THESIS

ROAD RUNOFF AND EROSION AT THE PLOT AND ROAD SEGMENT SCALES, ST. JOHN, U.S. VIRGIN ISLANDS

Submitted by

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ABSTRACT OF THESIS

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Changes in land use such as clearing lots for home sites and building access roads increases erosion and changes the timing and amount of runoff. Previous studies concluded that erosion from unpaved roads was the largest source of sediment on St. John. This study was undertaken to: 1) determine runoff and erosion rates from individual storms at the plot scale in undisturbed vegetation, from the road surface, and the road cut slope; 2) determine sediment yields from road segments that are 10 to 20 times larger than the road plots, and relate these to the road segment characteristics and compare erosion rates from the plots and segments; 3) assess the change in erosion processes between different storms, sites, and scales by measuring grain-size distributions of eroded sediments from the plots and the road segments; 4) determine which variables best predict the amount of runoff and erosion at the two scales; and 5) use the data to calibrate locally used runoff and erosion models.

Six plots were established on two roads and these consisted of four road surface and two cut slope plots. Three 40 m² plots were established in undisturbed vegetation. Data collected from July 1996 to March 1997 included rainfall depth and intensity, runoff volume, sediment yield, and grain-size distribution. Eleven traps were established to capture sediment from road segments of 100 to 800 m². Captured sediment mass and grain-size distributions were measured in January and June 1997.