INTRODUCTION

The watershed is a basic concept in hydrology. The definition of a watershed is the “land area that contributes runoff to a given point in a stream or river”. It is also synonymous with catchment and drainage or river basin. Watershed boundaries are defined by topography and can be delineated using topographic maps.

OBJECTIVES

The objective of this laboratory is to estimate the annual sediment loss from a selected site within Brushy Creek Watershed located just west of College Station, Texas. You have been provided a topographic map of this area. You have also previously determined the rainfall amount for several different storms including various rainfall durations and return periods. In addition, you have completed a runoff analysis of several different rainfall events, and you have estimated the volume of surface water runoff from selected storms.

GIVEN INFORMATION

1. Topographic map, watershed boundary and watershed area including the proposed site for the erosion analysis (Figure 1).

2. Soil and land use information were used in earlier laboratory sessions.

3. Additional information required for estimating the soil loss is provided in the accompanying materials.

4. The proposed site is shown in RED on the attached topographic map. The “average” soil at this site is a fine granular sandy clay with an organic matter content of 2 percent and a moderate permeability. The “average” slope length is 900 feet and the average slope is 2 percent. The existing plant cover is pasture land in relatively good condition (C value of 0.013 and P value of 0.20). The site has an area of approximately 200 acres.

REQUIREMENTS

1. Estimate the annual soil loss for the selected site (Figure 1) for the current land use. Calculate both the erosion loss in tons per acre and the total erosion loss in total tons for the 200 acre site.

2. Estimate the annual soil loss for the selected site for intensive cultivation of a
new crop for an Ebola vaccine. This new crop is so profitable that an extremely rich person has purchased land and placed the property into an intensive row crop production. The crop has been planted up and down the existing slope with little regard to soil erosion (P value in the USLE is 1.0). The cropping factor for continuous production of this crop is a C value of 0.4.

3. Estimate the annual soil loss for the selected site for intensive cultivation of a new crop for this area but with modified production practices. Because of the excessive soil loss of the up and down hill continuous production, some alternative production practices are proposed. In this case, contour production is being considered (P = 0.6).

4. Estimate the annual soil loss for the selected site for intensive cultivation of a new crop for this area but with modified production practices. Because of the excessive soil loss of the up and down hill continuous production, some alternative production practices are proposed. In this case, the installation of terraces are being considered (modified LS = 0.25, modified P = 0.10).

5. Prepare a Table and a bar chart summarizing the results of your analysis and discuss these results. Use the TOTAL TONS for the site.

6. Estimate the amount of sediment delivered to the stream system from this site for each of the cases 1-4 above. Use the TOTAL TONS for the site. Discuss the results using a bar chart to illustrate the results.

REPORT

Prepare a report summarizing the experiments conducted. In addition to the typical report requirements (See report instructions on the class webpage), the results and discussion section should include a discussion of how modifying the production practices (P) and length/slope (LS) affect the amount of soil delivered to the steam. Also compare the amount of soil erosion from the site to the amount that was delivered to the stream.
Figure 1: Topographic map of Brushy Creek Watershed. The box indicates the erosion analysis area.
**Figure 2:** Average annual values of the rainfall erosivity index R.

**Figure 3:** Slope length and steepness factor, LS, as a function of slope length and slope steepness.
Figure 4: Graphs to determine K factor.

Figure 5: Standard soil texture triangle.