The role of geology in the development of secondary salinity and its relationship with vegetation

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At farm scale geological factors such as dolerite dykes and bedrock highs are considered important for predicting the location of secondary salinity outbreaks, whereas broad scale prediction is based on the effect that topography has on hydrology: geology is ignored except as it is reflected in the topography.

Investigation of a fourth order catchment of the Arthur River using detailed, low level airborne magnetometry and ground truthed aerial photograph interpretation reveals a spatial relationship between the development of secondary salinity away from the main stream line and the Kojonup Fault (interpreted from the aeromagnetic data): the salinity in the stream line is explained by the topography. Two adjacent third order tributaries in this catchment have similar geomorphology, but only the one associated with the fault has extensive development of salinity. This suggests a causal relationship, which is supported by the fact that three out of four similar pairs of tributaries within 40 km have a similar distribution of salinity.

Structures similar to the Kojonup Fault occur at approximately 8 km intervals in the region, suggesting that at least 50% of the landscape could be subject to the influence of such structures and therefore the development of associated secondary salinity.