

THE HYDROLOGICAL LIMITS OF URBANIZATION

Rimma Vedom, Ph. D., Hydrology and Environment, 905 823 6088,
rimma@can.rogers.com, www.hydrology.ca

A new vision of a watershed structure and the accurate assessment of the flow components (base-, inter-, and surface flow) provided by the SimpleBase Delineation Model opens a new possibility for its application in hydrological modeling for each flow component verification. According to the model, baseflow is considered as a groundwater discharge into a river from the transregional aquifers permanently drained by this river; the interflow component is the discharge from the temporary groundwater formation due to particular recharge event (snow melting, rains, humidity fluxes); the surface flow is the overflowing part of recharge flow that moves in streams, not through porous media. The model, besides the automatic estimation of baseflow BFI, interflow IFI, and surface flow SFI indexes for undeveloped watersheds, gives possibility to estimate semi-manually the changes in IFI/SFI ratio conditioned by the level of storm water network development. The assessment conducted on 42 watersheds located in Southern Ontario indicates an enormous increase of SFI for some small watersheds located in heavily urbanized areas: Canard R. (Windsor) – 40.6%, Sandusk Cr. (Hagersville) – 42.5%, Mimico Cr. (Toronto) – 31.7%, Black Cr. (Toronto) – 29.4%. The erosion case on Black Cr. in August 19, 2005 suggests there are some reasonable limits for the storm water drainage capacity should be established as the criteria for watershed urbanization (paved area), depending on the watershed dynamic buffer relative size and hydrogeology. To assess the impact using SimpleBase Delineation Model TM, it is enough to have just the hydrograph of an impacted stream. Precipitation is needed to establish the limit.

The complete text and presentation can be found in materials of the 59th Annual conference of CWRA.