

Using AEM data as part of an Integrated Assessment of the Salinity Hazard and Risk to Gunbower State Forest and the River Murray Floodplain in the Gunbower Island-Barr Creek reach of the Murray River, SE Australia.

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In 2007 the Australian Government funded an AEM survey (acquired with the RESOLVE frequency domain system) to provide information in relation to salinity management issues in the River Murray Corridor, including the Gunbower Island to Barr Creek sub-project area.

The study found that healthy vegetation along the Murray River is generally associated with river 'flush zones', where fresh groundwater is present to depths of up to 20m in zones up to 1.5km in width (eg in Gunbower Forest). Groundwater and salinity gradients suggest salt mobilisation from irrigated lands is adversely affecting vegetation health along the western boundary of the Forest. Overall, in the southern half of the project area the Murray River would appear to be a losing system, with a low short to medium term risk of off-site movement of salt into the River through the groundwater system.

In the northern half of the area there are discontinuous flush zones, the groundwater levels are closer to surface, and the river system may be a gaining system in places, with a moderately high salinity risk. Also, the Loddon River, Murrabit River and Barr Creek have no flush zones developed, and are potentially gaining systems at increased salinity risk.

Overall, the AEM and remote sensing data analysed in this study provide a new spatial context for assessing salinity hazard and risk, although there is a need for further ground validation and analysis including hydrodynamic modelling. The data might be used to guide plans for future salt interception in this area.