

What Lies Deep Beneath – Acid Sulfate Soil Impacts on Groundwater Resources Used for Irrigation

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Over 17 years have passed since the hazards posed by Acid Sulfate Soils (ASS) were recognised in WA with a catastrophic oxidation event during dewatering of a development in Perth's northern suburbs. Since then, regional mapping has identified ASS risks lies beneath over 6000 km² (about half) of the Swan Coastal plain. The risks posed by these soils are mostly to water quality and aquatic ecosystems rather than the directly to soils for agricultural production purposes. However, this may not be the case where water is used for irrigation. In many situations, the effects of oxidising ASS go unnoticed but this is likely to change under a drying climate and increasing pressure on water resources. Two contrasting examples of how ASS in southern WA are impacting groundwater resources and the potential implications for irrigation uses of this water have been examined in detail. The first example, to the north of Perth where ASS are coupled with the Gnangara regional groundwater system - groundwater in this location is acidifying beneath 380 km² of the mound. This has been caused by drying and oxidation of ASS following the decline in groundwater levels over more than two decades. In a contrasting situation, ASS in the Myalup irrigation area south of Perth has contributed to increasing groundwater salinity caused by neutralisation of the acidity in shallow sediments. The divergent impacts of increasing acidification or increasing Calcium Sulfate (Ca-SO₄) dominated salinity, carry different implications for irrigation uses. These will be discussed in the context of climate and water use trends.