


Shelterbelt Planting.

Preliminary Report on Tree Guard Study.

Arborgreen

Arborgreen is a Supporting
Partner of Landcare Australia





On the 14th of August 2023, Arborgreen installed a selection of biodegradable and non-biodegradable tree guards at a planting site near Carrickalinga, South Australia. The objective is to gather data on tree guard effectiveness based on predefined parameters. This initiative is part of a more significant endeavour to restore the Glossy Black Cockatoo habitat following consequential habitat loss caused by the Kangaroo Island bushfires of 2019-2020.

We selected the site based on its relevance. A Grassy Sheoak Woodland characterises the site in a mild temperate climate with an average annual rainfall of 523mm. The soil composition primarily consists of shallow clay loam over rock. Combined with these conditions, this type of site would typically break down biodegradable tree guards over approximately one to two years, depending on the guard type. The survival rate of planted seedlings in these conditions would normally be about 85%, provided the expected summer rainfall occurs.

// Habitat Restoration

Part of a larger endeavor to restore habitat for the Glossy Black Cockatoo.

// Grassy Sheoak Woodland

The plants chosen for the project are all Drooping Sheoak (*Allocasuarina verticillata*), spaced at approximately 3.5 to 4 metres between each tree.

// Trialling a range of tree guards

Fourteen differing tree guard/stake/weed matting combinations have been selected for the trial, ranging from the common and time-tested fluted plastic guards to new innovative biodegradable guards not yet released.



Tree Guard Trial Assessment

16 October 2023

Arboregreen completed the first assessment on 16 October 2023. At this assessment, 87% of the tree guards were intact and in good condition, and 76% of the trees were thriving.

// Weather during the assessment period

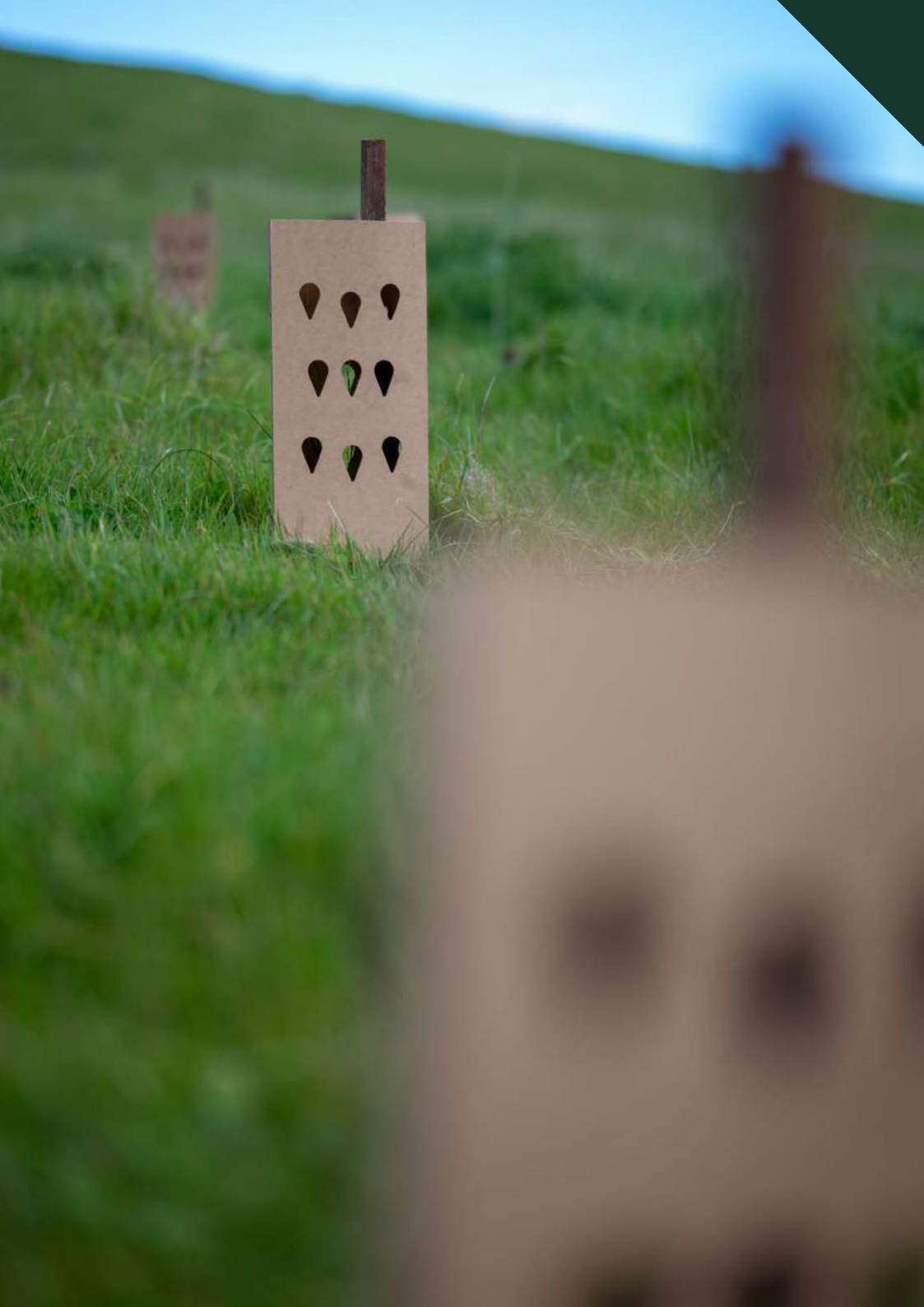
The rainfall patterns during the assessment period from installation on 14 August to 16 October were lower than the average rainfall, with August rainfall totalling 26.6mm (compared to a median rainfall of 71.1mm) and September rainfall totalling 42.4mm (compared to a median rainfall of 54mm). The first 14 days of October were also extremely dry, with the whole of October receiving only 14.6mm (compared to a median rainfall of 41.6mm).¹ Wind exposure at the site was high as it is perched on the top of a ridge.

// Guard degradation

Thirty-one tree guards were showing signs of damage at this assessment. Of the thirty-one tree guards damaged, fencing contractors had driven over nine of the tree guards, severely damaging both the tree and the guards. Sixteen guards were damaged by birds pulling apart the guards to get at the jute matting inside, with some rodents chewing out the base of some guards. Six guards experienced degradation that was related to weather events. One guard had the supporting stake/cane broken by a predator, and the guard blew away in the wind.

¹ Data collected from the Yankalilla BOM weather station.





A summary of the guard condition is below.

- **450mm Fluted Plastic + 1 Hardwood Stake:** excellent condition with no weather or grazing damage.
- **450mm GreenGuard POP Tri Biodegradable + 1 Hardwood Stake:** starting to fold over a little with some tears from crows.
- **320mm GreenGuard MINI Biodegradable Carton + 2 Bamboo Canes:** holding shape well with some tears from crows.
- **300mm Mallee Biodegradable Carton + 2 Bamboo Canes:** torn quite a bit by crows but were still overall intact.
- **435mm Mallee Biodegradable Tube + 1 Hardwood Stake:** folding over a lot from the wind, several guards were severely damaged.
- **450mm GreenGuard POP Tri Biodegradable + 1 Tanapost Pine Stake:** starting to fold over a little, didn't have as many tears from crows as the same guards with hardwood stakes.
- **442mm Gropod Biodegradable + 1 Bamboo cane:** excellent condition with one guard chewed out by a predator.
- **225mm Gropod Biodegradable + 1 Bamboo cane:** excellent condition with one guard chewed out by a predator.

Access the complete numbers on the guard degradation in **Appendix – Guard deterioration 16.10.23.**

// Tree survival

It was apparent that the site had been heavily grazed by various animals and birds, with signs of grazing by kangaroos and crows being most evident. It is some of the heaviest grazing pressure observed by the team assessing the site compared to a typical revegetation project. The grazing pressure is likely due to the location being very exposed.

Contractors observed groups of crows pulling the jute mats apart and taking small pieces away. The assumption is that the birds are using this for nesting material. There was also evidence of the guards having tears originating from the holes – an apparent effort to get to the jute inside.

Kangaroos were mainly prevented from grazing on the Sheoak in the guards, but in several instances, they had been able to push their mouths down into the guard and had either grazed the top off the seedling or pulled the seedling out of the ground. Thirty-seven seedlings were assessed as being killed by animal predation, with sixteen of the guards destroyed entirely.

Disappointingly, nine of the seedlings were damaged by fencing contractors driving over the entire guard and seedling. Sixteen individual plants were pulled out of the ground with the whole rootball intact, often indicative of poorer planting techniques where the soil was not compacted enough around the rootball. The remaining two seedling deaths were due to unknown causes.

Full details on the seedling survival numbers can be found in **Appendix – Seedling survival 16.10.23.**



Appendix – Guard deterioration 16.10.23

| | | Reason For Attrition | | | | | | |
|--|-----------|----------------------|------------|-------------|----------------|------------------|--------------|---|
| Tree Guard Type | QTY Alive | QTY Dead | % Survival | Driven Over | Poorly Planted | Animal Predation | Other Causes | General Notes on Seedling Condition |
| 1. 450mm Corflute with 11x38x750mm hardwood stake <i>(no weed matting)</i> | 19 | 1 | 95% | | 1 | | | Most seedlings in excellent condition, healthy and growing well |
| 2. 450mm Corflute with 11x38x750mm hardwood stake <i>(Jute weed matting)</i> | 18 | 2 | 90% | 1 | 1 | | | Most seedlings in excellent condition, healthy and growing well |
| 3. GreenGuard POP Triangular with 18x25x750mm hardwood stake <i>(no weed matting)</i> | 16 | 4 | 80% | 2 | 1 | 1 | | Most seedlings in good condition, healthy and growing well |
| 4. GreenGuard POP Triangular with 18x25x750mm hardwood stake <i>(Jute weed matting)</i> | 16 | 4 | 80% | | 2 | 2 | | Most seedlings in good condition, healthy and growing well |
| 5. GreenGuard MINI with 10-12mm x 600mm bamboo cane <i>(no weed matting)</i> | 12 | 8 | 60% | 1 | 2 | 5 | | Seedlings have suffered a fair bit from exposure and grazing |
| 6. GreenGuard MINI with 10-12mm x 600mm bamboo cane <i>(Jute weed matting)</i> | 15 | 5 | 75% | | 2 | 2 | 1 | Seedlings have suffered a fair bit from exposure and grazing |
| 7. Mallee 2L Biodegradable carton with 10-12mm x 600mm bamboo cane <i>(no weed matting)</i> | 11 | 9 | 55% | 2 | 2 | 5 | | Seedlings have suffered a fair bit from exposure and grazing |
| 8. Mallee 2L Biodegradable carton with 10-12mm x 600mm bamboo cane <i>(Jute weed matting)</i> | 11 | 9 | 55% | 2 | | 7 | | Seedlings have suffered a fair bit from exposure and grazing |
| 9. Mallee 435mm Biodegradable Tube guard with 11x38x750mm hardwood stake <i>(no weed matting)</i> | 14 | 6 | 70% | | 2 | 4 | | Seedlings have suffered a fair bit from exposure and grazing |
| 10. Mallee 435mm Biodegradable Tube guard with 11x38x750mm hardwood stake <i>(Jute weed matting)</i> | 14 | 6 | 70% | 1 | | 5 | | Seedlings have suffered a fair bit from exposure and grazing |
| 11. GreenGuard POP Triangular with 18x25x750mm Tanapost pine stake <i>(no weed matting)</i> | 17 | 3 | 85% | | 1 | 2 | | Most seedlings in good condition, healthy and growing well |
| 12. GreenGuard POP Triangular with 18x25x750mm Tanapost pine stake <i>(Jute weed matting)</i> | 15 | 5 | 75% | | 2 | 3 | | Most seedlings in good condition, healthy and growing well |
| 13. Gropod 442mm Biodegradable with custom flat 700mm bamboo cane | 19 | 1 | 95% | | | 1 | | Most seedlings in excellent condition, healthy and growing well |
| 14. Gropod 225mm Biodegradable with custom flat 400mm bamboo cane | 9 | 1 | 90% | | | | 1 | Most seedlings in excellent condition, healthy and growing well |

Appendix – Seedling survival 16.10.23

| | | | Reason For Damage | | | | | |
|--|-----------------|------------------|-------------------|-------------|----------------|------------------|--------------|---|
| Tree Guard Type | Quantity Intact | Quantity Damaged | % Guards Intact | Driven Over | Weather Damage | Animal Predation | Other Causes | General Notes on Tree Guard Condition |
| 1. 450mm Corflute with 11x38x750mm hardwood stake <i>(no weed matting)</i> | 20 | 0 | 100% | | | | | Guards in solid condition, no damage observed |
| 2. 450mm Corflute with 11x38x750mm hardwood stake <i>(Jute weed matting)</i> | 19 | 1 | 95% | 1 | | | | Guards in solid condition, no damage observed other than one guard driven over |
| 3. GreenGuard POP Triangular with 18x25x750mm hardwood stake <i>(no weed matting)</i> | 18 | 2 | 90% | 2 | | | | Some guards folding over, two guards driven over |
| 4. GreenGuard POP Triangular with 18x25x750mm hardwood stake <i>(Jute weed matting)</i> | 18 | 2 | 90% | | | 2 | | Jute matting ripped up by crows, two guards torn by crows trying to get to jute with one completely collapsed, some guards folding over |
| 5. GreenGuard MINI with 10-12mm x 600mm bamboo cane <i>(no weed matting)</i> | 19 | 1 | 95% | 1 | | 1 | | Holding shape well, one guard with some tears from predation, one guard driven over |
| 6. GreenGuard MINI with 10-12mm x 600mm bamboo cane <i>(Jute weed matting)</i> | 19 | 1 | 95% | | | | 1 | Holding shape well, one guard with canes snapped and guard blown away, jute matting ripped up by crows |
| 7. Mallee 2L Biodegradable carton with 10-12mm x 600mm bamboo cane <i>(no weed matting)</i> | 15 | 5 | 75% | 2 | | 3 | | Not holding up well at the top of the site, lots of guards torn by crows, two guards driven over, holding up well at bottom of site |
| 8. Mallee 2L Biodegradable carton with 10-12mm x 600mm bamboo cane <i>(Jute weed matting)</i> | 16 | 4 | 80% | 2 | | 2 | | Not holding up well at the top of the site, lots of guards torn by crows, two guards driven over, holding up well at bottom of site |
| 9. Mallee 435mm Biodegradable Tube guard with 11x38x750mm hardwood stake <i>(no weed matting)</i> | 16 | 4 | 80% | | 3 | 1 | | Guards often folding over, several guards damaged badly |
| 10. Mallee 435mm Biodegradable Tube guard with 11x38x750mm hardwood stake <i>(Jute weed matting)</i> | 15 | 5 | 75% | 1 | 3 | 1 | | Guards often folding over, several guards damaged badly, one guard driven over |
| 11. GreenGuard POP Triangular with 18x25x750mm Tanapost pine stake <i>(no weed matting)</i> | 18 | 2 | 90% | | | 2 | | Some guards folding over, most guards ok |
| 12. GreenGuard POP Triangular with 18x25x750mm Tanapost pine stake <i>(Jute weed matting)</i> | 18 | 2 | 90% | | | 2 | | Some guards folding over, most guards ok |
| 13. Gropod 442mm Biodegradable with custom flat 700mm bamboo cane | 19 | 1 | 95% | | | 1 | | Guards in excellent condition, one guard has bottom chewed out by predator |
| 14. Gropod 225mm Biodegradable with custom flat 400mm bamboo cane | 9 | 1 | 90% | | | 1 | | Guards in excellent condition, one guard has top chewed off by predator |

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