

Monitoring soil hydrology for Giant Gippsland Earthworm *Megascolides australis* on a streamside bank in Gippsland, Victoria.

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Key points

- Soil moisture is a key influence on detection rates “gurgles” of the GGE in known colonies at a pilot study in Arawata, Gippsland, Victoria.
- Unusually dry conditions occurred throughout dry times during the projects duration
- This led to a decrease in soil moisture and reduced gurgle counts suggesting GGE moved away from the surface which had hotter and drier conditions than those at 80cm depth.
- Dry seasonal conditions resulted in a more rapid drawdown of moisture in areas where vegetation had been planted prior to the projects initiation confirming the importance of zoned planting.

Abstract

The Giant Gippsland Earthworm (*Megascolides australis* McCoy 1878; GGE) has been identified by the Australian Government as a Saving Native Species (Priority Species). It is listed as Vulnerable under the Environment Protection and Biodiversity Conservation Act 1999 and Endangered under the Flora and Fauna Guarantee Act 1988, with populations at risk from altered soil hydrology.

In a 21-month pilot study, we monitored soil hydrology within habitat occupied by a healthy GGE colony at Arawata, Gippsland, and in adjacent uncolonised areas. Colony activity was assessed through counts of audible "gurgles", which are produced when moving earthworms displace water within their burrows. Environmental probes monitored soil moisture and temperature to a depth of 80 cm, and soil oxygen at 30 cm.

GGE occupy specialised habitat within moist clay-based soils on hillslopes with terracettes and along creek banks in South and West Gippsland. As an anecic species, they move vertically through the soil profile in response to changing environmental conditions.

Monitoring was undertaken in known habitat areas and adjacent sites to better understand soil moisture conditions within and between colonies. During the study period, Gippsland experienced below-average rainfall for extended periods. Surface soil moisture and temperature showed high variability in response to rainfall, while deeper soils remained comparatively stable.

As soil moisture declined, fewer gurgles were detected, suggesting reduced earthworm activity under drier conditions. A revegetated site also exhibited a rapid decline in deeper soil moisture during summer, potentially associated with vegetation drawdown. These findings indicate that reductions in soil moisture may limit GGE mobility and increase risk to the species, highlighting the importance of careful land management and revegetation planning near known colonies.