

Impacts of land use on groundwater quality in Western Australia

PRIYANTHA RANJAN SARUKKALIGE

Department of Civil Engineering, Curtin University of Technology, GPO Box U1987, Perth, Western Australia 6845, Australia

p.sarukkalige@curtin.edu.au

Abstract To determine the effects of land use on groundwater quality in Western Australia, a quantitative analysis is carried out using groundwater quality data supplied by the Department of Water from over 500 groundwater wells across the Perth metropolitan area. We analysed four main groundwater quality indicators; nutrients, physical parameters, inorganic non metals and trace metals. We found that groundwater beneath agricultural land was found to be particularly susceptible to nutrient loading due to the application of fertilisers. Nutrient levels were found to be rising over time due to increasing agriculture and urban developments. Industrial areas were also found to have numerous contamination plumes that continue to migrate with the groundwater flow. According to Australian and New Zealand Environment and Conservation Council (ANZECC) guidelines and the Australian Drinking Water Guidelines (ADWG), several areas are identified as vulnerable for groundwater quality, including: rural areas (Carabooda Lake, Gnangara and Jandakot Mounds, Cockburn Sound, Forrestdale, Joondalup and Ellenbrook); high-density urban areas (Balcatta and Neerabup); and industrial areas (North Fremantle, Welshpool and Kwinana).

Key words groundwater quality; pollution; land use; Western Australia