Infiltration Rate Change due to Burlington Commercialization

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Abstract: A study of the infiltration rates on different surfaces will be conducted around Loomis street in Burlington, Vermont. A rainfall simulator constructed by Paul Melillo to calculate the degree of runoff in sites ranging from healthy lawns to gravel driveways. An increase in impermeable surfaces is directly related to an increase in runoff over time.
We will determine how much run off water is collected in relationship to the amount of precipitation that accumulates. The connection between the amount of run off on different surfaces and the amount of precipitation will give us an understanding of how certain storms will affect varied terrains. The results will be presented at a level accessible to the general public

Purpose: On the hill section of Burlington there has been a large increase of impermeable surfaces over the past 20 years. This increase is most likely due to the increased amount of rental space acquired by Kurfis and Bierman (2001). They did not investigate how much of the green space loss was permitted or its hydrologic effects. The experiment Paul Melillo, Heidi Keller, and Richard Morse are working on will be able to determine the effects of this increased impermeable space in Burlington.

Description: A rainfall / runoff simulator will be used to measure rain for a specific time and rate on a given area. The runoff will be measured in order to determine a runoff rate and thus allow calculation of the infiltration rate for the given surface. Infiltration rates will be measured on a three different types of surfaces (gravel, grass, and forest) in order to determine what percentage of rain is infiltrated during precipitation and what percentage runs off. Once data are obtained, a number of hydrological calculations such as: the maximum runoff, time sequence of run off, and maximum rate of water absorption using accepted hydrologic techniques, will be computed. These computations will relate the intensity of precipitation to the amount of run off produced. This will help us to see how the increase in commercialization has affected the land. To further compare commercialization and its effect on the land we will be conducting this experiment on human altered terrains as well as forests where there hasn't been any human interaction.

Results: Our results will interpret the data collected on infiltration rates. Charts will be composed comparing the varying rates at the defined locations. We hope to see that commercialization has greatly increased the amo unt of infiltration run off due to amount of precipitation. The varying data from one location to the next will prove that commercialization has had an impact on the rates of run off.

Proposed Completion Date of: November 10, 2001

Works Cited:

Kurfis, James and Bierman, Paul. "Residential Land Use- Changes and characteristics of land use in a residential neighborhood from 1978-1999." 2001, Report to Code Enforcement Office, City of Burlington.

Melillo, Paul, Department of Geology, University of Vermont, Burlington, VT. 05405.

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