

## **CHANGING WATER ENVIRONMENTS: THE INTERACTION BETWEEN VITICULTURE, WATER USAGE AND SEDIMENTS**

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The Sunraysia district in South Eastern Australia has been a viticulture centre for over a hundred years. The soils, within the grape districts of the Murray Basin, have been subjected to flood and aerial irrigation methods for over a century although recently the move towards less water intensive methods has been encouraged. The identification of salinity issues associated with irrigation were first identified in the 1940's and a system of subsurface drainage was placed below the vineyards to manage the perched water table, reduce potential salinity issues and allow the continuation of successful grape growing in the region. The drainage system remains in place and essential for salinity and nutrient management however the appearance of crystalline blockages within the network is of concern. An investigation has been carried out on the nature and composition of the blockages. This presentation explores the "secrets" unlocked from within the calcitic sediments that are contained in the terra cotta subsurface drainage system first laid down during the early 20th century. The crystalline blockage material was subjected to chemical and mineralogy analysis revealing a history of chemical capture. The examination of the sediments, accumulating for 80 years, present a history and insight into the nature of the chemicals that have lodged in the drainage system over time and include fungicides, soil enhancers, growth promoting elements applied to the grapevines during the growing season. The examination of the sediment provides us with a picture of the types of minerals/materials that were present during the times when drainage waters were discharged directly into the iconic Murray River. The significance of this discharge is evidenced by usage with 3,780Gl extracted from the river annually. Salinity and nitrification are known and ongoing problems.

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