

URBANISATION EFFECTS ON STREAM HYDROLOGY AND NUTRIENT LOADS

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Eutrophication is an increasing problem in many of the world's waterways and the associated proliferation of algae and weeds can lead to a significant loss of amenity in terms of water supply, fisheries and recreation. Phosphorus and nitrogen enrichment are the two most common causes of eutrophication. Both these elements are readily transported in streamflow and their concentrations are strongly dependent on land use in the catchment.

In agricultural regions, fertiliser use is a principal source of both phosphorus and nitrogen in streams. However, dependent on catchment conditions, urban waterways can also contribute significant nutrient loads. Both hydrology and water quality of waterways are significantly affected by urbanisation.

The Large Scale Catchment Model (LASCAM) has been developed with the aim of predicting the impacts of land use and climatic change on the daily trends of streamflow and water quality (salinity, sediments, nutrients, etc.) in large catchments over long time periods. The model has been used to test and predict the possible effects of urbanisation on an agricultural subcatchment (Yakamia District) located in Yakamia Creek catchment in Western Australia within the next 20 years.

The results show that: i) urbanisation increases runoff due to the larger impermeable areas increasing overland stormflow; ii) the reduction of vegetation cover with increased impermeable area adds to overland stormflow runoff, but ensures baseflow is little affected by urbanisation; and iii) streamflow and phosphorus loads are expected to increase about 2.4-fold following urbanisation.