

# **Report as of FY2008 for 2008VI118B: "Virgin Islands Water Resources Map Study"**

## **Publications**

- Other Publications:
  - ◆ None as yet. Project is continuing.

## **Report Follows**

## **PROBLEM AND RESEARCH OBJECTIVES**

A sediment reduction program was prepared for the U.S. Virgin Islands Department of Conservation and Cultural Affairs in 1979 by the firm BC&E-CH2M Hill. The stated purpose of the program was to minimize the occurrence of soil eroding and being transported into the islands' coastal waters. A sediment reduction map was produced as an output of the study used to establish the Virgin Islands Sediment Reduction Program (VISRP).

The sediment reduction maps were produced to be used for planning and enforcement within the VISRP. The sediment reduction maps were named the "Water Resources Map" and became a requirement for the acquisition of a development permit. The maps display terrestrial and marine features that are directly related to sediment reduction or biological communities sensitive to the affects of sediment discharge.

Despite changes to the landscaped and seascape of the Territory, the water resources map has not been updated and development permit applicants are still required to submit a copy of the map section with the area to be developed. There is evidence that the delivery of sediment to the coastal system has increased exponentially during the past 50-60 years. Development practices ignoring the management of soil erosion has been identified as the primary contributor to sedimentation. How reliable is the information contained in the water resources map for making land use decisions?

Impoundments are major features on the water resources map. They serve an essential role in sediment control. The overtopping protection and holding capacity are indicators of how well an impoundment is functioning.

This study will review the relevancy of how the water resources map is used currently. The existing condition of impoundments within study areas on St. Thomas and St. Croix will be surveyed and mapped. Procedures will be developed for expanding, integrating and maintaining updates of the data needed for planning and enforcing sediment controls. The goal of this project is to evaluate the reliability of the impoundment data contained in the water resources map for making land use decisions. This will be accomplished by evaluating:

- How the inventory of impoundments is maintained and used by the Department of Agriculture.
- How is the updated Department of Agriculture impoundment inventory shared with and used by other users (Department of Planning and Natural Resources and engineers, etc.)?
- Evaluate how GIS technology could be used to improve planning and enforcement of sediment reduction.

## **METHODOLOGY**

Since the water resources map was produced 20 plus years ago there have been significant advances in desktop Geographic Information System (GIS). These advances have made the collection, update, analysis and dissemination of spatial data cheaper and more efficient.

Field surveys will be conducted in the study areas to assess the existing condition of the impoundments shown on the existing water resources map. In addition, impoundments changed or developed in the study areas after 1978 will be identified and mapped. The primary source for this information will be a review of historical aerial photos and records at the Department of Agriculture and the Department of Planning and Natural Resources.

This study will review the workflow for the portion of the permitting review process relating to sediment control. A focus group comprised of plan reviewers, natural resource managers, scientists and developers in land development related field will be utilized to develop recommendations for expanding, integrating and maintaining updates of the data collected by this study.

## **PRELIMINARY FINDINGS AND SIGNIFICANCE**

The study area inventory of impoundments GIS layer based on an on-screen aerial photo survey was completed. The St. Thomas point layer has a total of 24 features and St. Croix 33 features. A total of 80 pictures have been catalogued: 24 for St. Thomas and 56 for St. Croix;

Students from the MESA (Math and Environmental Science Summer Academy) Non-Point Source Project which is based at the St. Croix Education Complex High School continue to show interest in studying impoundments in the study area. Some of the students are developing a project to study the impact of water hyacinths on the ponds.

UVI undergraduate Duvane Hodge, a biology major, was hired and trained to complete the GIS layer for St. Thomas. After conducting a literature review of best practices for monitoring sediment/impoundment ponds, a 10 item checklist was developed to score the condition of the impoundments during field survey. Duvane using her programming skill has developed a macro which would allow a user to enter a value for each of the 10 items on the check list then present a maintenance required score.

No maintenance needed	😊
Slight maintenance needed	😬
Intermediate maintenance needed	😞
Major maintenance needed	😓

**Figure 1** Symbols for maintenance requirement score

A GIS project and draft maps are being prepared for a focus group presentation to resource managers and development plan reviewers to provide feedback on a proposed workflow for updating the water resources map and utilizing GIS to support the permitting review process relating to sediment control.

**Figure 2** View of the St. Thomas Water Resources GIS project map view



## Next Steps

### June 2009

- Focus Group
- Report compilation
- Conduct final Focus Group meeting

### July 2009

- Complete GIS project production, map production and report compilation