Practical Suggestions for Revegetation in a Warming and Drying Climate

Climate change has reached the level where practices based on past experience may be no longer valid. This article:

- Summarises the major Peninsula climate drivers
- Provides the latest forecasts for what may be very hot and dry summer of 2026/27
- Outlines approaches for minimising new plant losses, especially for next summer.

This article is rather long and contains a lot of information. But following the guidelines does improve plan survivability. Please take the time to assimilate it.

Peninsula Climate Drivers

Before proceeding, check out the iconic Climate Dogs discussion of the major climate drivers for Victoria. Of particular relevance to this discussion are Indie, Sam, and Enso.

Global warming is bringing dryer conditions across the Peninsula, together with warmer days and nights, and increasingly frequent and severe heat waves (State of the Climate 2024).

This gradual change is modulated by the periodic phases of local climate drivers, such as the El Nino Southern Oscillation (ENSO), the Indian Ocean Dipole (IOD, Indie), and the Southern Annular Mode (SAM):

- ENSO is the well, known changes in Pacific Ocean temperature. El Nino has warmer waters in the east, cooler in the west, and typically drier conditions over southeastern Australia. Our worst droughts have occurred in this phase. La Nina is the reverse, and is associated with wetter, cooler conditions.
- A positive mode of the IOD has warm SSTs in the North Indian Ocean and cool anomalies south of Indonesia. This is associated with dry anomalies over much of Australia. The negative phase is the reverse.
- SAM is driven by changes in the Southern Ocean, and associated meridional movements of the subtropical ridge. In a positive mode, the subtropical ridge lies south of Australia, inhibiting the penetration of fronts and rain-bearing systems, and resulting in dry conditions. In the negative mode, the subtropical ridge lies to our north and leads to wet anomalies.

Wild Card: global warming also has resulted in our nearby oceans being substantially warmer than a few decades ago. This means more available atmospheric moisture, which may counter some of the above climate dry periods and enhance the wet periods (see the July 2022 MPLN Newsletter).

Forecasts for Summer 2026

The forecast outlook for each climate driver is (BoM June 2026):

- El Nino is here and is expected to lie between strong and extreme over summer, with associated hot and dry conditions, severe heatwaves and increased fire hazard
- The SAM has recently moved from positive to neutral and is thus trending away from dry conditions. This may be a contributor to the welcome recently improved rainfall
- The IOD is currently neutral, but trending towards positive (dry conditions).

Taken alone, these point towards a severe summer. But, as discussed above, climate change is reshuffling the seasonal climate deck, meaning that statistical techniques and associations based on past data may no longer be good indicators of the future.

Models have the advantage that they include all of the above drivers in a way that is valid now, and they can provide an objective assessment of the likely forecast spread. BoM outlook forecasts combine both relationships and models and aim for the best of both worlds. Their extended-range forecasts are released near the beginning of each month and can be found here, or by watching the June 21 Landline.

Reducing the Risk in 2026

In summary, the current forecasts indicate that we should be planning for dry, to very dry summer conditions, warmer days and nights, heat waves, and increased fire risk. All of which add up to increased stress on our new plants.

The following is based on experience, backed up by references as indicated. Provided here as advice and information only.

Soils and Solar Exposure:

Recent experience has been for reduced seedling survival on sandy soils during drought and heat waves, especially when on or near a ridge line and exposed to the afternoon sun. Clay-based soils have fared better. Flood plains or near-riparian areas have done best.

For this season, we have adopted the precautionary approach of postponing planting on sandy soils for 2026. The exceptions are where irrigation is available, or we are filling in under previous plantings (which can protect new plants). We also have postponed some plantings on exposed north and westward facing slopes.

Plant Early:

The earlier the planting, the better the opportunity for a good root structure to develop. Barker (2024) conducted a trial planting of the same eucalyptus species in winter and in spring 2020. Their comparison of survival and growth rates in October 2022, were (note that all were planted in corflute guards with a surrounding protective fence):

- All of the winter plantings survived.
- One third of the spring plantings had died - one plant had died back to the corm, then resprouted when the rains returned.
- **At the end of the trial, the average height and weight of the autumn plantings was twice that of those in spring (note that all plants were germinated at the same time).**
- The differences were assessed to be highly significant using the Fisher Exact Test (a test of whether the difference could have occurred randomly).

Use Artificial Aids:

Artificial aids include watering during extreme periods, using water crystals, applying suitable fertilisers, and including soil wetting agents. Of these, irrigation can be very effective, but is time consuming and may be expensive.

Trials of water crystals and fertilisers by Baker (2024) found the following:

"*Early root growth was shown to be best where water crystals were used, with survival rates also being enhanced by the use of water crystals. Root growth with native fertiliser was somewhat better than for the control group, but not to a significant degree."*

Wetting agents: Dry soil can become quite hydrophobic, especially calcareous and related sandy soils. Added to this is the way soil fungi prevent desiccation during dry periods by wrapping up in fatty, hydrophobic substances. The result is that summer rains tend to pool and run off rather than soaking in to benefit the plant.

This can be alleviated by use of a suitable wetting agent, which encourages deep water penetration. Note that the wetting agents should be applied both at planting and again in summer.

Clay soils are less prone to the hydrophobia, and some develop cracks where rainwater can penetrate deeply. Even here, use of wetting agents can be positive.

Our Approach to 2026 Planting:

The first precautionary approach has been to postpone planting in some areas for now. Following is a summary of practices adopted by us this year, it uses all known evidence, but is of necessity somewhat subjective.

Choice of Plant Guards:

Suitably selected guards provide essential protection against browsing by rabbits and swamp wallabies. But they do raise a lot of issues, some real, some not. Here we examine these by type of guard.

- There is widespread concern over environmental degradation from using plastic. The relative environmental impact of plastic and cardboard guards has been examined in the April 2023 MPLN Newsletter. In essence, recycled plastic guards used multiple times are less damaging than cardboard. They do, however, spread microplastics into the environment if left in place for lengthy periods.
- Semi-opaque corflute and plastic guards:
    - On the positive side, these are robust, protect against animals, high winds, reduce the sun intensity and particularly UV radiation, and maintain a moist local micro-environment on hot, dry days
    - May lead to fungal diseases in wet conditions – we have had this happen, but only in conditions of saturated soils.
    - Greenhouse heating is oft quoted as a serious deficiency, but I have not seen any objective observations of this for ventilated corflute and opaque plastic guards. The typical AI response to this question refers to an excellent study by Close et al (2007), but their study only applied to clear, soft plastic guards (see next item).
- Clear, soft plastic guards are not recommended. They collapse easily, blow away in high winds, and focus sunlight onto the plant. Close et al (see above), found elevated temperatures and leaf stress in such guards.

- Cardboard guards have similar positives to plastic guards. But our testing found that current cardboard guards quickly go soft in wet conditions and collapse inwards onto the plants. New types of cardboard guard are starting to appear and are worthy of consideration, but we have stayed with plastic for 2026.
- Open mesh plastic guards are robust, reusable, and provide excellent ventilation in damp, wet conditions. On the negative side, they provide little protection from solar radiation and no UV protection. Wire netting or welded mesh guards have the same characteristics, but offer greater protection from large animals.
- Bracken: my experience has been that stands of bracken provide an excellent environment for new plantings (not grasses or small herbs). This widespread plant is worthy of consideration as a cheap alternative to guards.

Maintaining Sufficient Moisture

Good soil moisture not only provides moisture for the plant, it enables leaf evaporation to cool the immediate environment in hot conditions, and helps prevent leaf browning from intense solar radiation. Maintaining good moisture is particularly important for the period when new revegetation is gradually spreading its roots out and downward. Approaches to maintaining soil moisture include:

- Irrigation is excellent, but it is expensive to install, and thus beyond most budgets. We have one planting in 2026 where the landholder has installed drip irrigation to all plants.
- Using water crystals has been demonstrated to improve plant survival and growth markedly (see "Use Artificial Aids" above). However, care needs to be taken with its application – the crystals expand to many times their original size and placing too many at the bottom of the planting hole has been observed to push the seedling completely out, to lie unprotected on the ground. This year, we are trialling the following approach:
    - Us an augur to drill down well below the tube depth.
    - Scatter half a teaspoon of water crystals in the bottom, and over the soil used to refill the area around the plant.
    - If the soil is dry, filling the hole with water and leaving it to soak in would be beneficial.
    - Place the seedling into the hole so that its trunk base is just below the surrounding soil.
    - Push in the remaining soil/crystal mix, taking care to leave a small depression to collect future rainfall and runoff.
    - Be sure to leave no gaps around the plant – most growing roots will not cross an air gap.
- Use of a soil wetting agent:
    - See "Use of Artificial Aids" above for background.
    - We are scattering a soil wetting agent on the surface around each seedling at planting, and may repeat as deemed needed through the season.
- Use of fertilisers:
    - Given the lack of a significant benefit for hot weather survival found in the Barker (2024) trials, and local experience that seedlings becoming too bushy and thus subject to wind and thermal stress, we are not using fertilisers for 2026.
- Working with Grass and Weeds.
    - Spraying to kill all grasses and weeds has the advantage of reducing competition for both light and water. But there is a major disadvantage in that the bare ground heats up and dries rapidly. Opportunistic weeds also soon germinate and cause problems.

    - We have found that slashing general pasture grasses, such as sweet vernal, rye, etc, protects the soil and does little damage to seedlings - this is being continued in 2026.
    - Exotics such as trefoil and fog grass smother the seedlings. Kikuyu dries out the ground, grows over plants, and the underground shoots complete with the growing roots. They are being removed before planting and weed mats are being used to suppress regeneration.
    - Mulch and cardboard weed mats can both be quite effective in reducing weed and grass competition and in retaining soil moisture. We are using mats in selected locations in 2026. One potential negative is that a subjective test of cardboard guards found that dry mats tended to be hydrophobic and reduce water availability in periods of occasional rainfall. This needs proper objective analysis before being seen as a concern.
- Damaged Roots: That tightly bound roots need to be gently roughed up to encourage them to spread outward is well known. Less well understood is that bent or curled up roots at the bottom of the tube may limit downward penetration and severely impact the plant later in life, particularly for plants with a tap root. Cutting such roots cleanly off promotes improved downward growth

Longer term best practice:

- Planting an overstory first is an excellent way of protecting new seedlings from heat and wind. Starting with rapidly growing tall bushes and small trees, can be effective. But this nirvana is rarely a realistic option.

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June 2026

Comments, suggestions, and improvements will be gratefully received.