

AN ASSESSMENT OF HYDROLOGICAL MODELS COMMONLY USED IN NEW ZEALAND

M. Groves (WSP), B. Schicker (WSP), E. Gil-Goldsbrough (WSP)

ABSTRACT

When estimating stormwater run-off, various hydrological models can be used to calculate the predicted volume. Commonly used approaches in New Zealand are:

- Horton infiltration
- Fixed percentage run-off
- The Soil Conservation Service Curve Number Loss Model (SCS CN)

The hydrological model to be used is usually specified by the client or chosen by the modeler. The choice of model can have significant impacts in terms of their calibration and their applicability for assessing future options or design schemes.

Calibrating using the different hydrological models can provide a good fit to observed data. However, which performs best in terms of peak flow, volume, and visual match and over a wide range of events of varying significance; and how well do they then scale up for assessing design flows and volumes?

This paper examines the differences between infiltration excess models (known as Hortonian flow) and run-off models based on a fixed percentage run-off, whether constant or time varying (such as the SCS CN approach) through undertaking calibration with common observed data sets with a consistent scoring methodology.

The assessment aims to understand their limitations through:

- Long time series calibration using measured rainfall and flow data.
- Using a consistent scoring methodology to quantify the calibration performance based on peak flow, visual fit, and volume.
- Assessment of design storms using the calibrated models and their variance.

The paper is intended to provide users with a detailed understanding of the different hydrological approaches and their applicability / limitations.

KEYWORDS

Stormwater Management, Hydrology, Rainfall-runoff