

Vegetation Monitoring Report for 'Threat mitigation and soil hydrology for the Giant Gippsland Earthworm' Project



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1 Background

Bass Coast Landcare Network, in partnership with South Gippsland Landcare Network, Gippsland Threatened Species Action Group, Invert-Eco and Drift Media, was successful in receiving \$349,251 from the Australian Government for a project entitled, '*Threat mitigation and soil hydrology for the Giant Gippsland Earthworm*'. The Giant Gippsland Earthworm (GGE) is listed as vulnerable under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The GGE is one of the largest earthworms in the world and is only found within 44,000 hectares of the south-western Strzelecki Ranges.

The majority of GGE populations occur on private land used for agricultural activity, predominantly in beef and dairy farming enterprises. Fencing and revegetation is required to protect waterways and to stabilize steep bank erosion. Past revegetation activities have not been designed with GGE habitat requirements in mind. Plantings are often too dense resulting in increased competition for soil moisture and a drier soil profile. This can have a detrimental impact on GGE habitat as soil moisture retention is critical for the species. Historic, naturally occurring Ecological Vegetation Classes (EVCs) in spring soaks are now extinct or highly modified. This highlights the importance of vegetation structure and density in maintaining suitable soil moisture conditions for GGE habitat.

This project involved establishing long-term monitoring plots at new and existing revegetation sites and historical revegetation/remnant vegetation sites, as well as monitoring several existing plots that were established in the Australian Government funded 2022/23 project, '*Enhanced knowledge and Protection of the Giant Gippsland Earthworm*'.

This project established the following:

- 7 new long-term vegetation monitoring sites at 4 private properties with documented GGE populations
- 6 vegetation monitoring plots at 4 properties in newly created revegetation areas from the 2022/23 project
- 6 historical revegetation sites that were re-monitored
- 2 additional monitoring sites at a GGE location along Moonlight Divide Track in the Mount Worth State Park, where vegetation changes will be monitored via photo points regularly taken by members of the Friends of Mount Worth and recorded on a monitoring sheet
- Floristic and structural data that was collected from existing remnant vegetation patches and historical and newly fenced revegetation sites
- 2 additional floristic quadrats that were established on private property, but the landholder withdrew part way through the project.

2 Vegetation Monitoring Sites Summary

A total of 20 vegetation assessments were conducted on 10 properties, covering both historical revegetation/remnant vegetation sites, future sites to be fenced, or newly fenced sites to be revegetated to protect GGE habitat. These include 2 sites completed on a private property where the landholder subsequently withdrew from the project. An additional general assessment was undertaken in Mount Worth State Park within GGE habitat.

Eleven remnant/existing revegetation sites were sampled where GGE colonies were known to exist, and 9 sites were carried out in pasture paddocks where fencing and revegetation work was to take place within the timeframe of this project. These figures include the 2 sites that were established before the landholder withdrew from the project.

3 Methodology

A site assessment by the Invert-Eco team was undertaken on all properties where GGE had been recorded more than two years prior, to confirm colony presence.

GGE site assessment reports were produced by Invert-Eco and Oates Environmental Consulting Pty Ltd (OEC) for the 4 new properties and 2 existing properties included in the project (see separate 'Threat Mitigation and Hydrology in Giant Gippsland Earthworm' report by Van Praagh, B. April 2026).

Following on, and in association with the Invert-Eco team visits to the properties, vegetation quadrats were established by OEC. As well as 6 historical revegetation sites, 6 additional properties, with vegetation monitoring plots established in 2022/23 within or adjacent to GGE habitat, were re-monitored to see if there were any changes in vegetation structure and floristics over the 2-year period.

4 Vegetation quadrats

4.1 Vegetation monitoring plots established in new revegetation areas 2024/25

Eight new vegetation quadrats, varying in size according to the size of the GGE colony, were undertaken and marked at the properties listed below, and GPS co-ordinates were recorded for future monitoring purposes.

An additional quadrat was established on a property included in the 2022/23 project in an area that was about to be densely planted with tussock grasses and sedges in GGE habitat to combat weeds.

Two quadrats were established at a property at Arawata, but the landholder later withdrew from the project.

Quadrat data collected at each of the sites was entered into an Excel spreadsheet (see Attachment 1).

Property localities/quadrat sites	Number of quadrat sites
Kardella (AES2)	1
Ranceby (GAL1, GAL2)	2
Arawata (HAR1, HAR3, HAR4)	3
Ranceby (MMIL2)	1
Bena (MIL3)	1
Arawata	(2) withdrew from project

A summary of vegetation quadrat sites and the equivalent Invert-Eco GGE study site locations is summarised below:

Invert-Eco Study Site 1 Arawata (Soil moisture probes)	HAR1, HAR2, HAR3, HAR4
Invert-Eco Study Site 2 Ranceby A	MMIL1, MMIL2
Invert-Eco Study Site 3 Kardella	AES1, AES2
Invert-Eco Study Site 4 Ranceby B	GAL1, GAL2

AES2

Location: Kardella

Quadrat size: 10 x 8 m

Aspect: south-east

Total number of indigenous species: 1 (*Acacia melanoxylon*)

Total number of weed species: 10 (mainly pasture grasses)

GGE presence: gurgles heard adjacent to the quadrat.

Quadrat looking north-west to south-east



General view looking downslope towards quadrat



GAL1

Location: Ranceby

Quadrat size: 10 x 10 m

Aspect: south

Total number of indigenous species: 2 (herbs)

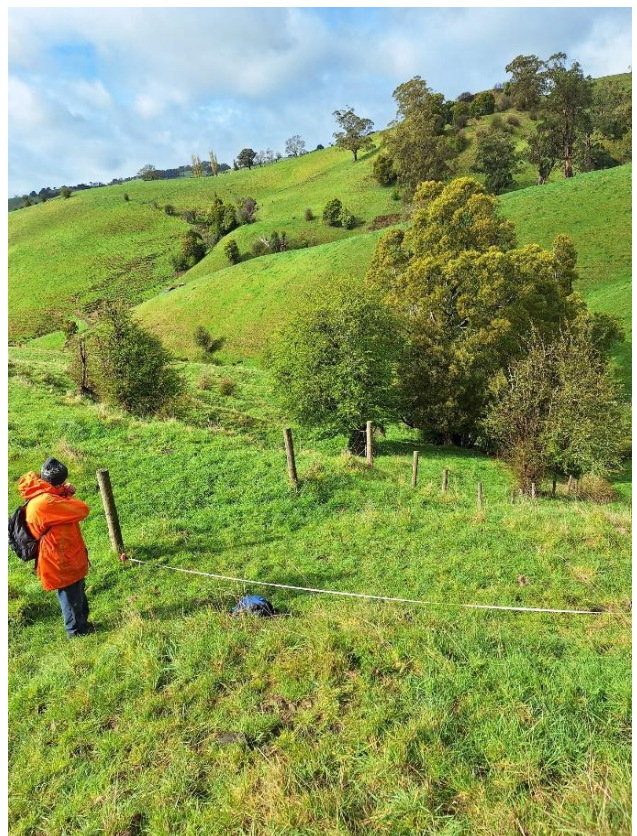
Total number of weed species: 13

GGE presence: numerous gurgles heard both within and outside quadrat.

Quadrat looking north-west to south-east



General view looking downslope towards quadrat



GAL2

Location: Ranceby

Quadrat size: 13 x 8 m

Aspect: south

Total number of indigenous species: 0

Total number of weed species: 18

GGE presence: numerous gurgles heard both within and outside quadrat. Site dominated by pasture grasses.

Quadrat looking north-west to south-east



General view looking upslope



HAR1

Location: Arawata

Quadrat size: 10 x 10 m

Aspect: east-south-east

Total number of indigenous species: 3 (fern, rush and herb)

Total number of weed species: 12

GGE presence: gurgles heard in quadrat.

Quadrat looking north-west to south-east



Looking south-west to north-east



HAR3

Location: Arawata

Quadrat size: 10 x 5 m (control site – no GGE present)

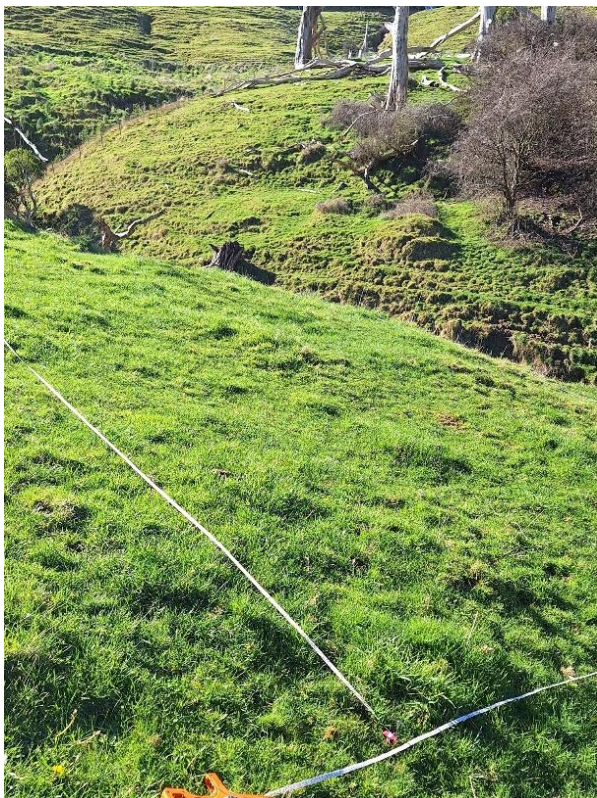
Aspect: south-west

Total number of indigenous species: 0

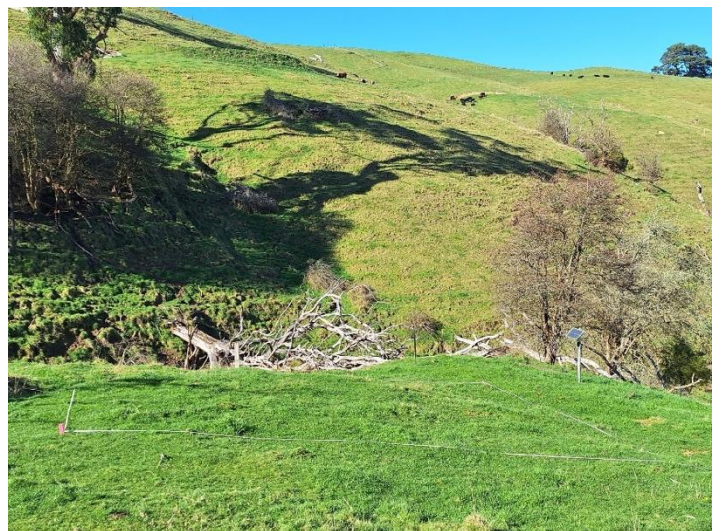
Total number of weed species: 9

GGE presence: no.

Quadrat looking south-west to north-east



Looking downslope to quadrat



HAR4

Location: Arawata

Quadrat size: 10 x 10 m

Aspect: west

Total number of indigenous species: 2

Total number of weed species: 9

GGE presence: no, but gurgles heard downslope near creek.

Quadrat looking south-west to north-west



Looking north-west to existing revegetation site



MMIL2

Location: Ranceby

Quadrat size: 8 x 8 m

Aspect: east

Total number of indigenous species: 1

Total number of weed species: 11

GGE presence: 2 gurgles downslope of quadrat.

Quadrat looking north-west to south-east



Looking downslope from quadrat



MIL3

Location: Bena

Quadrat size: 12.5 x 3 m

Aspect: west

Total number of indigenous species: 0, but quadrat planted densely the next day with *Carex appressa* and *Poa labillardierei* to combat the weed (Hemlock)

Total number of weed species: 5

GGE presence: gurgles heard in quadrat.

Quadrat established directly following planting of grasses in GGE habitat in 2024



4.2 Vegetation monitoring plots established in new revegetation sites in 2022/23 and re-monitored in 2024/25

Property localities/quadrat sites	Number of quadrat sites
Bena (MIL2B)	1
Ranceby (BUT3, BUT4)	2
Ranceby (MMIL1)	1
Korumburra (O'NEI2)	1

General view of one of the properties with GGE at Ranceby

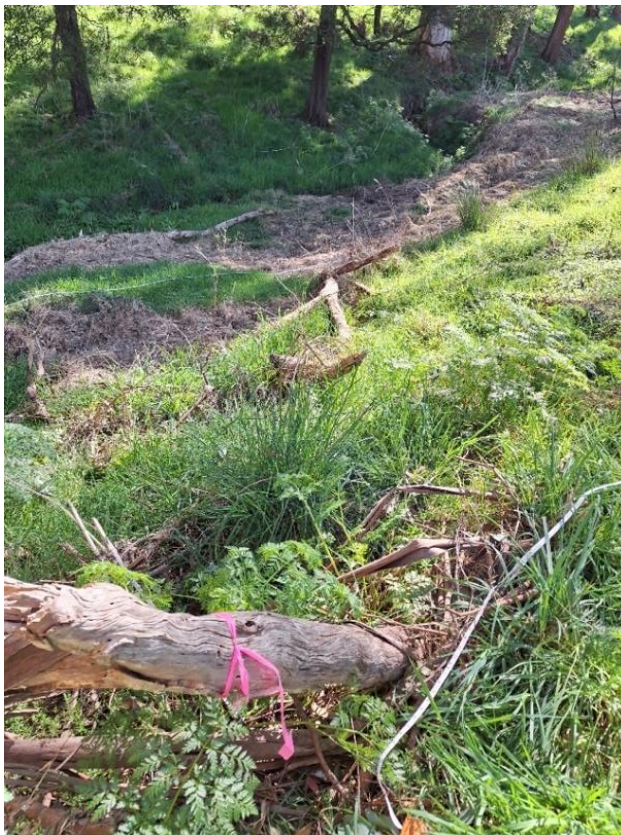


MIL2B

Location: Bena

Vegetation changes: Not much change in vegetation cover or species diversity was noted since the area had been fenced off in 2022. The Hemlock and Blackberries had been sprayed before planting in August 2024 when the quadrat was re-surveyed and 2 indigenous species, Common Tussock-grass (*Poa labillardierei*) and Tall Sedge (*Carex appressa*), were planted shortly after re-monitoring this site. GGE gurgles were also heard in the quadrat (under a log) in August 2024.

June 2022



August 2024



BUT3

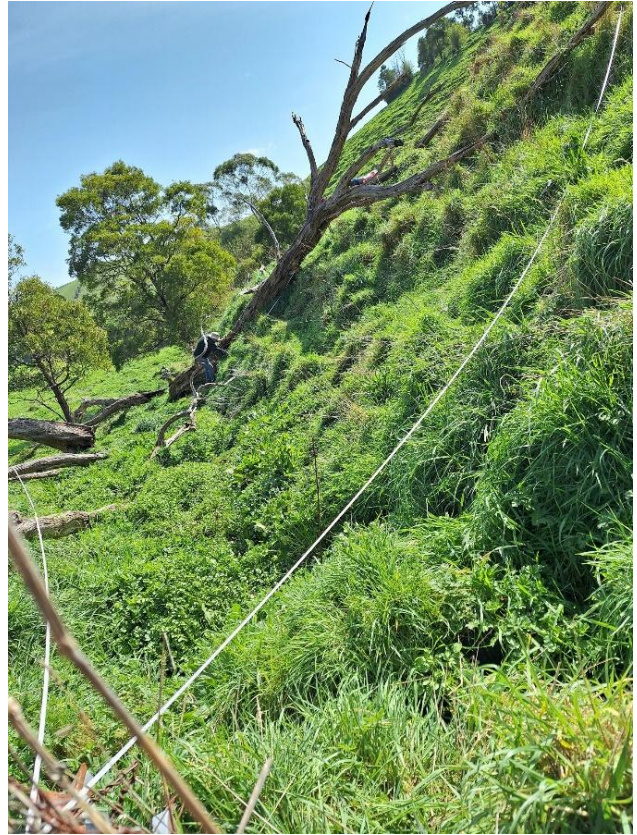
Location: Ranceby

Vegetation changes: At the time of re-monitoring the site, no indigenous vegetation plantings had occurred adjacent to the GGE site, and the first stage of the plantings occurred further upslope on the western side of the creek. Further plantings are planned in the future.

May 2022



September 2024

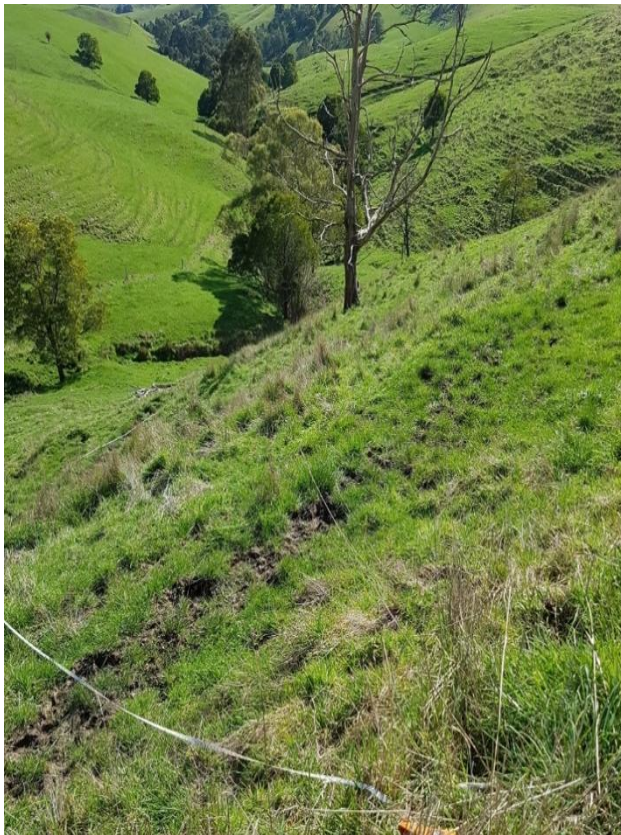


BUT4

Location: Ranceby

Vegetation changes: A number of indigenous plants had been planted in the site in 2023/24, including Hemp Bush (*Gynatrix pulchella*), Burgan (*Kunzea spp.* upright form), Rush (*Juncus spp.*), Snowy Daisy-bush (*Olearia lirata*) and Common Cassinia (*Cassinia aculeata*). Weedy grasses had increased in cover, as to be expected with fencing off the area. 2 other indigenous species were occurring naturally in the site – Soft Crane’s-bill (*Geranium potentilloides*) and Native Flax (*Linum marginale*).

September 2022



September 2024



MMIL1

Location: Ranceby

Vegetation changes: Taller and denser weedy pasture grasses were noted in 2024, as to be expected following exclusion of cattle. Plantings have not occurred within the quadrat, but Blackberry has been removed, and the Hawthorn bushes have died off within and adjacent to the quadrat following chemical spraying. No GGE gurgles were heard in April 2023, but a number, both within and adjacent to the quadrat, were heard in September 2024.

April 2023



September 2024



O'NEI2

Location: Korumburra

Vegetation changes: Little vegetation change has occurred over 17 months within the quadrat. No plantings are to occur in this steep site or the adjacent area due to the presence of GGE colonies. Plantings are being carried out on the other side of the gully. A few GGE gurgles were heard within the quadrat. The landholder is controlling any Blackwood saplings that are emerging along this slope in GGE habitat.

April 2023



September 2024



4.3 Vegetation monitoring plots established in historical revegetation sites in 2022/23 and re-monitored in 2024/25

Localities/quadrat sites	Number of quadrat sites
Moyarra (BRA1)	1
Arawata (SUT2, SUT3)	2

BRA1 looking downhill



BRA1

Locality: Moyarra

Vegetation changes: The site was planted around the dam approximately 9 years ago and consists of an understorey of *Eucalyptus* trees to small shrubs with a pasture ground layer. The understorey trees and shrubs include Blackwood (*Acacia melanoxylon*), Silver Wattle (*Acacia dealbata*), Prickly Moses (*Acacia verticillata*), Hemp Bush (*Gynatrix pulchella*), Musk Daisy (*Olearia argophylla*) and Tree Everlasting (*Ozothamnus ferrugineus*). Within the quadrat at the dam site, the planted Strzelecki Gum had increased in height and had an increase of 6 cm in Diameter Breast at Height (DBH). The percentage of projective foliage cover of understorey trees and large shrubs increased from 15% to 20%, and the medium shrubs from 40% to 50%. In July 2022, a GGE gurgle was heard just below the fence line in the quadrat, and in August 2024, GGE gurgles were heard above the fence line upslope of the quadrat, but not within the quadrat.

July 2022



August 2024



SUT2

Locality: Arawata

Vegetation changes: The monitoring site is in typical GGE habitat on a steep mid-slope of wet clay with Burrowing Crayfish chimneys and dominated by Creeping Buttercup (*Ranunculus repens*). Sparse shrubs are in the understorey, with some larger ones overhanging the site.

Little change was recorded in the vegetation cover over the 2 years, with a small increase in the cover of medium shrubs. The site is in a soak in an open area of the forest which was planted in 2002/03. A number of GGE gurgles were heard in both August 2022 and 2 years later in August 2024.

August 2022



August 2024



SUT3

Locality: Arawata

Vegetation changes: The site was planted in 2009 and supplementary planted in 2010 due to wallaby damage. Little change has taken place in the vegetation cover over the past 2 years, except for a slight increase in the cover of Brake Fern (*Pteris tremula*) and Tall Sedge (*Carex appressa*). Branches from large trees, such as eucalypts, only overhang the site, as the heavy clay soil inhibits the growth of large trees, or, as the landholder found when planting the eucalypts, they will only survive for the first few years in such habitat. In both August 2022 and August 2024, several GGE gurgles were heard both within and over the fence adjacent to the quadrat.

August 2022



August 2024



4.4 Vegetation monitoring plots established in 2024/25 in historical revegetation sites

Localities/quadrat sites	Number of quadrat sites
Arawata (HAR2)	1
Kardella (AES1)	1

General views in vicinity of AES2



HAR2

Locality: Arawata

Quadrat size: 10 x 10 m

Aspect: east-south-east

Total number of indigenous species: 9 (site planted in 2023 and includes eucalypt species and large to medium shrubs planted approximately 2-3 m apart with a projective foliage cover of approximately 20%)

Total number of weed species: 9 (dominated by medium tufted and large non-tufted pasture grasses)

GGE presence: gurgles heard in quadrat.

Quadrat north-west looking south-east



Looking south-west to north-east



AES1

Locality: Kardella

Quadrat size: 5 x 5 m

Aspect: south-east on lower slope near creek

Total number of indigenous species: 3 (shrub, fern and sedge). Silver Wattle with a cover of 5% overhangs the quadrat. The area was planted over 30 years ago, mainly with indigenous species, but due to the wet clay soil, larger shrubs and trees are unable to survive in this environment and tend to be on the drier soils upslope of the quadrat

Total number of weed species: 6 (dominated by Blue Periwinkle and Creeping Buttercup)

GGE presence: gurgles heard in quadrat.

Quadrat looking north-east to south-west



Looking south-west to north-east



4.5 Remnant vegetation sites on public land established as a Citizen Science monitoring plot in 2024/25

Land Manager	Number of sites
Parks Victoria, Mt Worth State Park	2

Following on from a successful talk and walk by the author in Mount Worth State Park with local Landcare groups and Friends of Mount Worth, a Citizen Science GGE monitoring sheet has been produced for sites MDT1 and MDT2 for use by these community groups and Parks Victoria staff.

Two linear sites have been established along the Moonlight Divide Track, MDT1 and MDT2, with a modified recording sheet also produced for community members. A fallen Blackwood log across the Moonlight Divide Track was used as a divider between MDT1 and MDT2.

GGE habitat, Moonlight Divide Track, Mount Worth State Park



MDT1

Mount Worth State Park

Land Manager: Parks Victoria

Notes: Within this site, numerous gurgles were heard along the track and on the sides of the track and sometimes under small bushes. The main plant species observed on the sides of the track, at the fallen log, were an overstorey of Blackwood (*Acacia melanoxylon*), and an understorey layer dominated by Snowy Daisy-bush (*Olearia lirata*). Also present were Prickly Currant-bush (*Coprosma quadrifida*), Soft Tree-fern (*Dicksonia antarctica*), Rough Tree-fern (*Cyathea australis*), Mother Shield-fern (*Polystichum proliferum*), Kangaroo Apple (*Solanum aviculare*) and Pennywort (*Hydrocotyle*) species. The soil was wet, blue-grey clay, with 30 mm of rain having been recorded in the area in the previous week.

Northern end of MDT1



Southern end of MDT1



MDT2

Mount Worth State Park

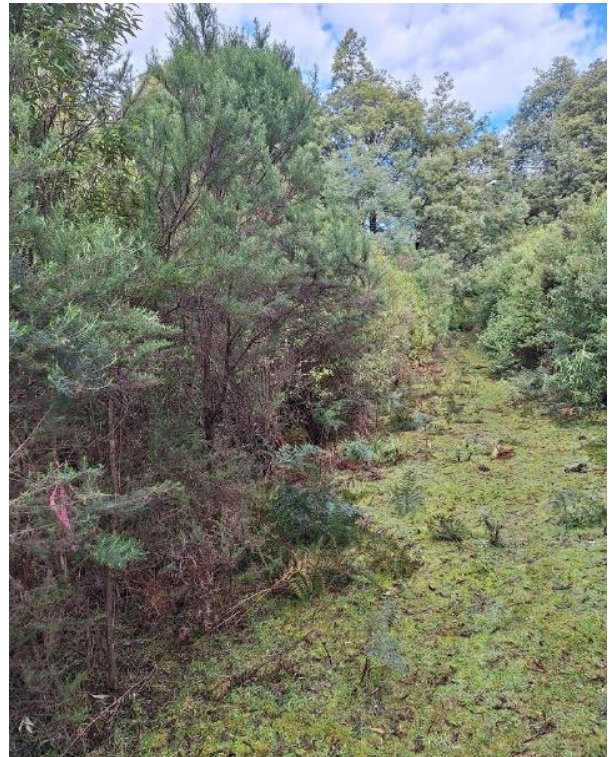
Land Manager: Parks Victoria

Notes: The northern end of this site is a flat, grassy area, approximately 250 m north of the fallen Blackwood log which marks the southern end of the site. The vegetation towards the northern end, in the grassier areas, consisted mainly of small shrubs and herbs. Pink flagging tape was used as markers at both ends of the site along the track. A number of gurgles were also heard along the track within this site.

Southern end of MDT2



Northern end of MDT2



5 Photo Points

Photo points were established at 11 sites on 10 different properties to monitor long-term vegetation changes including encroachment of trees and larger shrubs into GGE habitat. The photo points were established mainly on fence posts in the newly fenced-off areas by means of a small, pink square metal plate screwed into the post. In some monitoring sites, a wooden stake with a corresponding GPS co-ordinate for the vegetation quadrat was used. See Appendix 1 for photo point sites, locations and notes and Appendix 2 for photographs of the established photo points.

Photographs were taken from this point at different angles to capture as much of the revegetation area as possible. Ideally, these sites should be photographed on an annual basis, or every 2-3 years to record revegetation growth, and in historical revegetation sites, to note any encroachment of woody trees and shrubs.

6 Talks to Landcare and Friends Groups

The author presented talks with a combined total of approximately 240 people in attendance. The aim of these talks was to increase awareness of GGE, promote understanding of its habitat requirements (particularly soil moisture and vegetation structure) and encourage landholder and community participation in monitoring and conservation activities. Some of these presentations included a field walk as well, to locate GGE colonies and learn more about GGE habitat. As a result of these community talks, further GGE sites were also discovered and mapped.

The following groups were in attendance:

Arawata Landcare Group

Bass Valley Landcare Group

Friends of Korumburra Botanic Park

Friends of Mount Worth

Friends of Ritchies Reserve

Gippsland Threatened Species Action Group

Korumburra Landcare Group

Mount Worth & District Landcare Group

Neerim & District Landcare Group

7 Results summary

Vegetation quadrats have now been established in several locations within GGE habitat in the south-western Strzeleckis. Vegetation plots established in 2022/23 on private land that were revegetated as part of the 'Enhanced knowledge and protection of the Giant Gippsland Earthworm' project were re-monitored. There was a general increase in pasture grasses as is to be expected until the indigenous plantings have reached a height to start shading out the pasture grasses. One landholder has been thinning out juvenile Blackwoods to prevent encroachment and establishment within GGE habitat. These observations are consistent with the importance of maintaining appropriate vegetation density to support soil moisture retention within GGE habitat, particularly in lower slope and seepage areas.

The quadrats established in historical revegetation sites were re-monitored with little difference except for a slight increase in tree and shrub foliage cover at a couple of sites and an increase in ground layer ferns and sedges at another site. GGE gurgles were heard both in 2022/3 and 2024/5 at or adjacent to these sites. At Site BRA1 no GGE gurgles were detected this year but gurgle sounds can vary during the day and in response to local soil moisture conditions. A gurgle was heard just upslope in a pasture paddock. Recently the author returned to GGE sites

at two properties at Arawata where numerous gurgles were heard following rainfall events in October and November 2025 compared to the drier 2025 winter months.

The quadrats established in Mount Worth State Park were along the Moonlight Divide walking track in old-growth forest. GGE gurgles were heard along the edge of this track where the vegetation was not as dense and smaller shrubs were present. The author has set up a citizen science project with Friends of Mount Worth and Latrobe Catchment Landcare Network has offered to facilitate and support this project. A GGE Monitoring Sheet has been produced (see sample in Attachment 2) which will be used by the Friends of Mount Worth to record the number of gurgles heard when walking this track. Parks Victoria Rangers have also shown interest in using the recording sheets as well when working in the Park. This will contribute to ongoing monitoring of GGE activity in relation to vegetation structure and site conditions.

8 Recommendations

- For future monitoring of the vegetation quadrat sites, a portable soil probe be used to record soil temperature and moisture levels, to better understand the relationship between vegetation structure and soil hydrology in GGE habitat.
- Monitoring of vegetation quadrats to be carried out every 2-3 years, funding dependant.
- If future funding is limited, rationalize the number of quadrats to be re-monitored ensuring there is a good coverage of new sites that were revegetated during the 2022/23 and 2024/25 projects and historical planting sites greater than 10 years old.
- Latrobe Catchment Landcare Network to facilitate and support the Citizen Science project for recording GGE in Mount Worth State Park created as part of this project.

8 Appendices

Appendix 1: List of photo point sites, GPS locations and notes

Site	GPS location	Notes
AES2, Kardella	401498 5748852	Pink square metal plate on small gate post on western fence line near AES2.
BRA1, Moyarra	388684 5741591	Upslope from Quadrat BRA1 looking down onto quadrat.
East of BUT4, Ranceby	400928 5756088	Pink square metal plate on fence, 14th post, including assembly post, from one corner of new northern boundary fence and to the west. Waypoint 359.
West of GAL1 & GAL2, Ranceby	397975 5750631	Western fence running north-south in new revegetated area. 16th post down from the top (including top post). Pink metal plate screwed in to top of fence post.
Upslope on fenceline from HAR1 & HAR2, Arawata	399399 5748334	Pink square metal plate on top of new wooden fence post at lower gate on west side of creek.
IRV1, Bena	388235 5743185	Photo taken from in front of stake looking towards fallen log. A known GGE site. Burrowing Crayfish chimneys nearby and soil a brownish clay. Planted <i>Pomaderris aspera</i> , <i>Acacia melanoxylon</i> , <i>Cassinia aculeata</i> , <i>Goodenia ovata</i> . Open ground layer and scattered tall shrubs.
MIL3, Bena	388235 5743185	Tall wooden stake in ground looking east over dense grass plantings
MMIL1, Ranceby	397925 5749936	Pink square metal plate on top of new wooden fence post, one post east of gate. Upslope from Quadrat MMIL1
MMIL2, Ranceby	398407 5749999	Pink square metal plate on top of new wooden fence post at gate (with chain) on western side of creek at Quadrat MMIL2.
O'NEI2, Korumburra	396020 5746943	Pink square metal plate on top of new wooden fence post above Quadrat O'NEI2.
SUT3, Arawata	404199 5748792	Flagging on wire fence at Quadrat SUT3 looking downslope along fenceline.

Appendix 2: Photo point sites

AES2, Kardella



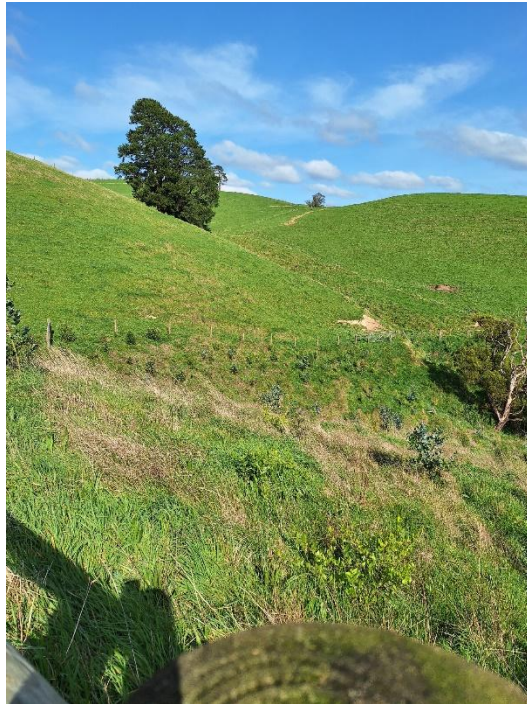
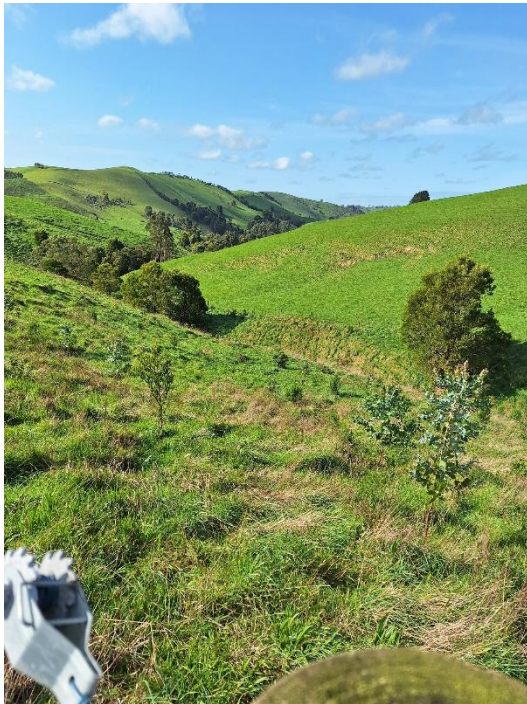
September 2025

BRA1, Moyarra



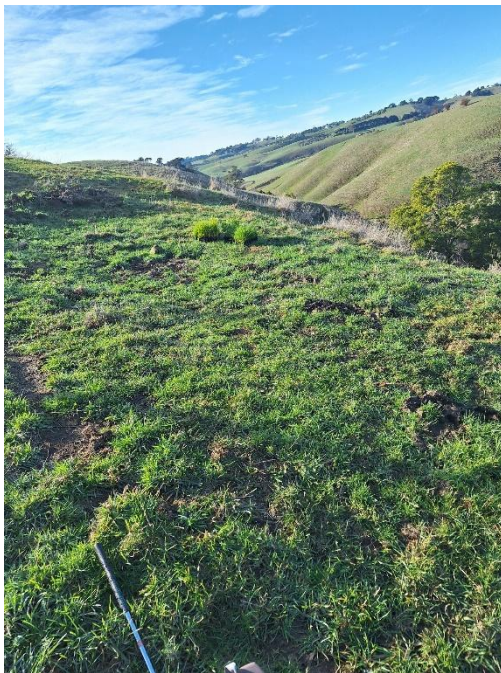
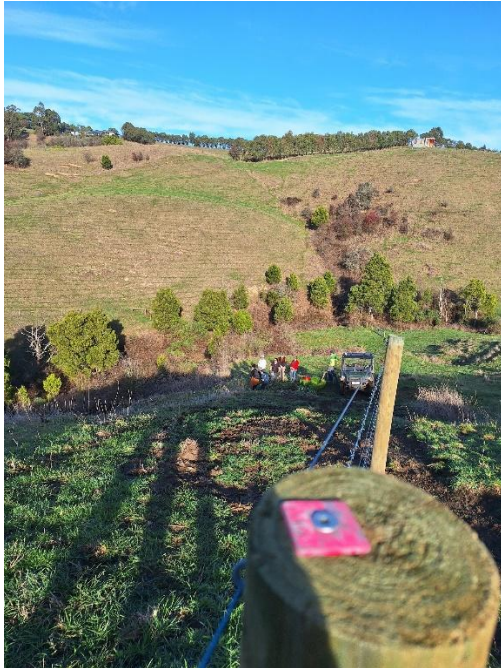
August 2024

BUT4, Ranceby



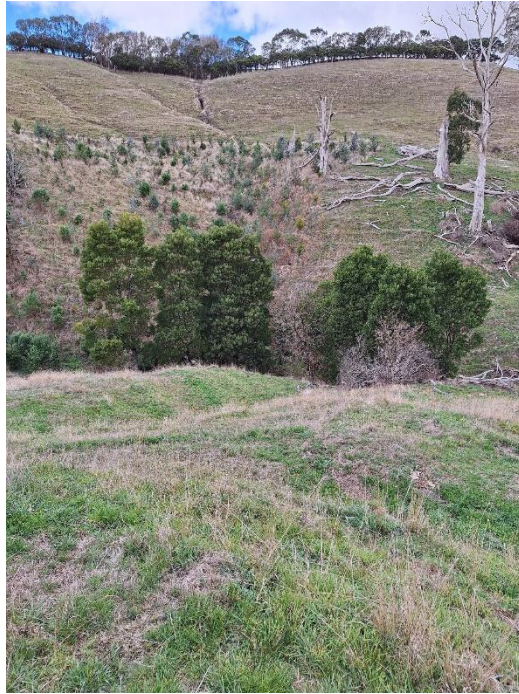
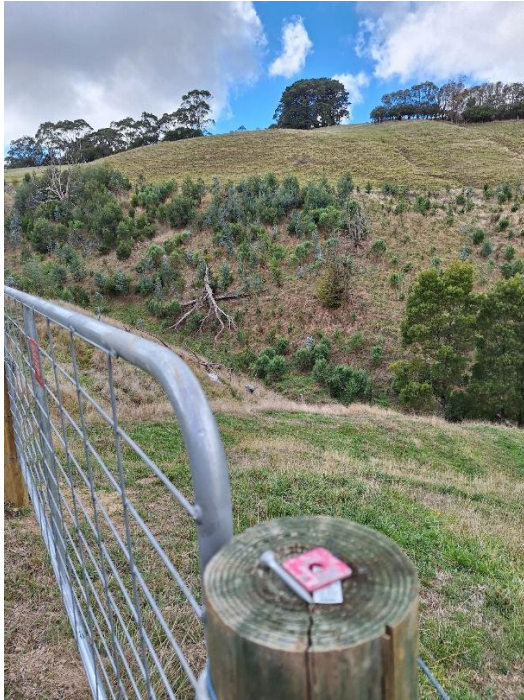
September 2024

GAL1/2, Ranceby



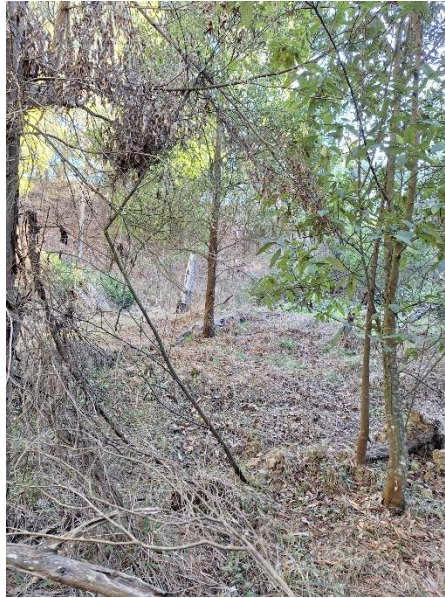
July 2025

HAR1/2, Arawata



May 2025

Buchanans Rd, Bena



June 2025

MIL3, Bena



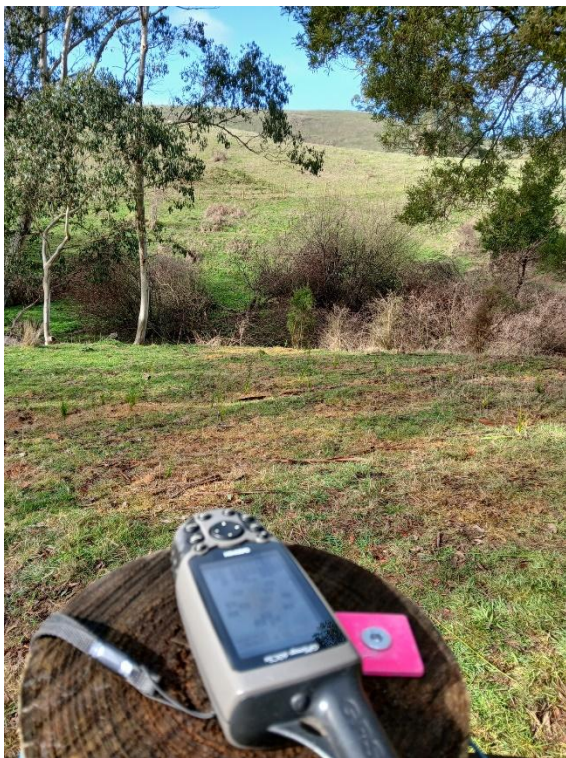
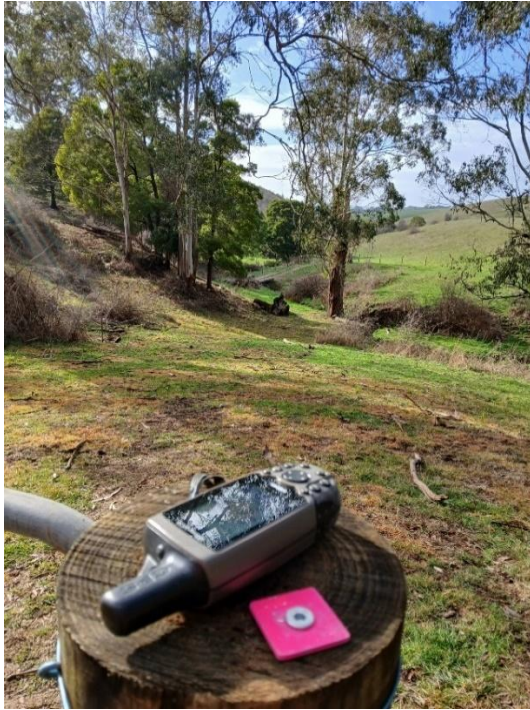
November 2025

MMIL1, Ranceby



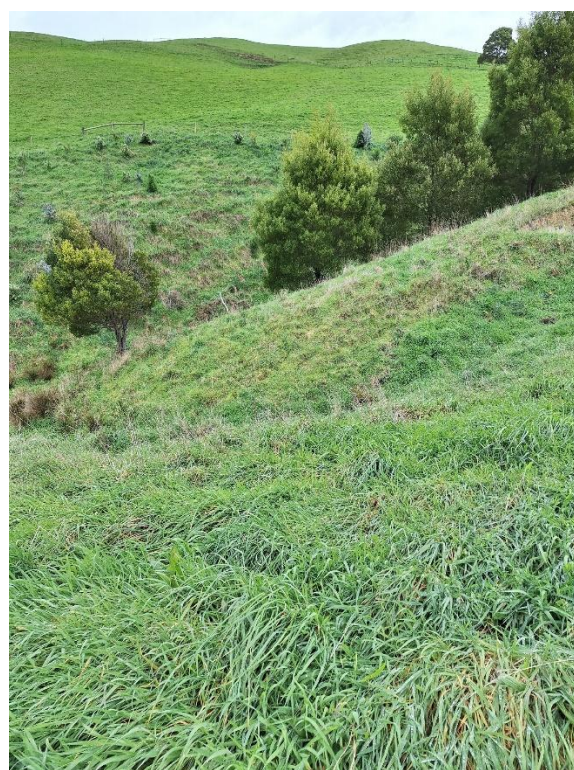
September 2024

MMIL2, RAnceby



May 2025

O'NEI2, Korumburra



September 2024

SUT3, Arawata



November 2025

Parks Victoria: Mount Worth State Park

MD1



Photo point looking south from fallen log

MD2



Photo point looking north from fallen log



Australian Government

The 'Threat Mitigation and Soil Hydrology for the Giant Gippsland Earthworm' project received grant funding from the Australian Government.