunsi Bay	STT-17B	Low	B	Dissolved Oxygen pH Turbidity	Unknown	2010 2012	2016
VI-STT-16	Spring Bay	STT-17A	Low	B	Dissolved Oxygen pH	Unknown	Prior to 2010	2016
VI-STT-17	Mandahl Bay Subwatershed, Offshore	STT-16A STT-18 VI577932	Low	B	Dissolved Oxygen 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)	2010 2012	2016
VI-STT-18	Water Bay	STT-19 VI591668	Low	B	Dissolved Oxygen pH Turbidity	Unknown	2010 2012	2024
VI-STT-19	Smith Bay	STT-20 VI431925	Low	B	Dissolved Oxygen Turbidity	On-site Treatment Systems (Septic Systems and Similar Decentralized	2010 2012	2024

						Systems)		
VI-STT-21	St. John Bay	STT-21A VI327776	Low	B	Dissolved Oxygen Turbidity	Unknown	2010 2012	2024
VI-STT-22	Red Bay	STT-21B	Low	B	Dissolved Oxygen Turbidity pH	Urban Runoff	Prior to 2010	2024
VI-STT-23	Vessup Bay	STT-22B	Low	B	Temperature Enterococci Turbidity	Major Municipal Point Source Discharge	2010 2012	2024
VI-STT-24	Red Hook Bay	STT-22A VI1764950	Low	B	Enterococci Turbidity	Urban Runoff Other Marina/Boating On-vessel Discharges	2010 2012	2024
VI-STT-25	Great Bay	STT-23 VI505006	Low	B	Dissolved Oxygen Turbidity	Other Marina/ Boating On-vessel Discharges Internal Nutrient Recycling	2010 2012	2026
VI-STT-28	Cowpet Bay	STT-24 STT-24A	Low	B	Dissolved Oxygen	Package Plants (Small Flows)	Prior to 2010	2026
VI-STT-31	Nazareth Bay	VI389422	Low	B	Turbidity	Erosion and Sedimentation	2010 2012	2026
VI-STT-32	Jersey Bay, Offshore	STT-25	Medium	B	Fecal Coliform	Urban Runoff	Prior to 2010	2015
VI-STT-34	Benner Bay Lagoon Marina	STT-27D STT-27E	Medium	B	Enterococci Turbidity	Other Marina/ Boating On- vessel Discharges Discharges from Municipal Combined Storm Sewer Systems Changes in Tidal Circulation/ Flushing Highway/ Road/ Bridge Runoff (Non-construction Related) Sanitary Sewer Overflows (Collection System Failures)	2010 2012	2015

VI-STT-35	Mangrove Lagoon	STT-27A STT-27B STT-27C	Medium	B	Temperature Enterococci Turbidity	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	2010 2012	2015
VI-STT-36	Frenchman Bay Subwatershed East	STT-28A STT-28B VI951607	Medium	B	Dissolved Oxygen Turbidity	Erosion and Sedimentation	2010 2012	2015
VI-STT-37	Frenchman Bay	STT-29A VI891065	Medium	B	Dissolved Oxygen Turbidity	Impacts from Resort Areas (Winter and Non-winter Resorts) Other Recreational Pollution Sources	2010 2012	2015
VI-STT-38	Limetree Bay	STT-29B VI776527	Medium	B	Dissolved Oxygen Turbidity	On-site Treatment Systems (Septic Systems and Similar Decentralized Systems) Erosion from Derelict Land (Barren Land) Highways, Roads, Bridges, Infrastructure (New Construction)	2010 2012	2015
VI-STT-39	Morningstar Bay	STT-30 VI937158	Medium	B	Enterococci Turbidity	Impacts from Resort Areas (Winter and Non-winter Resorts) Other Recreational Pollution Sources	2010 2012	2015
VI-STT-43	St. Thomas Harbor, Inner	STT-31B STT-31C STT-32A STT-32B STT-33A STT-33B	Low	C	Turbidity	Residential Districts Urban Runoff/Storm Sewers Other	2010 2012	2030

		STT-34 STT-35 STT-36 STT-37 STT-38						
VI-STT-47	Hassel Island at Haulover Cut to Regis Point	STT-2 STT-3	Low	C	Turbidity	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) Ballast Water Releases	2010	2030
VI-STT-49	Druif Bay	STT-40	Low	B	Turbidity	Land Development Erosion and Sedimentation	Prior to 2010	2030
VI-STT-50	Flamingo Bay	STT-41	Low	B	Turbidity	Commercial Ferries Residential Districts Other Marina/ Boating On-vessel Discharges Other Recreational Pollution Sources	2010	2030
VI-STT-51	Krum Bay	STT-4	Low	C	Turbidity	Other Marina/ Boating On-vessel Discharges	2010 2012	2030
VI-STT-52	Lindbergh Bay	STT-5A STT-5B VI514102	Low	B	Dissolved Oxygen Turbidity	Other Recreational Pollution Sources	2010 2012	2032
VI-STT-53	Cyril E. King Airport Subwatershed,	STT-6C	Low	B	Dissolved Oxygen	Major Municipal Point Source	Prior to 2010	2032

	Offshore							
VI-STT-54	Perseverance Bay, Offshore	STT-6B	Low	B	Dissolved Oxygen Turbidity	Erosion and Sedimentation	2010 2012	2033
VI-STT-55	Brewers Bay	STT-7A VI293962	Low	B	Dissolved Oxygen Turbidity	Erosion and Sedimentation	2010 2012	2033
VI-STT-56	Perseverance Bay	STT-7B	Low	B	Dissolved Oxygen	Erosion and Sedimentation	Prior to 2010	2033
VI-STT-57	Fortuna Bay	STT-8	Low	B	Dissolved Oxygen Enterococci Turbidity	Erosion and Sedimentation	2010	2033
	KEY							
	Text in Green: New Listings							
	Text in Brown: Listings Previously Omitted							

Appendix 2: 2012 Responsiveness Summary for US Virgin Islands List of Impaired Waterbodies & Assessment Methodology

Responsiveness Summary

2012 US Virgin Islands
List of Impaired Waterbodies
&
Assessment Methodology

March 2013

Prepared By:

Department of Planning & Natural Resources
Division of Environmental Protection

I. Introduction

The Virgin Islands Department of Planning and Natural Resources (DPNR) Division of Environmental Protection (DEP) has prepared this report to summarize and respond to the comments received on the public noticed drafts of the US Virgin Islands 2012 List of Impaired Waterbodies and Assessment Methodology.

Comments were only received from the United States Environmental Protection Agency Region 2 (EPA) staff during the 30-day public notice period. The public comment period began on March 21, 2012 and ended on April 21, 2012. The public comment period was published in both local newspapers: The Virgin Islands Daily News and The Avis. Additionally, the public notice was posted on the DPNR-DEP website at the following link: http://www.dpnr.gov.vi

II. Comments

Below is a summary of the comments received by DPNR and DPNR's responses to those comments:

Comments received on the Draft List of Impaired Waters

Number	Comment	Response
1.	There were some hits of VOCs, SVOCs, metals and one pesticide in surface water samples from Turpentine Run collected during both the RI and pre-design investigation. According to the ROD, surface water contamination in the vicinity of FWP was due to leaching of GW from the site. I'm assuming there was no action for surface water because containing the plume would prevent additional leaching. The metals exceedences were primarily downgradient from the Municipal WWTP discharge. I'm not aware of any surface water sampling that has been conducted since the pre-design investigation 12 years ago. Three (3) excepts from related documents attached: 1. SW_pre-design.pdf 2. SW-PhaseIIRI.PDF 3. Fig5-33.pdf	DPNR appreciates this comment and will share it with all relevant programs to ensure this situation is monitored.

2.	*Coral Bay Community Council:* I had a chance to review the 303d narrative. Unfortunately, it still seems to contain the wrong names (and therefore locations) for the assessment unit IDs in Coral Bay. I highlighted all the places in your report that use these labels - to make it easy to correct it -- and also sent the corrected table from our previous discussion. If there is something I don't understand, please let me know. I look forward to the corrected version - since in any case, I do see that Coral Bay is on the priority list, and we appreciate that. Submitted the following files to provide details on her concerns: 1. Corrected Coral Bay Assessment unit Id.docx 2. 303 d narrative 4 12 with highlighted Coral Bay assessment id issues.pdf	The corrections were made to the 303d Narrative and throughout the 305(b) Report.
3.	*Center for Biological Diversity:* This agency submitted their comments via a letter and CD of reference documents dated November 22, 2011.	The responses to these comments were responded to in the attached letter and table.

No comments were received on the Draft Assessment Methodology

GOVERNMENT OF THE VIRGIN ISLANDS OF THE UNITED STATES
========
DEPARTMENT OF PLANNING AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL PROTECTION
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FREDERIKSTED, ST. CROIX, VI 00841
PHONE: (340) 773-1082 FAX: (340) 773-9310

March 26, 2013

Ms. Miyoko Sakashita, Attorney
Center for Biological Diversity
351 California Street, Suite 600
San Francisco, CA 94104

Re: Comments received during the Data Solicitation Period for 2012 US Virgin Islands Integrated Report

Dear Ms. Sakashita:

This letter provides a detailed response to the comments we received from the Center for Biological Diversity (CBD) during development of the US Virgin Islands 2012 Integrated Water Quality Monitoring and Assessment Report. The Department of Planning and Natural Resources, Division of Environmental Protection (DPNR-DEP) considered all of the information and studies submitted by the Center for Biological Diversity on November 22, 2011. Of the collective 50 references provided by CBD (see table attached), DPNR-DEP identified none that presented information that which warrant listing USVI waterbody segments as impaired based on the US Virgin Islands Water Quality Assessment. DPNR-DEP further assessed these articles to determine whether the information demonstrated that US Virgin Islands (USVI) waters were failing to attain (or will fail to attain by the next listing cycle) USVI's pH criteria and/or general narrative criteria to protect aquatic life use because of ocean acidification.

An overall summary of our response to CBD can be found in the Responsiveness Summary submitted as a part of DPNR-DEP's Administrative Record for the US Virgin Islands 2012 Integrated Water Quality Monitoring and Assessment Report to the US Environmental Protection Agency (EPA) Region 2 Office. This Responsiveness Summary can be found on our website at: www.dpnr.gov.vi

CBD's detailed comments focused on the three areas where they assert USVI coastal waters should be listed as impaired for not meeting ocean acidification-related water quality standards:

1. ocean waters are exceeding the marine water quality standard for pH;
2. designated uses for aquatic life are likely not attained; and
3. general criteria protecting fish and wildlife are likely not attained.

Detailed responses to the comments are provided below:

Comment #1: *U.S. Virgin Islands must list its ocean waters as impaired because they are not attaining the marine pH water quality standard which allows no more than 0.1 change in pH. On average, the oceans have already declined by 0.11 units as a result of ocean acidification (Caldeira &Wickett 2003; Orr et al. 2005; Caldeira et al. 2007; Feely et al.*

2008). Ocean acidification is also impairing the aquatic life uses of the Virgin Islands' waters. Within the past decade, scientists have observed a significant decrease in the saturation state of a calcium carbonate mineral, aragonite, in the greater Caribbean region (Gledhill et al. 2008). The calcification of corals is strongly related to the aragonite saturation state (Langdon & Atkinson 2005). Other calcifying animals from plankton to shellfish are also adversely affected by ocean acidification.

Response #1:
The United States Virgin Islands (USVI) established in the USVI Water Quality Standards Regulations (VIWQSR) that the maintenance and propagation of desirable species of aquatic life (including threatened, endangered species listed pursuant to section 4 of the federal Endangered Species Act and threatened, endangered and indigenous species listed pursuant Title 12, Chapter 2 of the US Virgin Islands Code) and primary contact recreation (swimming, water skiing, etc.) are designated uses to be maintained and protected for the coastal waters of the USVI.

Currently for Class A, B and C Waterbodies Aquatic Life Use Support is based on the physical and chemical data available for all parameters applicable to this use as indicated in the VIWQSR. The conventional parameters used for the assessment of aquatic life use support are: Dissolved Oxygen (DO), Temperature, Turbidity and pH. All waters are evaluated, based on the availability of water quality data and/or other available information to determine if they comply with the different applicable water quality standards and whether or not the designated uses are attained. CBD submitted many documents related to ocean acidification and climate change. However, after evaluating all of the studies submitted by CBD, none of the documents included data that showed any pH data outside of USVI's applicable water quality standard pH range of 7.0-8.3 standard units for Class A and B or 6.7-8.5 standard units for Class C. Also, none of the documents submitted provided conclusive evidence that the aquatic life use in the coastal waters of the USVI are threatened or impaired. Further, the studies provided are global in nature and therefore are insufficient to determine whether there is a 0.1 unit change in local coastal waterbody segments.

However, according to other available water quality available data, DPNR determined that the assessment units included in Table 1 are impaired for the aquatic life use due to exceedences outside of VI's water quality pH standard range of 7.0-8.3 standard units for Class A and B or 6.7-8.5 standard units for Class C.

In addition, CBD requests that the USVI includes all water bodies that fail to meet any water quality standard, including numeric criteria, narrative criteria, and water body uses requirements. CBD has not identified which specific USVI coastal waters would need to be listed for not meeting the water quality standards and has not provided a basis to justify such a listing of waters.

CBD provided the following references (Caldeira & Wickett 2003; Orr et al. 2005; Caldeira et al. 2007; Feely et al. 2008) to support their positions. However, these articles are insufficient for use in determining whether waterbodies are in compliance with the USVI Water Quality Standards. These studies examine global averages and are not within the appropriate scale to assess USVI coastal waters. Further, the Gledhill et al. (2008) does not contain information, such as raw data, in the methodology section that is required to adequately compare the information provided to the USVI Water Quality Standards and Langdon & Atkinson (2005) article examine aragonite saturation; aragonite is not a parameter listed in the USVI Water Quality Standards and therefore cannot be used to list USVI coastal waters as impaired.

Table 1. USVI Coastal Assessment Units Currently listed for pH Impairments

Assessment Units	Sources of Pollution	Causes of Impairment
VI-STC-23 (St. Croix-By-The-Sea)	Urban Runoff/Storm Sewers Erosion and Sedimentation	pH, Turbidity
VI-STC-27 (Long Reef Forereef, East)	Marina/Boating Sanitary On-vessel Discharges Discharges from Municipal Combined Storm Sewer Systems	pH, Turbidity
VI-STC-39 (Teague Bay)	Highway/Road/Bridge Runoff (Non-construction Related)	Dissolved Oxygen, Turbidity, pH, Fecal Coliform
VI-STC-40 (Teague Bay, Backreef)	Highways, Roads, Bridges, Infrastructure (New Construction) Marina/Boating Sanitary On-vessel Discharges	Turbidity, pH, Fecal Coliform
VI-STJ-15 (Round Bay)	Unknown	Turbidity, pH
VI-STJ-23 (Fish Bay)	Unknown	Turbidity, pH
VI-STJ-25 (Rendezvous Bay subwatershed, offshore)	Unknown	Turbidity, pH, Fecal Coliform
VI-STJ-26 (Chocolate Hole)	Marina/Boating Sanitary; On-vessel Discharges, Non-Point Source	Dissolved Oxygen, pH, Turbidity
VI-STJ-28 (Great Cruz Bay)	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	Turbidity, Dissolved Oxygen, pH
VI-STJ-30 (Cruz Bay)	Commercial Ferries Marina Fueling Operations Other Marina/Boating On-vessel Discharges Other Recreational Pollution Sources Commercial Ferries Marina Fueling Operations Other Marina/Boating On-vessel Discharges Other Recreational Pollution Sources	Fecal Coliform, Turbidity, Secchi Depth, Dissolved Oxygen, pH, Enterococci, Fecal Coliform
VI-STT-01 (Botany Bay)	Highways, Roads, Bridges, Infrastructure (New Construction)	pH, Enterococci
VI-STT-02 (Stumpy Bay)	Unknown	Turbidity, pH

VI-STT-04 (Santa Maria Bay)	Post-development Erosion and Sedimentation	Dissolved Oxygen, pH, Turbidity
VI-STT-05 (Caret Bay)	Source Unknown	Turbidity, Dissolved Oxygen, pH
VI-STT-07 (Dorothea)	Source Unknown	Turbidity, Dissolved Oxygen, pH
VI-STT-08 (Hull Bay)	Other Marina/Boating On-vessel Discharges Other Recreational Pollution Sources	Dissolved Oxygen, pH, Turbidity
VI-STT-10 (Magen's Bay)	Highways, Roads, Bridges, Infrastructure (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)	Turbidity, Dissolved Oxygen, pH, Fecal Coliform, Enterococci
VI-STT-13 (Mandahl Bay Marina)	Other Marina/ Boating On- vessel Discharges Other Recreational Pollution Sources Changes in Tidal Circulation/ Flushing	Enterococci, Fecal Coliform, Dissolved Oxygen, pH, Secchi Depth, Turbidity
VI-STT-15 (Sunsi Bay)	Sources Unknown	Dissolved Oxygen, pH, Turbidity
VI-STT-16 (Spring Bay)	Sources Unknown	Dissolved Oxygen, pH
VI-STT-17 (Mandahl Bay Subwatershed, Offshore)	Other Marina/ Boating On- vessel Discharges Other Recreational Pollution Sources Illegal Dumping On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	Dissolved Oxygen, Total Fecal Coliform, Turbidity, pH
VI-STT-18 (Water Bay)	Sources Unknown	Dissolved Oxygen, pH, Turbidity
VI-STT-22 (Red Bay)	Urban Runoff	Dissolved Oxygen, pH, Turbidity

Comment #2: *Coastal waters do not attain the numeric criteria for pH*

Response #2:
After evaluating all of the studies submitted for CBD, none of the documents included data that shows any data outside of the accepted range of 7.0-8.3 standard units for Class A and B or 6.7-8.5 standard units for Class C standard units from USVI's pH applicable water quality standard or justification for listing additional USVI coastal waters as impaired. However, after reviewing monitoring data and the USVI Water Quality Standards, the assessment units listed above in Table 1 have been listed as impaired for pH.

CBD provided the following references (Caldeira & Wickett 2003; Orr et al. 2005; Caldeira et al. 2007; Feely et al. 2004; Feely et al. 2008) to support their positions. However, these articles are insufficient for use in determining whether waterbodies are in compliance with the USVI Water Quality Standards. These studies examine global averages and are not within the appropriate scale to assess USVI coastal waters. Additionally, they are insufficient to determine whether there is a 0.1 unit change in local coastal waterbody segments.

As for Orr et al. (2005), this modeling study is written at a global spatial scale and no methodology section was provided to sufficiently to determine its correlation to USVI's waterbody segments. Meehl et al. (2007) document was not included in the references provided by CBD; therefore, DPNR could not review this reference for compliance with the USVI Water Quality Standards.

Comment#3: *Virgin Islands has sensitive coral reefs that are threatened by ocean acidification*

Response #3:
DPNR agrees that its coral reefs are sensitive resources that must be protected. USVI Water Quality Standards currently has narrative Biocriteria which is used in this regard. DPNR has conducted studies in conjunction with EPA Region 2 through a RARE Project which collected data to show the correlation between better water quality data and coral health. This project also allowed the Biological Assessment Protocol to be tested in the USVI coastal waters. Additionally, there are currently on-going projects to collect additional data. Once all the data is collected and analyzed DPNR will work to develop additional biological criteria for is coastal waters.

The Albright et al. 2010 article presents the results for a laboratory study with the objective of investigating the effect of pCO2 on the three sequential life histories that are critical to successful sexual recruitment of broadcast-spawning reef corals. As part of the discussion the authors established that the Caribbean acroporid populations have experienced widespread decline over the last several decades due to hurricanes, disease, bleaching, and predation. In summary, DPNR determined that this article appears to present information on the aquatic life use criteria and will continue to gather data to determine if a future "threat" listing is needed.

The Cohen et. al. 2009 and Cohen and Holcomb 2009 studies provided do not contain sufficient information in the methodology sections that is needed to effectively compare the data provided with the USVI's water quality standards. Specifically, the Cohen et. al. 2009, does not provide sufficient raw data, while the Cohen and Holcomb article does not contain a methodology section. Although the Cohen et al. study does include specimens from Bermuda, it should be noted that Bermuda is located much further north and is closer to the US Mainland than the USVI. Similarly, the De'ath, Lough, and Fabricius (2009) experiments conducted during this study were located near the Great Barrier Reef, which are both geographically too far from the USVI to extrapolate data on aquatic life within the USVI coastal waters. The Veron 2011 article is a literature review document which presents information that is not at an appropriate spatial scale to extrapolate to USVI coastal waters.

Comment #4: *Estuaries are already impacted by ocean acidification*

Response #4:
DPNR agrees that USVI estuaries are some of the most biologically productive and may contain some of the most extensive ecosystems and that they may be more susceptible to changes in pH than the open ocean. The articles prepared by A. W. Miller et al. in 2009; Waldbusser et al. 2010; Feely et al. 20120 and Miller 2009 are conducted in areas that are geographically too far from the USVI to extrapolate data for USVI coastal waters. Therefore, these articles do not provide a basis for listing an assessment unit for exceedences of pH or other water quality standard.

Comment #5: *Ocean acidification's impacts are overwhelmingly negative for aquatic life.*

Response #5:
Although DPNR agrees that ocean acidification's impact may be negative for aquatic life, the studies presented do not provide sufficient information that allows DPNR to confirm this determination as it relates to USVI's aquatic life. Additionally, DPNR agrees that the study of ocean acidification can benefit from further studies which would be more conclusive in determining its impact in the USVI coastal waters.

The Kroeker et al. study indicated that several investigations were not included because there was not enough information reported to ensure their comparability (e.g., seawater pH or two parameters of the carbonate chemistry). This article also did not provide any pH data showing the impairment of USVI's coastal waters. DPNR determines that this article does not provide a basis for listing an assessment unit by noncompliance of pH or other water quality standard.

The Tasneem Abbasi and S. A. Abbassi literature review summarized studies conducted in the Southern Ocean, Great Barrier Reef and California's coast which hypothesized that an increased CO2 concentrations in the atmosphere is resulting in Ocean Acidification, which when combined with global temperature rise is leading to the decreased number of corals and other calcifying organisms. However, none of the studies were conducted in or near waters which are representative of the USVI's coastal waters. Similarly, the Talmage and Gobler 2009 article is based on studies which obtained filtered seawater from eastern Shinnecock Bay, New York and larvae obtained from the East Hampton Shellfish Hatchery, which are also not representative of the USVI's coastal waters. Finally, although the National Research Council and the United Nations Environment Programme articles discuss the effects of ocean acidification in the US Mainland and throughout the world, neither article represents information specific to the USVI coastal waters or provided a basis for listing an assessment unit by noncompliance of pH or other water quality standard.

Comment #6: *Carbon dioxide trends further demonstrate the need to act now.*

Response #6:
The Intergovernmental Panel study discusses the correlation between climate change and sea level rise. The section on ocean acidification, mentions that the results of the time series stations include not only the increase in the anthropogenic carbon, but also other changes due to local physical and biological variability. The study continues to state that the consequences of the changes in pH on marine organism are poorly known. While, the Global Carbon Project document summarizes and presents global data; it is not an appropriate spatial scale to extrapolate to the USVI's coastal waters.

In closing, DPNR would like to thank you, , for providing comments on the 2012 USVI Impaired Waters List during the development of the US Virgin Islands 2012 Integrated Water Quality Monitoring and Assessment Report. If you have further questions regarding our responses, please feel free to contact me at (340) 774-3320 or by email at david.simon@dpnr.gov.vi.

Sincerely,

David Alvaro Simon, P.E.
Director

cc: Nesmarie Negron, USEPA Region 2
Anita E. Nibbs, DPNR-DEP

	Author	Name of Article/Study	Summary	Method of Study	Assessment
1.	Abbasi, Tasneem, and S. A. Abbasi.	Ocean Acidification: The Newest Threat to the Global Environment	Summary of studies conducted in Southern Ocean, Great Barrier Reef, California's coast and North Pacific and Indians Oceans. Increased CO2 concentrations in the atmosphere→Ocean Acidification combined with global temperature rise are leading to the decreased number of corals and other calcifying organisms.	Literature review	This article does not provide any information or data that could be used to determine whether USVI Water Quality Standards are not being met because the literature reviewed focused on a scale which was not appropriate to extrapolate data for USVI coastal waters.
2.	Albright, Rebecca, Benjamin Mason, Margaret Miller, and Chris Langdon	Ocean acidification compromises recruitment success of the threatened Caribbean coral Acropora palmata	Study was developed to determine whether OA threatens successful sexual recruitment of reef-building corals through testing fertilization, settlement, and post-settlement growth of Acropora palmata at pCO2 levels that represent average ambient conditions during coral spawning. The fertilization experiments described in this report were conducted in field laboratories in Key Largo, FL. Settlement and growth experiments were conducted at the Climate Change Laboratory at the Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami, FL.	Field and Laboratory Investigation	DPNR determined that this article appears to present information on the aquatic life use criteria and will continue to gather data to determine if a future "threat" listing is needed.
3.	Anderson, K., and A. Bows	Beyond 'dangerous' climate change: emission scenarios for a new world	Building on previous studies, this paper uses a cumulative emissions framing, broken down to Annex 1 and non-Annex 1 nations, to understand the implications of rapid emission growth in nations such as China and India, for mitigation rates elsewhere. The	Information document	Paper attempts to determine rating system to describe level of threat posed by climate change, specifically from CO2 emissions. However, since the paper focuses on global scenarios of atmospheric CO2 and includes no water analyses it does not provide any

	Author	Name of Article/Study	Summary	Method of Study	Assessment
			analysis suggests that despite high-level statements to the contrary, there is now little to no chance of maintaining the global mean surface temperature at or below 2◦C. Moreover, the impacts associated with 2◦C have been revised upwards, sufficiently so that 2◦C now more appropriately represents the threshold between 'dangerous' and 'extremely dangerous' climate change.		information/data that could be used to determine whether USVI Water Quality Standards are not being met. This document does provide information at an appropriate spatial scale to extrapolate to USVI waters.
4.	Bates, NR, A. Amat, and AJ Anderson	Feedbacks and responses of coral calcification on the Bermuda reef system to seasonal changes in biological processes and ocean acidification	Data sets were used to compare seawater carbonate chemistry and calcification rates from the high-latitude coral reef of Bermuda to study the present and future potential impact of rising carbon dioxide levels and ocean acidification on coral reef ecosystems in their natural environment.	Field Study	The study described throughout occurred in Bermuda. Although, it showed that physical changes experienced by Bermuda's reef system may be related to seasonal changes. Geographically Bermuda is too far to extrapolate data on aquatic life in the USVI.
5.	Beman, J Michael, Cheryl-emiliane Chow, Andrew L King, Yuanyuan Feng, and Jed A Fuhrman	Global declines in oceanic nitrification rates as a consequence of ocean acidification	The water samples collected from the Atlantic and Pacific Oceans, near the Bermudas, Hawaii, California coast and Saragossa Sea were collected and analyzed in a laboratory	Field sample collection and laboratory experiments	The study was laboratory-based with no field data collected. Lab studies alone are not sufficient to determine whether water quality standards are being met in USVI waters because water quality parameters are manipulated and therefore may not reflect the actual conditions within waterbodies.
6.	Beman, J Michael, et. al.	Supporting Information	This is the supporting information document for the study *Global declines in oceanic nitrification rates as a consequence of ocean acidification*. The supporting information for the study's results and discussion, explains that in certain ammonia oxidizer	Laboratory Experiments	This document does not provide any pH data showing the impairment of USVI's coastal waters. Given the geographic distances of the study sites to USVI, they may not representative the natural characteristics of USVI's coastal waters. Therefore, this

	Author	Name of Article/Study	Summary	Method of Study	Assessment
			communities present at different times or in different locations may be more or less sensitive to pH change of >0.14. Other information provided related to the materials and methods include experimental details; carbonate system parameters; 15NH4+ oxidation rate measurements and additional calculations.		article does not provide a basis for listing an assessment unit for exceedences of pH or other water quality standard.
7.	Bindoff, N.L., J Willebrand, V Artale, A. Cazenave, J.M. Gregory, S Gulev, K Hanawa, C. Le Quere, S Levitus, and Y Nojiri.	Observations: oceanic climate change and sea level. In *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*	The study discusses the correlation between climate change and sea level rise. The section on ocean acidification, mentions that the results of the time series stations include not only the increase in the anthropogenic carbon, but also other changes due to local physical and biological variability. The study continues to state that the consequences of the changes in pH on marine organism are poorly known.	Laboratory and Field Experiments	This study does not provide any pH data showing the impairment of USVI's coastal waters. Therefore, this article does not provide a basis for listing an assessment unit for exceedences of pH or other water quality standard for aquatic life use.
8.	Byrne, Maria, Melanie Ho, Eunice Wong, Natalie a Soars, Paulina Selvakumaraswamy, Hannah Shepard-Brennand, Symon a Dworjanyn, and Andrew R Davis	Unshelled abalone and corrupted urchins: development of marine calcifiers in a changing ocean	The study indicated that the species investigated in the southeast Australia, a climate change hotspot, where the ocean is warming a several times faster than the global average will decrease the species diversity. Additionally, ocean warming, acidification, decreased carbonate saturation are likely to impair skeletogenesis in various marine organisms.	Laboratory Experiments	This study does not provide any pH data showing the impairment of USVI's coastal waters because the study site, Southeast Australia, is located geographically too far from the USVI to extrapolate water quality data for the USVI coastal waters. Therefore, this article does not provide a basis for listing an assessment unit for exceedences of pH or other water quality standard for aquatic life use.
9.	Byrne, R.H., Sabine Mecking, R.A. Feely, and Xuewu Liu	Direct observations of basin wide acidification of the North Pacific Ocean	The study it explains that the 15-years pH differences are mapped and analyzed. It was noted that at high depths the pH change was	Field sample collection and laboratory experiments	Given geographical distance of the study site and the USVI, it may be too far to extrapolate data to aquatic life in USVI coastal waters.

	Author	Name of Article/Study	Summary	Method of Study	Assessment
			zero, but samples collected nearer to the surface displayed substantial changes in pH concentration which was later separated into anthropogenic and non anthropogenic components. Study area: North Atlantic and Pacific Oceans specifically between Ohau, Hawaii and Kodiak, Alaska.		
10.	Caldeira, K, and M.E. Wickett	Anthropogenic carbon and ocean pH	The authors provide information that corrects data previously published that states that decreases in the ocean's pH caused by the release of CO2 will be simply reversed. The authors, however, believe that the decrease in ocean pH is evitable; which will continue to affect marine biota.	Description of model results	Data provided does not allow for the determination of natural conditions. Therefore, this article does not provide a basis for listing an assessment unit for exceedences of pH or other water quality standard for aquatic life use
11.	Caldeira, Ken, and David Archer	Comment on Modern-age buildup of CO2 and its effects on seawater acidity and salinity; by Hugo A. Loaiciga (DOI 10.1029/2006GL027288)	The object of the document is to prove that the investigation conducted by Hugo A. Loáiciga is incorrect. The author concluded that the conclusions of the Loáiciga do not apply to the real ocean."	Information study	This study does not provide any pH data showing the impairment of USVI's coastal waters. Therefore, this article does not provide a basis for listing an assessment unit for exceedences of pH or other water quality standard for aquatic life use.
12.	Canadell, J. G., C. Le Quéré, M. R. Raupach, C. B. Field, E. T. Buitenhuis, P. Ciais, T. J. Conway, N. P. Gillett, J. T. Houghton, and G. Marland	Contributions to accelerating atmospheric CO2 growth from economic activity, carbon intensity, and efficiency of natural sinks	This paper discusses the affect that the global economy has had on the increase of CO2 emission from fossil fuels. The paper continues to outline the change in the earth decrease in its efficiency to absorb anthropogenic emissions.	Modeling Investigation study	This modeling study does not contain information in the methodology section that is needed to effectively compare the data provided with the USVI's water quality standards.
13.	Cohen, A.L., D.C. McCorkle, S. de Putron, G.A. Gaetani, and K.A. Rose	Morphological and compositional changes in the skeletons of new coral recruits reared in acidified seawater: Insights into the	The study investigated the changes that show in the morphology of the coral.	Modeling Laboratory experiment	This modeling study does not contain sufficient raw data in the methodology section that is needed to effectively compare the data

	Author	Name of Article/Study	Summary	Method of Study	Assessment
		biomineralization response to ocean acidification	The sample was collected from Bermuda reef and the experiment develops in a laboratory.		provided with the USVI's water quality standards.
14.	Cohen, A.L., and M. Holcomb	Why corals care about ocean acidification: Uncovering the mechanism	The effect of the ocean acidification in the coral reef principally the high amount energy used in calcification.	Modeling	This modeling study does not contain a methodology section that is needed to effectively compare the data provided with the USVI's water quality standards.
15.	Cooley, S.R., and S.C. Doney	Anticipating ocean acidification's economic consequences for commercial fisheries	The authors use an economic approach to outline the effect that ocean acidification has on the US commercial fishery; especially on mollusk and possible strategies to support fisheries and marine-resources dependent communities.	Investigation	This document does not present information on an appropriate spatial scale to extrapolate to USVI coastal waters.
16.	De'ath, Glenn, J.M. Lough, and K.E. Fabricius	Declining coral calcification on the Great Barrier Reef	The paper describes an investigation of the effect of the climate change and ocean acidification on the Great Barrier Reef, Australia, using *Porites* coral as an indicator of the environmental condition and the decline of the coral growth.	Laboratory experiments Modeling	This modeling study does not contain information in the methodology section that is needed to effectively compare the data provided with the USVI's water quality standard. DPNR determines that this article does not provide a basis for listing an assessment unit by noncompliance of pH or other water quality standard.
17.	Diaz-Pulido, Guillermo, Marine Gouezo, Bronte Tilbrook, Sophie Dove, and Kenneth R N Anthony	High CO2 enhances the competitive strength of seaweeds over corals	The experiments described in this report were conducted in Heron Island Research Station in Australia. The samples were collected on the Great Barrier Reef. The experiments served to describe the effect of the increasing concentration of atmospheric CO2 in the competition between coral and seaweeds. (May and June, the	Laboratory experiment	Australia is geographically too far from the USVI to extrapolate data on aquatic life within the USVI coastal waters.

	Author	Name of Article/Study	Summary	Method of Study	Assessment
			Australia autumn/winter 2009). The methodology section of the study indicated that the investigation was performed with controlled pH measurements of 7.60-8.10. The discussion and the results indicate that the mechanism by which increased *p*CO2 enhanced coral mortality at the interface between the seaweed and the coral tissue could not be deduced from our observations or data. Other asseverations indicated that not only the increase of pCO2 interacts in the competition between coral and seaweed or the mortality of the coral if not that chemical and biological process can cause coral mortality depending on the population and the others factors. The experiment shows that multiple factor can disturb the dynamics in the corals reefs.		
18.	Environmental Protection Agency	Memo: Integrated reporting and listing decisions related to ocean acidification. (NOT PROVIDED)	Information for all Regions and States.	EPA Guidelines	EPA provides this information for the purpose of assisting the regions and states in preparing and reviewing Integrated Reports related to ocean acidification impacts under Sections 303(d), 305(b), and 314 of the Clean Water Act (CWA).
19.	Feely, R.A., S.R. Alin, Jan Newton, C.L. Sabine, Mark Warner, Allan Devol, Christopher Krembs, and Carol Maloy	The combined effects of ocean acidification, mixing, and respiration on pH and carbonate saturation in an urbanized estuary	Study Area: Puget Sound Estuary in the U.S. Pacific Northwest. The area of the study is strongly influenced by seasonal upwelling. The article described the combined effects of ocean acidification and	Laboratory Experiment	Since Puget Sound Estuary is geographically far from the USVI it may to be too far to extrapolate data to aquatic life within USVI coastal waters.

	Author	Name of Article/Study	Summary	Method of Study	Assessment
			other natural and anthropogenic processes on Puget Sound waters. It was a seasonal study.		
20.	Feely, R.A., C.L. Sabine, J.M. Hernandez-Ayon, Debby Ianson, and Burke Hales	Evidence for upwelling of corrosive 'acidified' water onto the continental shelf	Hydrogeographic surveys along the continental shelf of western North America from central Canada to northern Mexico. The measurement of the pH observed during the investigation is in the range of 8.1-7.6.	Field experiment	Given the geographically distance of the study sites from the USVI it may be too far to extrapolate data on the aquatic life within the USVI coastal waters.
21.	Feely, R.A., C.L. Sabine, Kitack Lee, Will Berelson, Joanie Kleypas, V.J. Fabry, and F.J. Millero	Impact of anthropogenic CO2 on the CaCO3 system in the oceans (NOT PROVIDED)	The authors describe the effect of the CO2 in the calcification rates.	Field and laboratory experiment	This article does not provide at an appropriate scale to extrapolate to USVI's coastal waters. Therefore, DPNR has determined that this article does not provide a basis for listing an assessment unit by noncompliance of pH or other water quality standard.
22.	Friedlingstein, P., R. A. Houghton, G. Marland, J. Hackler, T. A. Boden, T. J. Conway, J. G. Canadell, M. R. Raupach, P. Clais, and C. Le Quéré	Update on CO2 emissions	Review of the CO2 emission by multiple factor such as global financial and economy crisis.	Investigation	This article does not provide at an appropriate scale to extrapolate to USVI's coastal waters. Therefore, DPNR has determined that this article does not provide a basis for listing an assessment unit by noncompliance of pH or other water quality standard.
23.	Fussel, H.-M	An updated assessment of the risks from climate change based on research published since the IPCC Fourth Assessment Report	This paper presents an updated assessment of the risks from anthropogenic climate change, based on a comprehensive review of the pertinent scientific literature published since finalization of the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment ReportAR4.	Literature review	This article does not provide at an appropriate scale to extrapolate to USVI's coastal waters. Therefore, DPNR has determined that this article does not provide a basis for listing an assessment unit by noncompliance of pH or other water quality standard.

	Author	Name of Article/Study	Summary	Method of Study	Assessment
24.	Gledhill, D.K., Rik Wanninkhof, F.J. Millero, and Mark Eakin	Ocean acidification of the greater Caribbean region 1996–2006	The study analyzes the Greater Caribbean Region as the region comprising waters 90-60W, 15-30N. This region houses extensive carbonate platform production and coral reef ecosystems including those of the Antilles Islands arc.	Field and laboratory experiment Modeling	This study did not indicate if samples were collected or if studies were conducted within or near the USVI's coastal waters. However, the study does recognize that there are multiple variables that influence the Caribbean Reef which are threatened with some of the greatest anthropogenic effects of human population growth, overfishing, coastal development, sediments, land-base pollution, nutrient runoff, boat damage and coral disease. The study does not contain information in the methodology section that is required to adequately compare the data provided against the standard. Therefore, DPNR determines that this article does not provide a basis for listing an assessment unit by noncompliance of pH or other water quality standard.
25.	Global Carbon Project	Carbon Budget 2009	Global review and estimates of carbon and related emissions/concentrations	Literature review	The document summarizes and presents global data and therefore not at an appropriate spatial scale to extrapolate to USVI coastal waters.
26.	Guinotte, J.M., and V.J. Fabry	Ocean acidification and its potential effects on marine ecosystems	The study indicated the possible impact in a group of marine organisms caused by ocean acidification.	Laboratory experiment/ Literature Review	The methodology portion of this study does not provide data/information needed to make a listing decision.
27.	Hoegh-Guldberg, O., PJ Mumby, AJ Hooten, RS Steneck, P. Greenfield, E. Gomez, CD Harvell, PF Sale, AJ Edwards, and K Caldeira	Coral reefs under rapid climate change and ocean acidification	The study outlined the effect of the ocean acidification in the marine ecosystem. It also presented data on the effect of the ocean acidification in the Great Coral Barrier of Australia and the Caribbean corals. It does not	Modeling	The information provided in the methodology section is not sufficient to effectively make a listing decision.

	Author	Name of Article/Study	Summary	Method of Study	Assessment
			mention the location of corals in the Caribbean.		
28.	Hoeke, Ron K., Paul L. Jokiel, Robert W. Buddemeier, and Russell E. Brainard	Projected Changes to Growth and Mortality of Hawaiian Corals over the Next 100 Years	This study investigates the uses of modeling techniques to quantitatively examine rates of coral cover change due to ocean acidification's effects on the Hawaiian Corals. This pilot study focuses on sites within the greater Hawaiian Archipelago to allow an examination of model sensitivities in a region of relatively low biological diversity (compared with the western Indo-Pacific) and reasonably well-studied responses of growth rates of several dominant reef-building corals to temperature models. This is accomplished by using evaluated coral mortality and coral bleaching. The study indicates the model does not account for multiple variations of the ecosystem dynamics.	Modeling	Given the geographic distances of the Hawaiian Archipelago to USVI, it may not be representative of the natural characteristics of the USVI's coastal waters.
29.	Jiang, L.Q., W.J. Cai, R.A. Feely, Yongchen Wang, Xianghui Guo, D.K. Gledhill, Xinping Hu, Felipe Arzayus, Feizhou Chen, and Justin Hartmann	Carbonate mineral saturation states along the US East Coast	Effect of the OA in the marine ecosystem in U.S. continental shelf (South Atlantic Bight) extends along the eastern U.S. coast from Cape Hatteras, North Carolina to West Palm Beach, Florida. Natural variation is not necessarily representative of USVI. The study investigates the differences in carbonate mineral saturation in the US East Coast and the West Coast of North America. The study	Field and laboratory investigation	Since the South Atlantic Bight and the West Coast of North America are both geographically far from the USVI, therefore they may not be representative of the natural characteristics of the USVI's coastal waters. USVI's coastal waters.

	Author	Name of Article/Study	Summary	Method of Study	Assessment
			concluded that the region's natural variation influences changes in the ocean's chemistry. In the case presented it was indicated that the waters' temperature and other regional natural conditions play important roles in the changes of the water chemistry.		
30.	Kelly, R P, M M Foley, W S Fisher, R A Feely, B S Halpern, G G Waldbusser, and M R Caldwell	Mitigating Local Causes of Ocean Acidification with Existing Laws	The document indicates that there are other causes that contribute to coastal acidification to include fresh waters inputs, pollutants and soil erosion. It is also mentioned that states have law mechanisms for protecting the coastal waters against acidification.	Literature review	This document is not written at the appropriate spatial scale to extrapolate to USVI's coastal waters. Therefore, DPNR has determined that this article does not provide a basis for listing an assessment unit by noncompliance of pH or other water quality standard.
31.	Kroeker, Kristy J., Rebecca L. Kordas, Ryan N. Crim, and Gerald G. Singh	REVIEW AND SYNTHESIS: Meta-analysis reveals negative yet variable effects of ocean acidification on marine organisms	Summary, synthesis and analysis of several investigations related to ocean acidification.	Meta-analysis Literature Review	The study indicates that several investigations were not included because there was not enough information reported to ensure their comparability (e.g., seawater pH or two parameters of the carbonate chemistry). This problem highlights the importance of data reporting in future ocean acidification research. For example biological response to ocean acidification, the studies were limited to a few taxonomic groups and even fewer ecosystems. DPNR has determined that the methodology portion of this study does not provide data/information needed to make a listing decision.
32.	Kuffner, I.B., A.J. Anderson, P.L. Jokiel, K.S. Rodgers, and F.T. Mackenzie	Decreased abundance of crustose coralline algae due to ocean acidification	Seven weeks of experiments exploring the effects of ocean acidification on crustose coralline algae. The investigation collected	Laboratory experiment	This study was laboratory-based with no field data. Laboratory studies alone are not sufficient to determine whether water quality

	Author	Name of Article/Study	Summary	Method of Study	Assessment
			information of changes in benthic communities to predict possible effects in the future.		standards are being met in state waters because water quality parameters are manipulated and therefore, may not reflect the actual conditions within a waterbody. DPNR determines that this article does not provide a basis for listing an assessment unit by exceedences of pH or other water quality standard.
33.	Lenton, T. M., H. Held, E. Kriegler, J. W. Hall, W. Lucht, S. Rahmstorf, and H. J. Schellnhuber.	Tipping elements in the Earth's climate system (NOT PROVIDED)	The study is about climate change.	Literature review	This article is not based on an appropriate spatial scale to extrapolate to USVI waters.
34.	Lischka, S., J. Büdenbender, T. Boxhammer, and U. Riebesell	Impact of ocean acidification and elevated temperatures on early juveniles of the polar shelled pteropod *Limacina helicina*: mortality, shell degradation, and shell growth (NOT PROVIDED)	Summarized a 29-day experiment in September/October 2009, which investigated the effects of rising partial pressure of CO2 and elevated temperature on pre-winter juveniles of the pteropod *Limacina helicina*. This study applied specifically to species inhabiting the Arctic surface waters that are projected to become temporarily and locally under-saturated with respect to aragonite as early as 2016.	Field and laboratory experiment	Natural conditions in the study area are not representative of the natural conditions of the USVI. The experiment was conducted in temperatures between 1-8 °C. Therefore, USVI determines that this article does not provide a basis for listing an assessment unit by noncompliance of pH or other water quality standard.
35.	Mathis, Jeremy T., Jessica N. Cross, and Nicholas R. Bates	Coupling primary production and terrestrial runoff to ocean acidification and carbonate mineral suppression in the eastern Bering Sea	Effect of ocean acidification on the marine ecosystem in the Bering Sea.	Field and laboratory experiment	Given the geographical distances from the study site to the USVI it may not be representative of the natural conditions of the USVI. Therefore, DPNR determines that this article does not provide a basis for listing an assessment unit by noncompliance of pH or other water quality standard.
36.	Miller, A.W., A.C. Reynolds,	Shellfish face uncertain future in	Laboratory experiment was	Laboratory	This study was a laboratory-based

	Author	Name of Article/Study	Summary	Method of Study	Assessment
	Cristina Sobrino, and G.F. Riedel	high CO2 world: influence of acidification on oyster larvae calcification and growth in estuaries (NOT PROVIDED)	conducted at the Smithsonian Environmental Research Center in Edgewater. The organisms were obtained from the Virginia Institute for Marine Science's Eastern Shore Laboratory, Wachpreague, VA. The study investigated the effects of CO2 in the estuarine ecosystem. The researchers indicated that the estuaries are more susceptible to changes in pH than the open oceans.	experiment	study with no field data. Laboratory studies alone are not sufficient to determine whether water quality standards are being met in state waters because water quality parameters are manipulated and therefore may not reflect the actual conditions within a waterbody.
37.	McMullen, C. P., and J. Jabbour	Climate Change Science Compendium 2009	Summary of the effects of climate change and the use of models to predict them.	Literature review	The information provided is not at an appropriate spatial scale to extrapolate to USVI coastal waters.
38.	Munday, PL, and DL Dixson	Replenishment of fish populations is threatened by ocean acidification	The study investigates the effect of rising CO2 in the behavior of larva fish. Species used came from the Cook University, Townsville, Australia and from the Great Barrier reef, Australia.	Laboratory experiment	The study is not representative of the population in USVI's coastal waters given the geographical distances the study sites to the USVI.
39.	National Research Council	Ocean Acidification: A National Strategy to Meet the Challenges of a Changing Ocean (NOT PROVIDED)	This paper summarizes the anticipated consequences of ocean acidification due to rising atmospheric carbon dioxide levels on fisheries, protected species, coral reefs, and other natural resources in the United States and internationally. The paper recommends that priorities be established for a national research, monitoring, and assessment plan to advance understanding of the biogeochemistry of carbon dioxide uptake in the ocean and the	Informative study	The information provided in this article is not in an appropriate spatial scale to extrapolate to USVI's coastal waters.

	Author	Name of Article/Study	Summary	Method of Study	Assessment
			relationship to atmospheric levels of carbon dioxide, and to reduce uncertainties in projections of increasing ocean acidification and the potential effects on living marine resources and ocean ecosystems.		
40.	Orr, J.C., V.J. Fabry, Olivier Aumont, Laurent Bopp, S.C. Doney, R.A. Feely, Anand Gnanadesikan, Nicolas Gruber, Akio Ishida, and Fortunat Joos	Anthropogenic ocean acidification over the twenty-first century and its impact on calcifying organisms	The investigation focuses on future surface and subsurface changes in high latitude regions; specifically in Southern Ocean, Artic Oceans and Subartic where planktonic shelled pteropods are prominent components.	Modeling	This modeling study's is presented in a global scale and there is no methodology section which are needed to determine correlation with USVI waterbody segments.
41.	Pelejero, Carles, and Eva Calvo	Paleo-perspectives on ocean acidification	The study presents changes in the ocean's water chemistry to include the decrease in pH. This study presents this information to provide a basis for understanding present and anticipated future changes.	Literature review	The study presents information which shows the Atlantic Ocean to have pH measurements of 7.4-8.4; however, it is not at an appropriate spatial scale to extrapolate to USVI's coastal waters.
42.	Raupach, M. R., G. Marland, P. Ciais, C. Le Quéré, J. G. Canadell, G. Klepper, and C. B. Field	Global and regional drivers of accelerating CO2 emissions	This study reviews information on global emissions of CO2. This analysis uses nine noncontiguous regions such as the U.S., China, Japan and others. The study takes into consideration the emission of CO2 and regionalized trends of the emissions.	Literature review	The study does not provide any pH data showing the impairment of USVI's coastal waters. DPNR determines that this article does not provide a basis for listing an assessment unit by noncompliance of pH or other water quality standard.
43.	Richardson, K., W. Steffen, H. J. Schellnhuber, J. Alcamo, T. Barker, R. Leemans, D. Liverman, M. Munasinghe, B. Osman-Elasha, N. Stern, and O. Waever	Synthesis Report from Climate Change: Global Risks, Challenges and Decisions, Copenhagen 2009	It summarizes the consequences of climate change on all aspects of the human being. It explores how the consequences of the environmental situation worldwide results in social effects and risks to human health which can both be attributed to climate change.	Literature review	The information presented is not at an appropriate scale to extrapolate to USVI's coastal waters.

	Author	Name of Article/Study	Summary	Method of Study	Assessment
44.	Schneider, Kenneth, and Jonathan Erez	The effect of carbonate chemistry on calcification and photosynthesis in the hermatypic coral *Acropora eurystoma*	Laboratory experiments were conducted on A. eurystomas coral. The coral samples were collected near Inter-University Instituted (IUI) in Eilat, Gulf of Eilat, Red Sea. The authors indicated that these studies did not separate the effects of pH and CO2. It was also noted that they obtained somewhat conflicting results with respect to the effects of Ca+.	Laboratory experiment	Given the geographic distances of the study sites to USVI, they may not representative of the natural characteristics of USVI's coastal waters. DPNR determines that this article does not provide a basis for listing an assessment unit by noncompliance of pH or other water quality standard.
45.	Silverman, Jacob, Boaz Lazar, Long Cao, Ken Caldeira, and Jonathan Erez	Coral reefs may start dissolving when atmospheric CO_2 doubles	The study investigated the decline in calcification of coral reefs as a result of increased temperature and atmospheric CO2.	Modeling	This article does not an appropriate methodology portion that provides data/information needed to make a listing decision.
46.	Southern California Coastal Water Research Project	Ocean acidification effects on shellfish workshop: Findings and recommendations (NOT PROVIDED)	This document summarized workshops held at Southern California Coastal Water Research Project office in Costa Mesa, California on July 7-8, 2010. The workshop included presentations which summarized OA research on the impacts on the west coast shellfish industry. Workshop participants determined that the existing datasets could not be used to explain impacts of OA on shellfish productivity, because the datasets are physically and spatially dissociated and the experiments do not follow standardized protocols.	Workshop Findings	Given the geographic distances of the study sites to USVI, they may not representative of the natural characteristics of USVI's coastal waters. Therefore, DPNR determined that this document does not provide a basis for listing an assessment unit for noncompliance of pH or other water quality standards.
47.	Suwa, Ryota, Masako Nakamura,	Effects of acidified seawater on	Manipulated duplicative aquarium	Laboratory	The study was not found to be

	Author	Name of Article/Study	Summary	Method of Study	Assessment
	Masaya Morita, Kazuaki Shimada, Akira Iguchi, Kazuhiko Sakai, and Atsushi Suzuki	early life stages of scleractinian corals (Genus Acropora)	studies were conducted in Sesoko Station, Tropical Biosphere Research Center, University Of Ryukyus, Okinawa, Japan. The experiment examined the effects of reduced seawater pH on early life stages of corals. The study found that the survivorship of coral larvae was not obviously affected by acidified seawater, the data also indicated the possibility that the survival of coral larvae may not be strongly affected by pH change.	experiment	representative of the natural conditions of USVI's coastal waters given the geographic distance of the study sites to USVI, they may not representative of the natural characteristics of USVI's coastal waters. DPNR determined that this article does not provide a basis for listing an assessment unit by noncompliance of pH or other water quality standard.
48.	Talmage, S.C., and C.J. Gobler	The effects of elevated carbon dioxide concentrations on the metamorphosis, size, and survival of larval hard clams (Mercenaria mercenaria), bay scallops (Argopecten irradians), and Eastern oysters (Crassostrea virginica)	This study evaluated the effect of the increasing CO2 levels on the growth and survivals of the larvae of three species of commercially and ecologically valuable shellfish. Filtered seawater was obtained from eastern Shinnecock Bay, New York. The larvae were obtained from the East Hampton Shellfish Hatchery.	Laboratory experiment	The study was not found to be representative of the natural conditions of USVI's coastal waters given the geographic distance of the sample collection sites to USVI. DPNR determined that this article does not provide a basis for listing an assessment unit by noncompliance of pH or other water quality standard.
49.	United Nations Environment Programme	Environmental consequences of ocean acidification: A threat to food security	Compendium of information related the effect of ocean acidification with emphasis on the marine food resources.	Informational document	The study is not in an appropriate spatial scale to extrapolate to USVI coastal waters.
50.	Veron, John E. N.	Ocean Acidification and Coral Reefs: An Emerging Big Picture (NOT PROVIDED)	This article presents information related the process and the effect of ocean acidification. The article summarizes the different sciences used to predict the path of ocean acidification impacts on the diversity of coral reef.	Literature review/ Informational document	This article presents information that is not at an appropriate spatial scale to extrapolate to USVI coastal waters.

	Author	Name of Article/Study	Summary	Method of Study	Assessment
51.	Waldbusser, G.G., E.P. Voigt, Heather Bergschneider, M.A. Green, and R.I.E. Newell	Biocalcification in the eastern oyster (Crassostrea virginica) in relation to long-term trends in Chesapeake Bay pH	The study investigated the effect of ocean acidification in the marine ecosystem of the Chesapeake Bay. The study analyzed 23 years of water quality monitoring data. It was found that there were variations in pH observed depending on the area, the salinity and the temperature. Furthermore, the study found the seasonal variation in pH. The study also found that higher salinity only increases calcification at reduced pH. Additionally, the result demonstrated that the fresh water inputs can contribute at the acidification.	Laboratory experiment	Given the geographic distances of the study sites to USVI, they may not representative of the natural characteristics of the USVI's coastal waters. DPNR determined that this article did not provide a basis for listing an assessment unit by noncompliance of pH or other water quality standard.
52.	Feely, R. A.; Dorey, Scott, C.; and Cooley, Sarah R.	Ocean Acidification: Present Conditions and Future Changes in a High CO2 World; *Oceanography* Vol. 22, No. 4 (NOT PROVIDED)	This article provided a brief introduction to ocean acidification and some historical information on how it became an important research topic quickly.	Literature Review	The information provided was not an appropriate spatial scale to extrapolate to USVI coastal waters.