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Identifying sources of acidity and spatial distribution of acid sulfate soils in the Anglesea River catchment, southern Australia

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Globally, coastal and estuarine floodplains are frequently underlain by sulfidic sediments. When exposed to oxygen, sulfidic sediments oxidise to form acid sulfate soils, adversely impacting on floodplain health and adjacent aquatic ecoystems. In eastern Australia, our understanding of the formation of these coastal and estuarine floodplains, and hence, spatial distribution of acid sulfate soils, is relatively well established. These soils have largely formed as a result of sedimentation of coastal river valleys approximately 6000 years BP when sea levels were one to two metres higher. However, our understanding of the evolution of estuarine systems and acid sulfate soil formation, and hence, distribution, in southern Australia remains limited.

The Anglesea River, in southern Australia, is subjected to frequent episodes of poor water quality and low pH resulting in closure of the river and, in extreme cases, large fish kill events. This region is heavily reliant on tourism and host to a number of iconic features, including the Great Ocean Road and Twelve Apostles. Poor water quality has been linked to acid leakage from mining activities and Tertiary-aged coal seams, peat swamps and acid sulfate soils in the region. However, our understanding of the sources of acidity and distribution of acid sulfate soils in this region remains poor. In this study, four sites on the Anglesea River floodplain were sampled, representative of the main vegetation communities. Peat swamps and intertidal marshes were both significant sources of acidity on the floodplain in the lower catchment. However, acid neutralising capacity provided by carbonate sands suggests that there are additional sources of acidity higher in the catchment. This pilot study has highlighted the complexity in the links between the floodplain, upper catchment and waterways with further research required to understand these links for targeted acid management strategies.