THE GOLD MINING LEGACY: A GEOCHEMICAL HISTORY OF THE VICTORIAN GOLDFIELDS WITH EMPHASIS ON OUR ARSENIC HERITAGE

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The mineral riches of the gold fields region of Victoria, Australia, have contributed to the nations wealth and development. The region retains unique artefacts, buildings and landscape features that help explain the past to future generations and provides testimony to a rich cultural past. This landscape is also a source of environmental contamination with metals such as arsenic, mercury, antimony and lead in elevated concentrations in many media.

Assessment and management of contaminants in soils, mine waste, vegetation (both indigenous and introduced) and animal (human and other) requires both acknowledgement of the complex behaviour of the contaminant and the reservoir or media. Definitions of backgrounds become complex, the history of a site is key and the potential impact on human health worthy of discussion.

Surface soil sampling reveals highly elevated metalloid values with up to 16,600 mg/kg arsenic. Public land, accessible to all, frequently returns values in excess of 1000 mg/kg arsenic with the water soluble component approaching 3% of this value. Drinking water usually meets WHO and Australian standards but water bodies used for recreation and irrigation record values up to 2.83 mg/L arsenic. Indigenous vegetation records up to 6.86 mg/kg dry weight arsenic and vegetables can prosper in 800 mg/kg arsenic soils. Domestic vegetable gardens returned produce in excess of the 1 mg/kg dry weight guidline.

This paper summarises historical and new data from this significant gold producing domain and postulates the need for clear advice to residence of the region. On a global scale the levels reported are modest but the potential for multiple contaminated media leading to ingestion by humans is high. The issue of low level but long term exposure is discussed in the context of confounding factors. The risk to our population needs to be considered and appropriate public health debates should ensue.

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