Curve Number Abstract August 19 2016 Seminar at TCNJ and Speaker Bios

ABSTRACT

Background: With the passage of the Small Watershed and Flood Control Act of 1954 (PL-566) and its assignment to the Soil Conservation Service, the need for a uniform procedure for runoff volume estimation from small watersheds based on available data, applicable nationwide, and incorporating soils and land condition expressions was apparent. To meet this need, the Curve Number procedure was developed under the leadership of the SCS, with the assistance of the Agricultural Research Service (ARS), and the US Forest Service (USFS). It has become well-known, and is used world-wide as a single event runoff model in planning and design for a wide range of land types from agricultural to urban, and in both engineering and land management scenarios. Application has been extended by the user community to a number of other situations, including the estimation of daily rainfall-runoff in continuous models. Since then, there have been 60 years of data collection and analysis that have offered greater insights to the rainfall runoff processes in general and to the USDA NRCS National Engineering Handbook Part 630 Hydrology values and procedures. There are major unappreciated technical issues and omissions with the Curve Number Method. While it has some reliability in humid rain-fed agriculture and many urban conditions, it has spotty performance in natural and undisturbed lands such as forests, or in a variety of non-standard newer land uses and land types.

A June 2014 editorial written by R.H. Hawkins in the Journal of Hydrologic Engineering, American Society of Civil Engineers, entitled, “Curve Number Method – time to think anew” highlights the history and misuse of the Curve Number Method for roughly 60 years, calling for “modernization” and updating of the method.

ASCE and USDA-NRCS have joined in a Cooperative Agreement in which ASCE will provide leadership in helping NRCS update the method. The updating will be directed to 4 specific chapters of its National Engineering Handbook Part 630 Hydrology (NEH 630) that are the heart of the Curve Number method. These are Chapter 8; “Land Use and Treatment”: Chapter 9; “Hydrologic Soil-Cover Complex”: Chapter 10; “Estimation of Direct Runoff from Storm Rainfall”, and Chapter 12 “Hydrologic Effects of Land Use and Treatment”. Chapters 8 and 12 have not been updated since their initial development in the 1950s, and Chapter 9 has been updated to include urban hydrology and Curve Numbers. The pivotal issues and first priorities are Chapters 9 and 10.

The purpose of this Seminar is to clarify many misconceptions and significant inaccuracies in using the USDA NRCS Curve Number Method, and to initiate and promote professional awareness. We believe this short course will help resolve and identify those issues.

SPEAKER BIOGRAPHIES

Richard Hawkins, Ph. D, P.E., F.ASCE, F.EWRI, Professor Emeritus, University of Arizona, Tucson, AZ. Dr. Hawkins has over 50 years of experience in engineering, hydrology, and natural resources, in education, research, and agency and consulting practice. Recently retired, he taught a variety of courses in general and watershed hydrology, modeling, hydraulics, sediment, water quality, fire science, and statistics. He has published widely in his specialty fields of small watershed hydrology and rainfall-runoff modeling, with accent on land condition impacts. He has taught continuing education courses on Curve Number rainfall-runoff for ASCE and for several local flood control interests. A native of Missouri, he is a graduate of the University of Missouri Columbia, with degrees in both Civil Engineering and in Forestry, and received MS and PhD degrees in Watershed Management from Colorado State University. He has also served on the faculties of Colorado State University, SUNY-Syracuse, and Utah State University. At Arizona he was the Chair of the Watershed Resources program for 10 years. In 2011 he was a Visiting Professor with the Warsaw (Poland) University of Life Sciences, and in 2013 at the Universita Degli Studi de Palermo (Italy) Dipartimento Scienze Agrarie e Forestali. He has experience with the US Forest Service, USDA-ARS, the California Department of Water Resources, and the California Division of Soil Conservation. In 1986-87 he served as a Distinguished Visiting Scientist with the USEPA in Corvallis OR. He has received several awards for professional service and scholarship,

and has had numerous international and consulting assignments. He has been a member of ASCE's Watershed Management Committee since 1961. In 2003 Dr. Hawkins received ASCE's Arid Lands Hydraulic Engineering Award.

Dr. Tim J. Ward, PhD, PE., F.ASCE, F.EWRI, is Dean of the School of Engineering and Professor of Civil Engineering at Manhattan College in Riverdale, The Bronx, New York City, NY. Professor Ward received BS and MS degrees in geological engineering from the Mackay School of Mines at the University of Nevada, Reno, with emphasis in surface water hydrology. His Ph.D. in civil engineering is from Colorado State University with emphases in hydrology, hydraulics, and geotechnical engineering. He is a Fellow of the American Society of Civil Engineers (ASCE), a Fellow of the Environmental & Water Resources Institute (EWRI) of ASCE, a member of the National Society of Professional Engineers, and a licensed professional engineer in New Mexico.

Donald E. Woodward, PE, F. ASCE, is the retired national hydraulic engineer with the U.S. Department of Agriculture's Natural Resources Conservation Service (NRSC). He was recipient of Arid Lands Hydraulic Engineering Award for outstanding contributions advancing arid lands hydrology and hydraulic engineering and associated water policy, and particularly the development of the methodology for estimation of runoff from rainfall using curve numbers in both arid and humid regions around the world. He co-authored and co-edited the reference book Curve Number Hydrology, published by ASCE Press. He is also the author of the chapter on hydrology in the NRCS National Engineering Handbook, which is considered the preeminent source for all who would apply the curve number relationship to estimate runoff from rainfall. A member of ASCE's Watershed Management Technical Committee, Woodward, who has made numerous U.S. Soil Conservation Service/NRCS career contributions toward the development of national policy regarding hydrology and hydraulic engineering work, has on many occasions represented the U.S. abroad as a preeminent federal expert on the application of methods with both arid and humid hydrology.