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Case study applications of the Riparian Particulate Model in tropical and sub-tropical Australia

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Abstract: The Riparian Particulate Model (RPM) [Newham et al., 2005] is a simple conceptual model of particulate trapping in riparian buffer zones. The model represents the key processes of settling, infiltration and adsorption which control particulate trapping. The model is intended for use by catchment managers and researchers to quantify the effectiveness of riparian buffers at site and catchment-scales. Application of the model enables assessment of the likely effects of riparian buffer establishment and assists in the prioritisation of investment. The RPM operates at a daily time interval. It is sensitive to the effects of consecutive pollutant loading events and variations in a range of buffer characteristics e.g. vegetation type, buffer slope and size. This paper reports on two separate applications of the RPM to illustrate potential uses. The first application of the RPM is for the simulation of the potential effectiveness of riparian buffer establishment using input data from an intensively monitored hillslope of the Wheel Creek subcatchment – part of the Burdikin River catchment of north Queensland. The second is a catchment-scale simulation of riparian buffer effectiveness in the 347 km² Pine Rivers subcatchment of southeast Queensland. The Pine Rivers catchment forms part of the drinking water supply for the city of Brisbane and hence is a locally important catchment for water quality improvement. Results produced using RPM in both case studies are presented. Improvements to the RPM and directions for ongoing research into riparian buffer behaviour including experimental studies are suggested.

Keywords: Riparian Particulate Model (RPM); Riparian buffers; Water quality modelling; Model simulation