

An aerial photograph of a watershed. A river flows through the center, surrounded by green fields and some buildings. The river eventually flows into a larger body of water, possibly a bay or ocean, where the water is a light blue color. The surrounding land is a mix of green and brown, indicating different types of vegetation and land use.

Managing the Salt River Watershed: Where do we go from here ?

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8/16/06

Agenda

- ◆ Review basic watershed features
- ◆ Review recommendations from previous planning efforts
- ◆ Updates?
- ◆ Discussion on steps to move forward



National Park Service
National Park Service
U.S. Department of the Interior

Salt River Bay

National Historic Park & Ecological Preserve
Virgin Islands

An aerial photograph of Salt River Bay National Historic Park & Ecological Preserve, showing a large bay with a winding river or inlet. The surrounding land is green and hilly, with some buildings and infrastructure visible. The water is a mix of blue and green, indicating varying depths and possibly mangrove areas.

Info comes from

- ◆ 1993 Salt River Bay APC (DPNR CZMP)
- ◆ 2004 DO TMDL Salt River Bay (DPNR DEP)
- ◆ An Ecological Characterization of the Salt River Bay National Historical Park and Ecological Preserve, U.S. Virgin Islands (NOAA)
- ◆ SARI Environmental Assessment Newsletter, Issue 1, Summer 2006
- ◆ GIS CD from DPNR and UVI Wetlands Study



An Ecological Characterization of the Salt River Bay National Historical Park and Ecological Preserve, U.S. Virgin Islands



An Ecological Characterization of the Salt River Bay National Historical Park and Ecological Preserve, U.S. Virgin Islands



NOAA Technical Memorandum NOS NCCOS 14



[report](#) | [data](#) | [maps](#) | [contributors](#) | [about](#)

Provides a report, maps, and spatial data characterizing the ecosystem by the Salt River Bay National Historical Park and Ecological Preserve, S. Virgin Islands. An overview of the project, the complete text report, downloadable GIS and image data, printable benthic and land cover maps, contributors and their contact information are provided through the links in the image above.

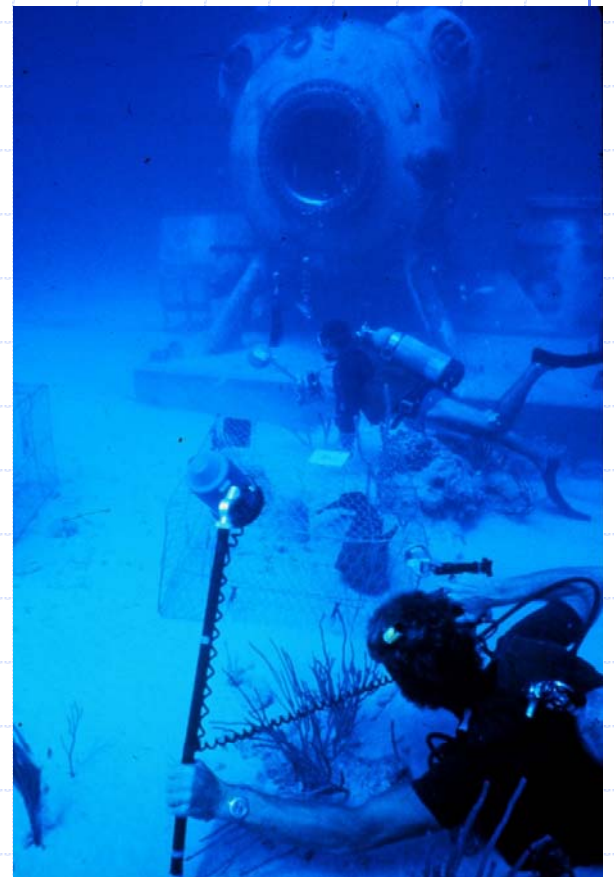
[National Oceanic and Atmospheric Administration \(NOAA\)](#)
[Ocean Service \(NOS\)](#) | [National Centers for Coastal Ocean Science \(NCCOS\)](#)
[for Coastal Monitoring and Assessment \(CCMA\)](#) | [Biogeography Program](#)

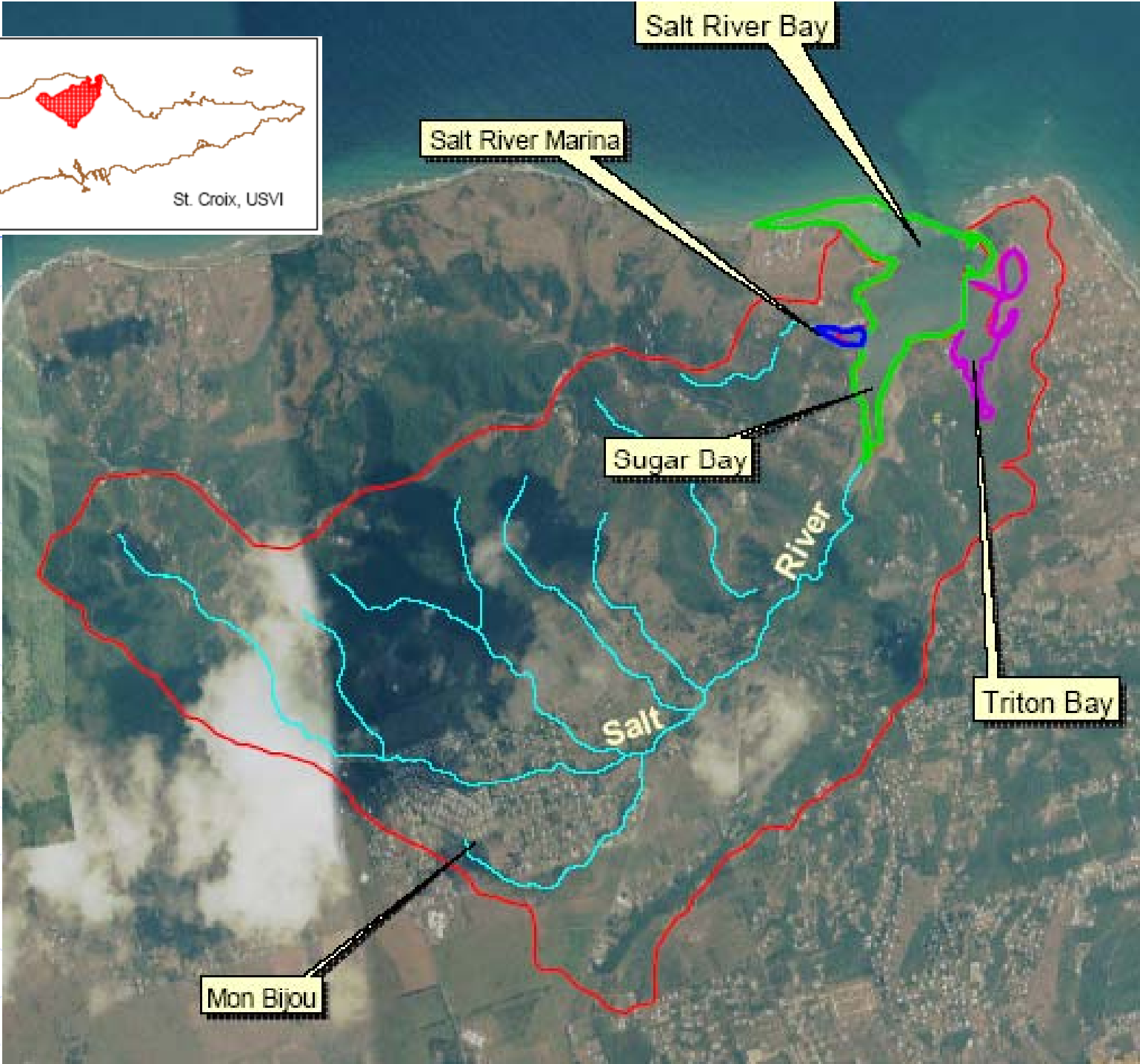
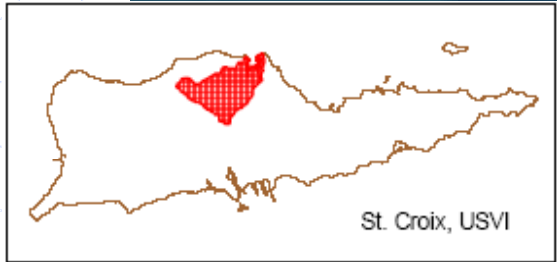
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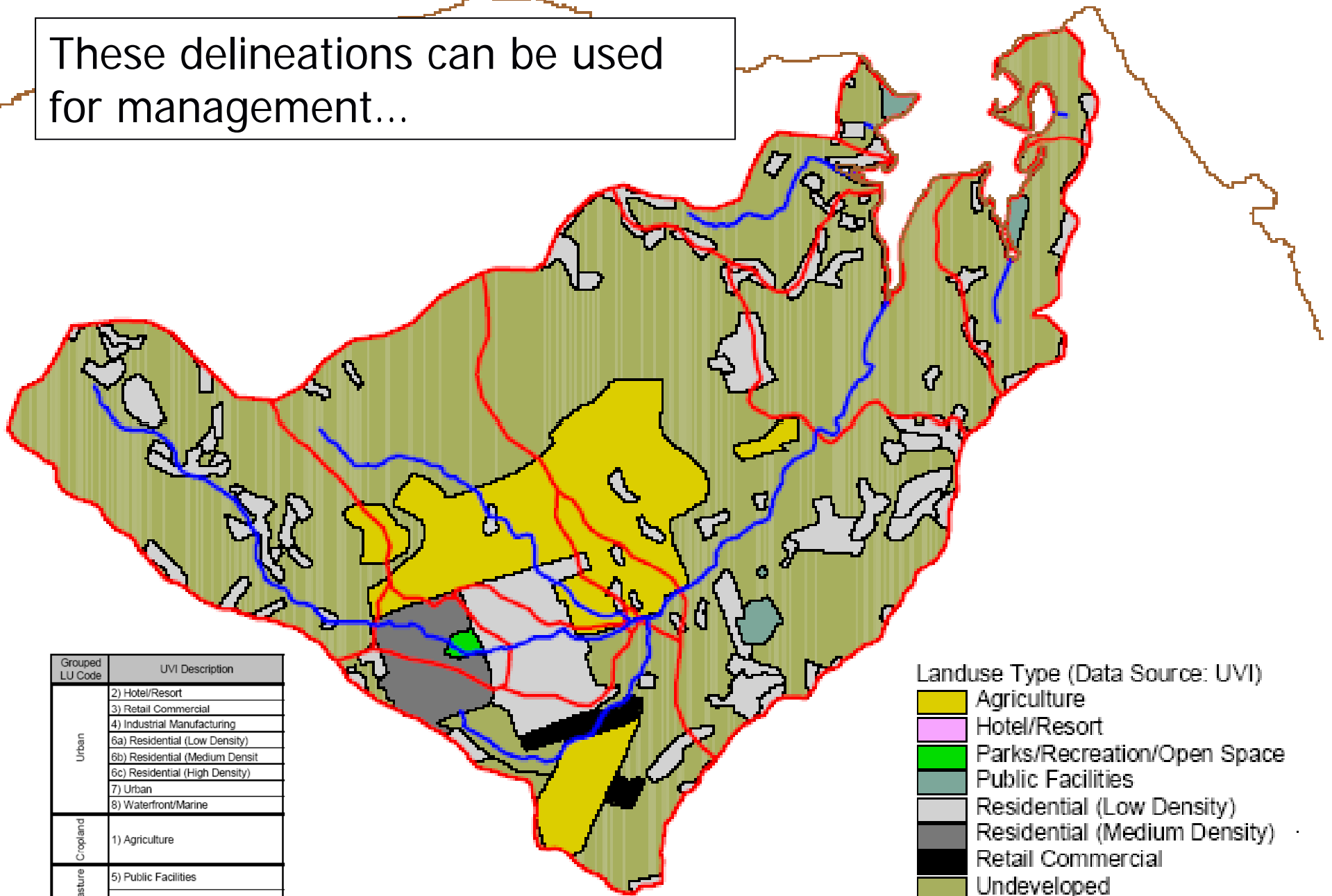
Watershed Features

- ◆ 6.7 sq mi drainage (APC ~ 4 sq mi)
- ◆ Watershed mostly forested, a few urban areas
- ◆ Significant groundwater resources
- ◆ Contains largest remaining mangrove forest in USVI; sea grasses; reef; national park
- ◆ Historic significance (ceremonial ball court, Columbus landing, etc)
- ◆ Only 1 of >2300 national sites jointly designated Natural & Historic Landmark













These delineations can be used for management...



Grouped LU Code	UVI Description
Urban	2) Hotel/Resort
	3) Retail Commercial
	4) Industrial Manufacturing
	6a) Residential (Low Density)
	6b) Residential (Medium Density)
	6c) Residential (High Density)
	7) Urban
	8) Waterfront/Marine
Cropland	1) Agriculture
Pasture	5) Public Facilities
	9) Parks/Recreation/Open Space
Forest	10) Undeveloped

Landuse Type (Data Source: UVI)

	Agriculture
	Hotel/Resort
	Parks/Recreation/Open Space
	Public Facilities
	Residential (Low Density)
	Residential (Medium Density)
	Retail Commercial
	Undeveloped

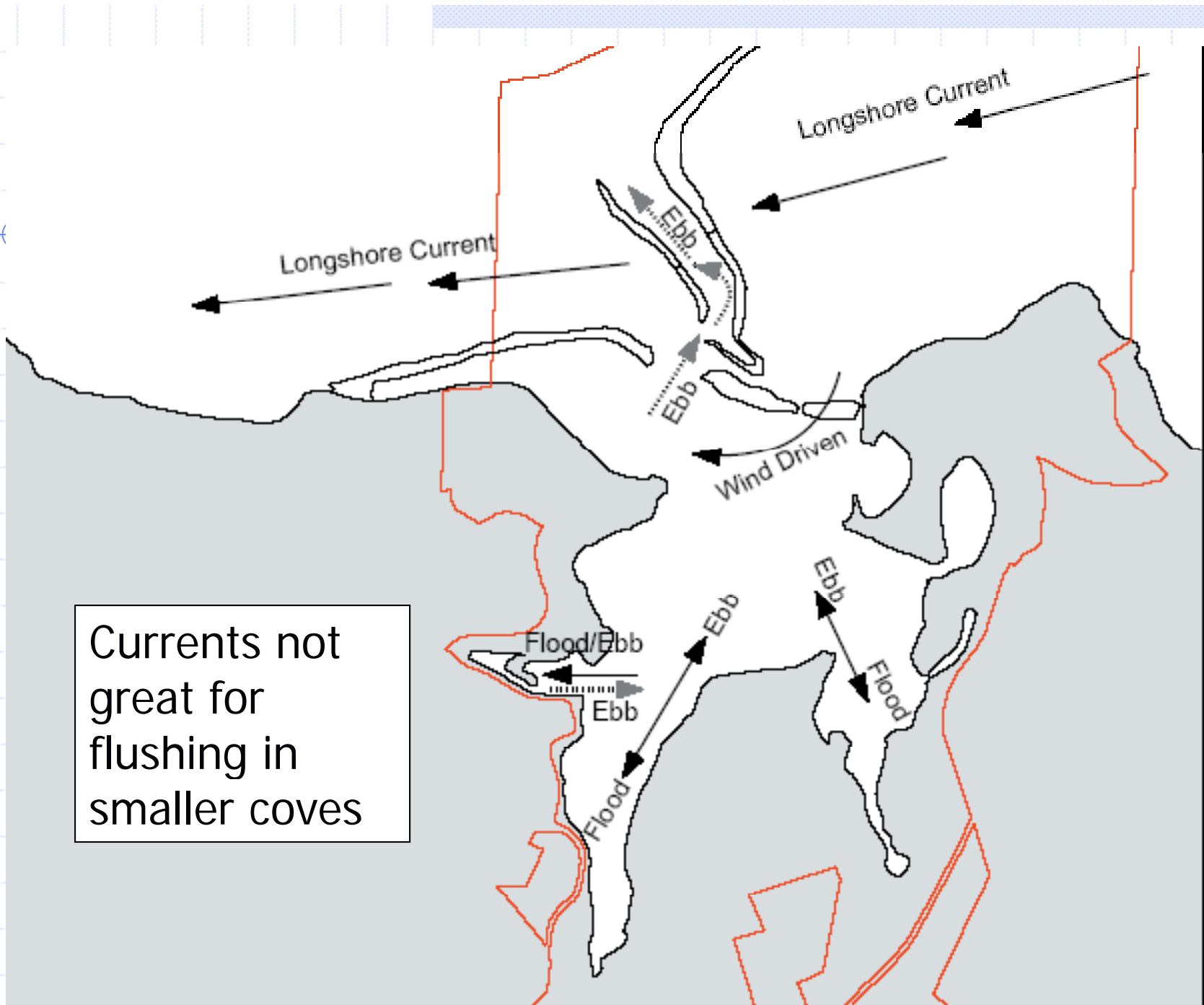
Watershed Features

- ◆ Uplands mostly shrub; arid
- ◆ Most of the soils in APC are classified by SCS as having severe limitations for residential septics
- ◆ Steep slopes and poor soils contribute to short saturation times and high runoff rates
- ◆ Measurable changes in salinity and turbidity
- ◆ Flooding common in Mon Bijou and Glynn
- ◆ Majority of land is privately owned; potential for development high

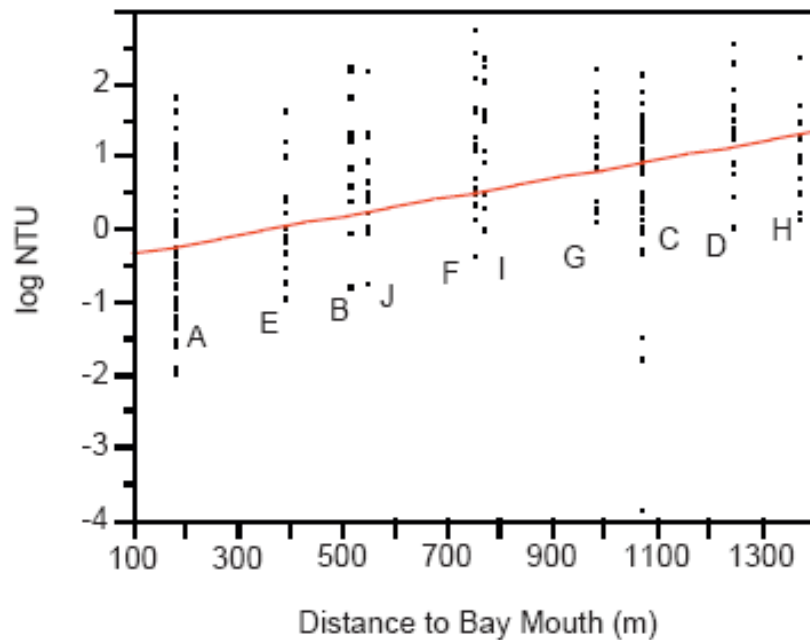


Figure 7.1. Sediment plume flowing from Sugar Bay, visible in 1970's aerial photograph.

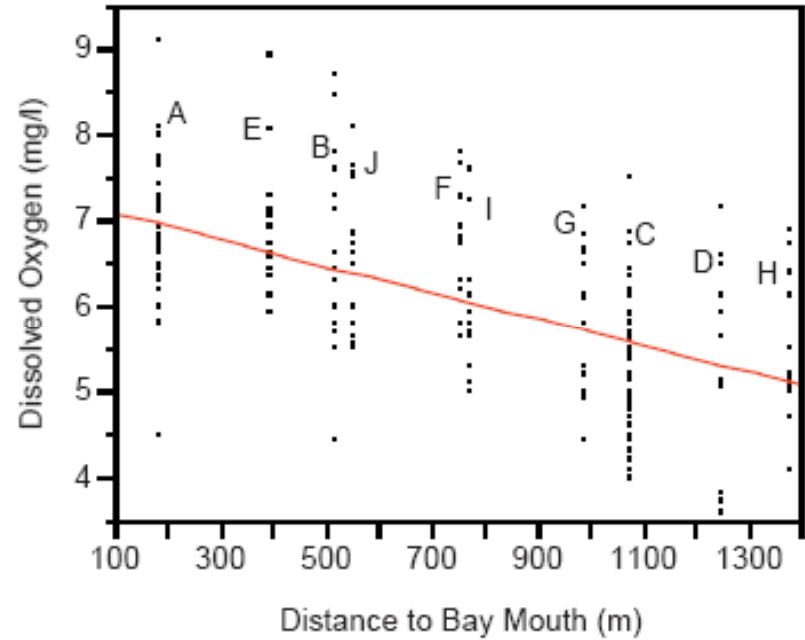
http://ccmaserver.nos.noaa.gov/products/biogeography/sari_cd/report.pdf



Currents not great for flushing in smaller coves



Stations farthest from the bay mouth such as Sugar Bay had over four times higher mean turbidity values.



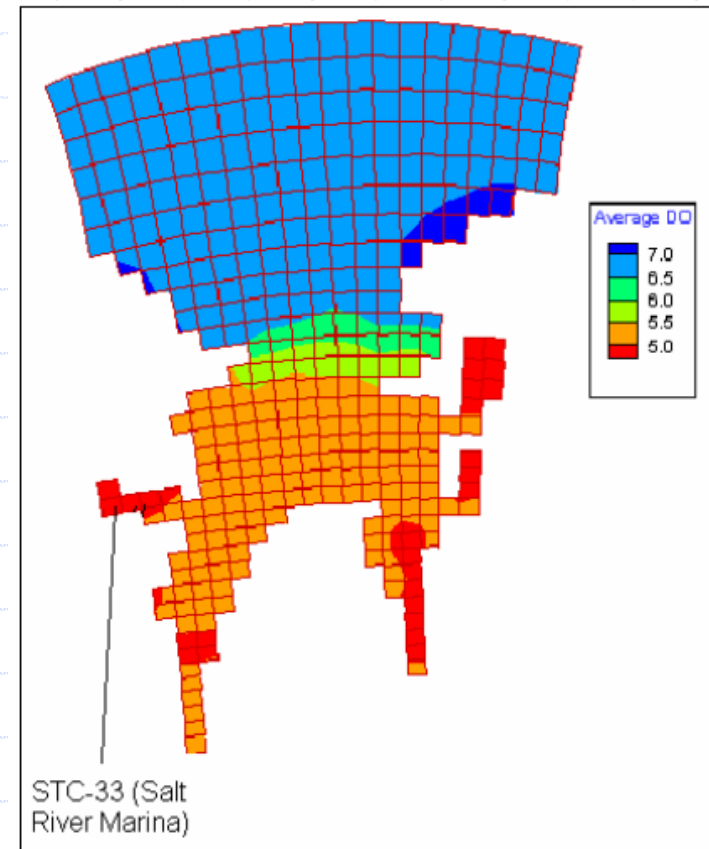
factors contributing to low DO include high turbidity, poor circulation, higher mean T, and proximity to large areas of sediment with high organic content.

Figure 7.4. Log transformed NTU (nephelometric turbidity unit) data plotted against distance from the Salt River Bay mouth. Data pooled from all DEP sites sampled during 1981 to 2002 was used in this analysis. Letters denote sampling sites (see Locator Map, Figure 1.1).

Figure 7.5. Dissolved oxygen (mg/l) plotted against distance from the Salt River Bay mouth. Data pooled from all DEP sites sampled during 1981-2002 where used in this analysis. sites (see Locator Map, Figure 1.1).

Water Quality

- ◆ Salt River designated as CLASS B water
- ◆ Average DO at Marina is below allowable levels for Class B waters (< 5.5 mg/l)
- ◆ 2004 TMDL for DO
- ◆ Average turbidity at the Steeple, Sugar Bay, NOAA Dock, and Beach less than allowable (Class B waters not to exceed 3 NTU); the most recent values have been within acceptable limits



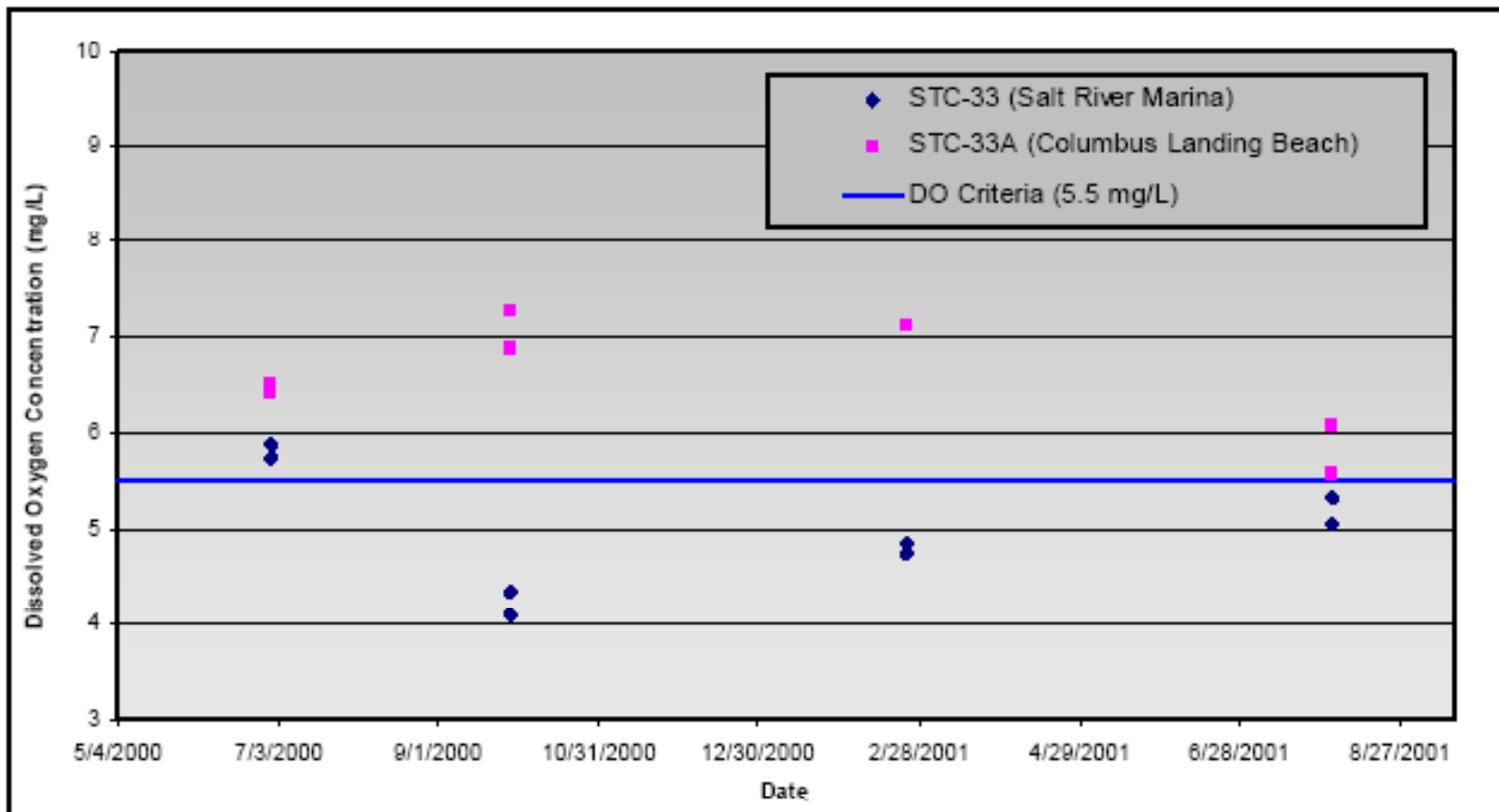


Figure 3-1. Dissolved Oxygen Criteria for Class B Waters, and Observed Data from Stations STC-33 and STC-33A in Salt River Bay.

§ 186-3. Class B

- (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 for primary contact recreation (swimming, water skiing, etc.).

Table 2-1. 2004 USVI 303(d) List of Impairments and Impairment Sources in the Salt River Bay System.

Assessment Unit ID	Assessment Unit Name	Class	Impairment	Source
VI-STC-16	Salt River Lagoon, Marina	B	Dissolved Oxygen	- Erosion from Derelict Land Other Marina/Boating On vessel Discharges Residential Districts
VI-STC-17	Salt River Lagoon, Sugar Bay	B	¹ Dissolved Oxygen	
VI-STC-18	Salt River Bay	B	¹ Dissolved Oxygen	

¹The AUs described as AU-STC-17 and AU-STC-18 did not demonstrate any DO violations based on the data sources evaluated. However AU-STC-17 and AU-STC-18 will remain on the 303(d) list because they are currently included as part of the TMDL development for AU-STC-16 as the Salt River Estuary due to their proximity and congruent nature. If necessary, TMDLs for AU-STC-16, AU-STC-17 and AU-STC-18 will be submitted concurrently to EPA to address the DO impairment observed in AU-STC-16.

(b) Class “B” (aquatic life and primary contact recreation).

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

(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.

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

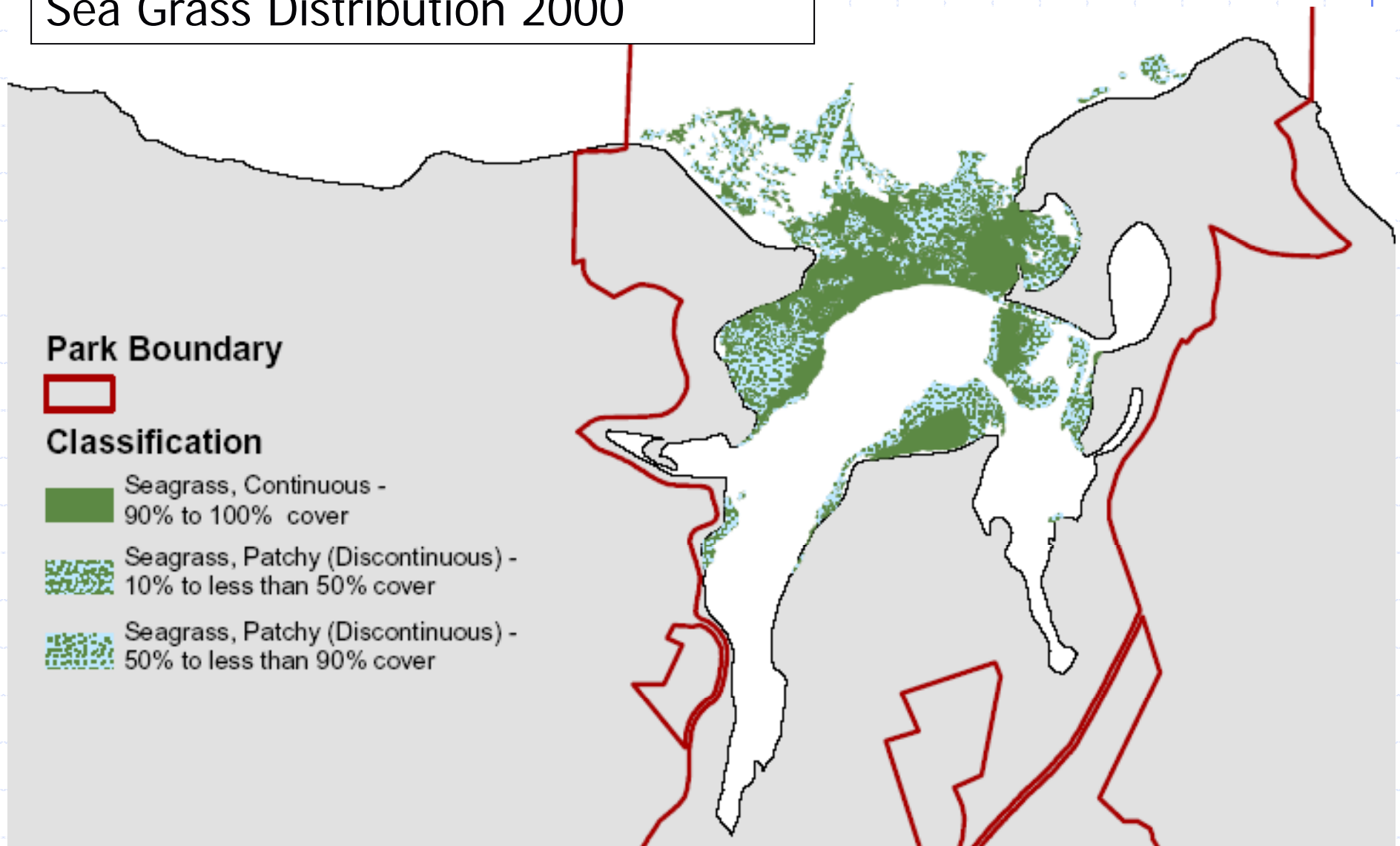
So are portions of the watershed exempt from Class B turbidity requirements?

Sources



- Sewer leaks and Mon Bijou lift station backups--recently fixed?
- Failing septics
- Illicits from Marina (estimate 50% of live-aboards)
- Sediment from urban runoff and upland erosion
- Ag (lower reaches of floodplain)
- Tourists from NY??

Sea Grass Distribution 2000
















Turbidity adds to sea grass declines...which decreases DO

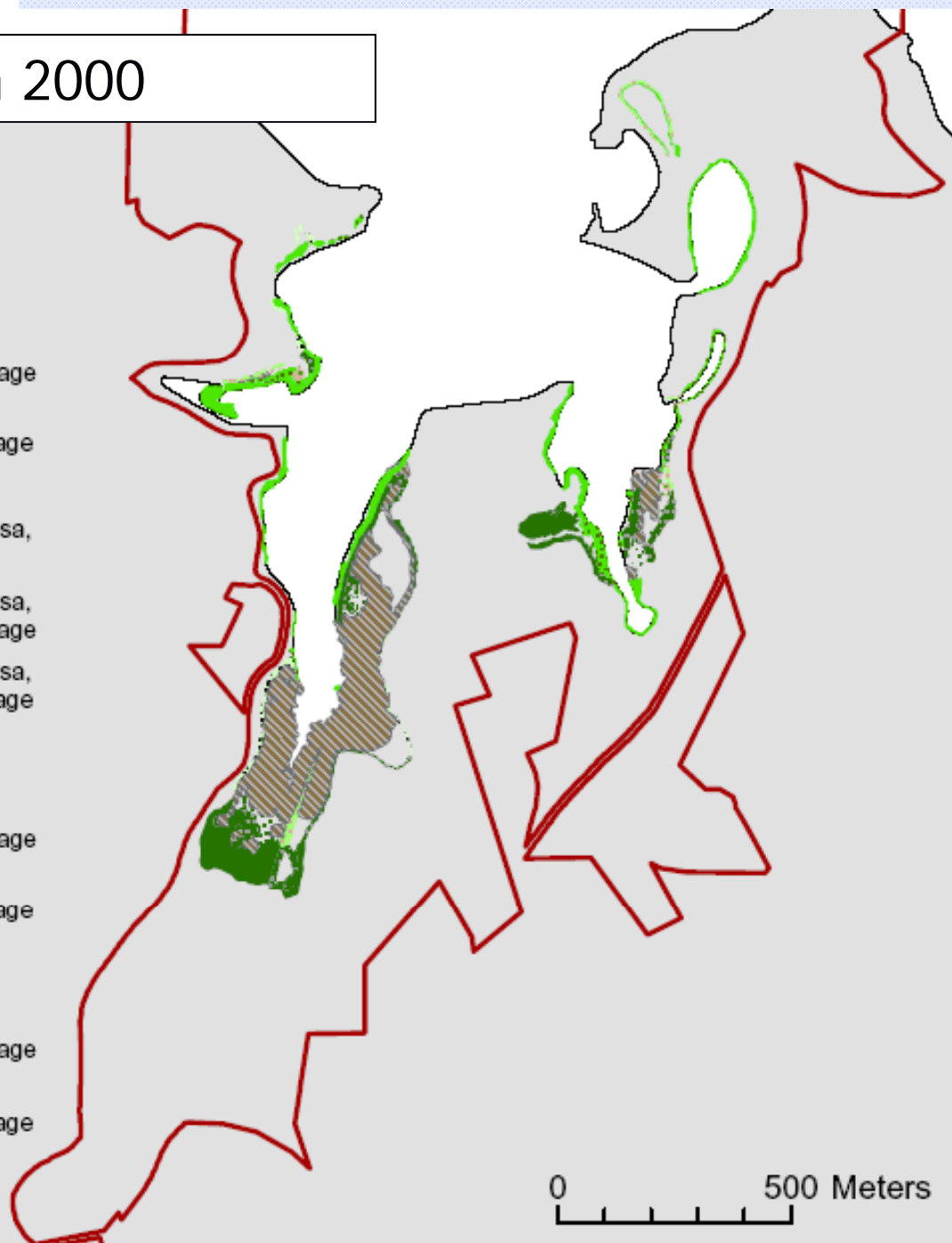
Mangrove Distribution 2000

Park Boundary



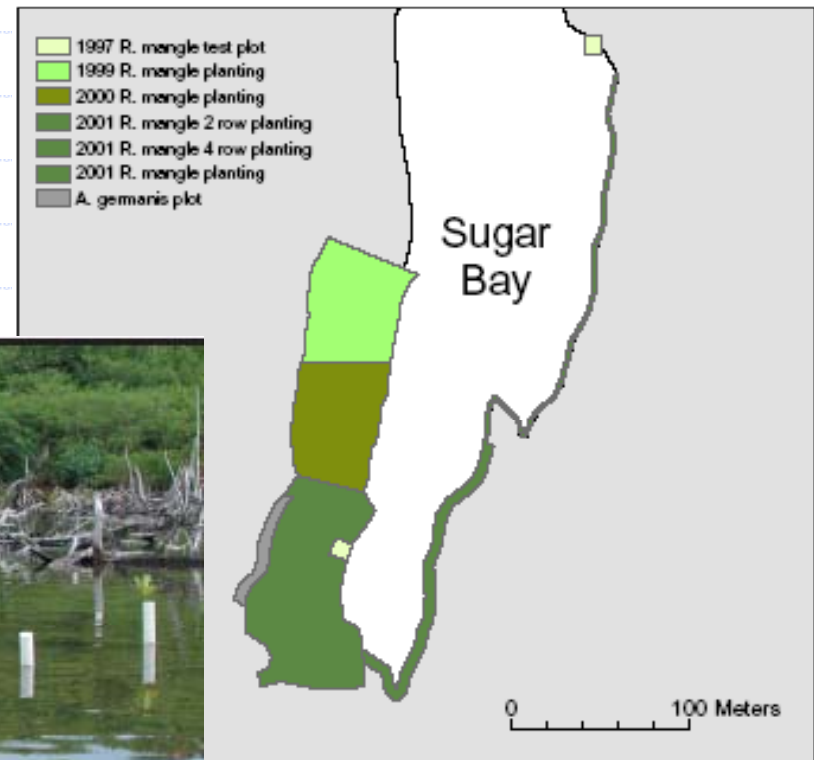
Classification

-  Mangrove, *Avicennia germanis*, Closed - >65% canopy cover
-  Mangrove, *Avicennia germanis*, Open - 15%-65% canopy coverage
-  Mangrove, *Avicennia germanis*, Sparse - 1%-15% canopy coverage
-  Mangrove, Dead
-  Mangrove, *Laguncularia racemosa*, Closed - >65% canopy cover
-  Mangrove, *Laguncularia racemosa*, Open - 15%-65% canopy coverage
-  Mangrove, *Laguncularia racemosa*, Sparse - 1%-15% canopy coverage
-  Mangrove, Mixed, Closed - >65% canopy cover
-  Mangrove, Mixed, Open - 15%-65% canopy coverage
-  Mangrove, Mixed, Sparse - 1%-15% canopy coverage
-  Mangrove, *Rhizophora mangle*, Closed - >65% canopy cover
-  Mangrove, *Rhizophora mangle*, Open - 15%-65% canopy coverage
-  Mangrove, *Rhizophora mangle*, Sparse - 1%-15% canopy coverage



Mangrove Restoration

- ◆ Summer of 1999, a 3-year reforestation project began
- ◆ funding from the V.I. DPNR through the federal CWA, and the Royal Caribbean Ocean Fund.
- ◆ 18,000 red mangroves (*Rhizophora mangle*) and 3,000 black mangroves (*Avicennia germinans*) will be planted in Sugar Bay.



Condition			Units	AU-STC16 _a	AU-STC-17 _b	AU-STC-18 _c
<i>Existing (2000-2001)</i>	Nonpoint sources	Watershed Contributions	(kg/day BOD _U) ¹	0.72	1.42	1.54
		Marina Contributions	(kg/day BOD _U) ²	1.21	0	0
		Salt River Marina Region	(kg/day SOD) ³	47.48	387.00	1001.85
	Permitted Point Source Contributions		(kg/day BOD _U) ⁴	-	-	-
	Total existing loads		(kg/day)	49.41	388.42	1003.39
<i>TMDL</i>	LA	Watershed Contributions	(kg/day BOD _U)	0.72	1.42	1.54
		Marina Contributions	(kg/day BOD _U) ⁵	0	0	0
		Salt River Marina Region	(kg/day SOD) ⁶	9.50	77.40	200.37
	WLA	Permitted Point Source Contributions	(kg/day BOD _U) ⁴	0	0	0
	MOS	Margin of Safety	(kg/day) ⁷	-	-	-
	TMDL	Total Maximum Daily Load	(kg/day)	10.21	78.82	201.91

At-1-11

TMDL Recommendations

- ◆ No discharge zone
- ◆ Reduce sediment loads from stormwater
- ◆ Septic inspections; sewer in areas with soils not suitable septic
- ◆ Sea grass restoration
- ◆ Removal of SOD hotspots

Where are you on these???

See handout

1993 APC Recommendations

- ◆ General Park Management Plan
- ◆ Land acquisition
- ◆ Make entire watershed Tier 1?
- ◆ Enforcement, inspection and maintenance of existing development (stormwater, ESC, septics, anti-degradation clause)
- ◆ Building design controls (buffers; shoreline setbacks, limited grading)
- ◆ Prohibition of farming activities in lower reach
- ◆ Pollution prevention @ marinas and dumpsters
- ◆ Unified floodplain ordinance
- ◆ Include salt ponds for protected habitat

Where are you on these?

How would you move forward with watershed management?

- ◆ Baseline characterization
- ◆ Community involvement and input
- ◆ Field assessments
- ◆ Priority recommendations
 - Regulatory/programatic
 - Restoration and protection projects
- ◆ Implementation strategy