

Are Ironstone Gravel Soils in Southwest Western Australia: All the Same?

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Ironstone gravel soils are widespread, locally common, and important for cropping in Western Australia (WA). The spatial extent of these soils is reasonably well known, but geographic differences and distinct subgroups of gravel soils are not. We present a novel approach to map ironstone gravel layers and associated fine earth texture classes to improve understanding of gravel soil characteristics and distribution across southwestern WA. Legacy soil information was mined using code within databases to define soil textural features for input to digital soil mapping [See poster by Griffin]. Soil observations from more than 43,000 sites were prepared for modelling. The main features assessed were: (i) Gravel layer presence or absence; a gravel layer was defined as 20% or more ironstone gravel by volume, 10 cm or more thick; (ii) Fine earth texture was defined as one of three classes; clay (> 35% clay), loam (10 – 35% clay), or sand (< 10% clay); and (iii) These gravel and texture features were determined for three depths, surface (0 – 5 cm), subsurface (5 – 30 cm), and subsoil (30 – 80 cm). Random forest was used to model and predict the probability of gravel and other texture classes, which were converted to binary maps of feature presence or absence. These maps were then combined using simple GIS rules, yielding nine simple Profile Texture Classes, plus gravel layer presence in the soil depths. Here we present the new set of maps available across the southwest of WA that can be used for improved and sustainable land use and management. This novel approach is found to produce more accurate map compared to other available approaches used for mapping in WA.