



USDA-ARS Concentrated Flow Erosion and Assessment Technology Research for Evaluation of Conservation Practices in Watershed Systems

R.L. Bingner, S.M. Dabney, E. J. Langendoen, H. G. Momm, R. R. Wells, and G. V. Wilson

US Department of Agriculture, Agricultural Research Service, National Sedimentation Laboratory, Oxford, Mississippi, USA

Concentrated runoff increases erosion and efficiently transfers sediment and associated agrichemicals from upland areas to stream channels. Ephemeral gully erosion on cropland in the U.S. may contribute up to 40% of the sediment delivered to the edge of the field. Typically, conservation practices developed for sheet and rill erosion are also expected to treat ephemeral gully erosion, but technology and tools do not exist to account for the separate benefits and effects of practices on various sediment sources. Practices specifically developed to treat ephemeral gully erosion need further testing, when used in conjunction with sheet and rill erosion control practices. Without improved research studies, subjective observations will continue to be used to satisfy quality criteria in lieu of scientifically defensible, quantitative methods to estimate the impact of gully erosion. Some of the more important limiting components are the identification of and relationships for: (1) ephemeral gully width; (2) soil resistance to gully erosion including a definition for non-erosive layers; (3) the effect of root mass and above ground vegetation on erosion resistance; (4) ephemeral gully networks; and (5) the effect of subsurface flow on ephemeral gullies. Currently, these components are represented through widely divergent to non-existent algorithms. Scientists at the U.S. Department of Agriculture, Agricultural Research Service are currently undertaking extensive research studies to understand the processes associated with concentrated flow erosion in fields and streams of watershed systems. A description of this research and the integration into enhanced technology for concentrated flow assessments critical for developing and testing conservation practices specifically designed for gully and channel erosion control will be provided.