

Hunger Mountain, near Waterbury Vermont, is a popular recreational area. Hikers and outdoor enthusiasts may access the area by car, parking in the unpaved parking lot. Our objective is to study how recreational land use is influencing infiltration and run off rates and how this may effect erosion rates.

Methods:

We will initially describe geologically relevant observations of the site, such as: type and density of vegetation, type of ground cover, soil types, grain sizes, topography, and drainage systems (e.g. streams, rivers, etc). We will test soil infiltration, run off, and erosion rates in the dirt parking lot, and the adjacent trail and forest.

Measuring infiltration rate (Coffee Can Method): This will be done using the coffee can method. A large coffee can, open on both ends with a marked reference line, is placed into the soil. Water is added until it reaches the reference line, the amount added is recorded. Then at specific time intervals water is added until it again reaches the reference line, the amount is recorded. (in the field time intervals will be established based upon simple observation of soil infiltration) This will be done until a relatively constant rate of infiltration is established. (over the several of the equal time intervals, the same amount of water has been added to reach the reference line)

Measuring Infiltration and run off rate (Mellilo style): We will isolate a specified area as determined by the methods of Paul Mellilo. The area is enclosed by a metal sheet, open 8 cm at the down slope end, a funnel extends off the open end. Plaster confines the runoff water, forcing it to flow out the funnel and into the collection buckets (yogurt containers). The collection bucket resides within a larger bucket (stabilization) which is within a dugout pit. (Soil samples will be collected from the dugout pit for later grain size analyses) We will then simulate rainfall using backpack pump sprayers. Rain fall is collected by three rain gauges which are spread out within the confined area. Runoff will be collected by the yogurt containers. Once a set amount of water has run off, depending upon relative runoff rates of the soil, (e.g. a full bucket will be collected if the runoff rate is high and perhaps a few centimeters if the runoff is low.) we will record the time, switch the collection bucket (keeping buckets in order of time interval) and record cumulative rain fall. We will continue this process until the time intervals between the set amount of run off are consistently the same, indicating that infiltration rates have stabilized. The amount of water collected in each of the yogurt containers is then measured and two buckets from each site (selected from the stabilized infiltration rate time period) are set aside for measurement of erosion rates. Then the data will be analyzed using a spread sheet to make hyetographs and hydrographs for each of the sites.

Measuring Erosion Rates: We will measure total suspended sediment from the set aside samples. They will be sealed, brought back to the lab, and the sediment will be allowed to settle overnight. Then we will decant off the excess water and allow the sediment to dry. Once dry we will measure the sediment by weight and compare weights between sites.

Mellilo Paul. Methods For Measurement of Infiltration Rates

Leopold, L.B. Water, Rivers and Creeks, University Science Books, Sausalito, CA, 1997.

