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## Effects of hydrology, riparian topography, and land uses on the water quality in the middle and down streams Han River, China

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Influence of lands use patterns on water quality is complex and scale dependent. The relationship among land use patterns/configurations, topography, and surface roughness of riparian zones and river water quality in the middle and down streams Han River, China, was analyzed using geographically weighted (GWR) multiple regression models. The land use types within 50 m and 100 m of riparian zones that exhibit the strongest association with riverine water quality were investigated. Water quality samplings were collected from 94 sites during November in 2015 (dry season) and May in 2016 (wet season) under the rainy days. GWR models have better predictions of  $\text{PO}_4^{3-}$  and TP in the Wet season and those of  $\text{NO}_3\text{-N}$ , TN, and Chl-a in the Dry season. High prediction differences of  $\text{PO}_4^{3-}$  and TP between Dry and Wet seasons. Most water quality variables in 50 m riparian zone have higher local parameter estimate (LPE) values than those in 100 m riparian zone, indicating 50 m riparian zone significantly influences riverine water quality. In the middle section, grass lands represent the source area of pollutants, which may discharge pollutants with runoff into Han River. However, forest land with high vegetation height can retard the rainfall becoming surface runoff and its relevant high surface roughness can increase infiltration and reduce the nutrient transport ability. Therefore, forest land exhibited a stronger contribution to water quality improvements. These findings provide important information for sustainable landscape management of riparian zones to improve riverine water quality.