

## TR-55 as a Source of Data for AnnAGNPS

### Description

Three types of important information can be found in NRCS Technical Release 55, Urban Hydrology for Small Watersheds. The first is runoff curve number data for the various land use and cover conditions encountered in the field. The second concerns information used to compute the time of concentration (Tc) for a cell. The third is the storm distribution type (to indicate how precipitation is distributed within a single day).

TR-55 can be downloaded from the NRCS web site. The address is <http://www.nrcs.usda.gov>. Click Technical Resources then click Technical Tools. TR-55 is available in PDF (Adobe Acrobat Reader) format.

Runoff Curve Number (RCN) data are used to determine daily runoff volume based on the daily precipitation. The RCN's for average antecedent runoff condition (ARC-2) are contained in Chapter 2 of TR-55. A reference data file has been created which has the RCN data from TR-55 in the proper format for use in AnnAGNPS. The name of this file is `Runoff_Curve_Number_Data(AnnAGNPS).txt`.

The time of concentration (Tc) for a cell can be entered in the Cell Data section of the AnnAGNPS input file. TR-55 contains a procedure for estimating the Tc. The TR-55 document contains the description of the procedure, guidelines for using the procedure, and an example calculation. The procedure is based upon dividing the flow path from the hydraulically most distant point in the cell to the outlet of the cell into overland, concentrated, and channel flow segments. The travel times for each of these segments are added together to estimate the Tc. The TR-55 computer program may be used to calculate the Tc for each cell. As an alternative, the Tc can be computed in AnnAGNPS based on certain user inputs described in the Cell Data section. The Manning's n for overland flow in a cell is one of these. Values for various cover types are contained in table 3-1 of TR-55.

The storm distribution type for a location may be determined from a map in TR-55 on page B-2. Each storm distribution type has a unique curve to distribute the precipitation over 24 hours. The storm distribution type is used to calculate the peak discharge at a location in the watershed and also to determine the energy intensity for a storm to use with RUSLE (sediment yield). Louisiana is entirely in the Type III region.

### Data Entry

#### RCN

All or part of the prepared RCN file may be included in the AnnAGNPS input file. Using an ASCII editor, merge that file into the AnnAGNPS input file, copy desired lines, or cut and paste the desired lines. If using only part of the table, be careful to note the number of curve number entries in the table and place that number on the Runoff Curve Number Data header record (column 41-50).

AnnAGNPS assumes one RCN line in the table applies to the field (and in turn to one or more cells). There could be situations when the field is not well-represented by a single land use and cover condition. In that case, some type of weighting of land use and cover condition may be utilized. In this case, the Curve Number Identifier entered in the Runoff Curve Number Data section should be given a unique, meaningful name and used with respect to the field(s) it represents. The determination of RCN based on land use and hydrologic soil group is particularly adapted to GIS. This has not been automated yet with respect to AnnAGNPS.

Entering runoff curve number data in the AnnAGNPS Input Editor is demonstrated in Example 1 to be covered later.

### Time of Concentration

Tc for a cell may be estimated by some procedure (such as TR-55) and entered into the AnnAGNPS input data file. The Tc may also be computed by AnnAGNPS if certain data are entered. Two of these items may be obtained from TR-55). The Overland Flow Manning's "n" may be obtained from TR-55 Table 3-1 (page 3-3) based on the land cover where overland flow occurs. The 2-year 24-hour precipitation which is needed to estimate the overland flow part of the time of concentration may be read from a map on page B-4 of TR-55. It is a reproduction of the National Weather Service Technical Paper 40 (TP-40).

Entering Tc directly and entering data so the Tc can be computed by AnnAGNPS (using the AnnAGNPS Input Editor) will be demonstrated in Example 1 to be covered later.

### Storm Distribution Type

The storm distribution type is assumed to be constant over the watershed in AnnAGNPS. If a watershed is near or crosses a distribution region line, a single distribution type must be selected.

Entering storm distribution type in the AnnAGNPS Input Editor is demonstrated in Example 1 to be covered later.