

INTRODUCTION

Successful tree establishment is the foundation of any forestry activity. “Best practice forestry establishment” is not a single prescribed method, but rather the application of appropriate establishment techniques based on site conditions, seasonal conditions, species selection and landholder objectives.

This document provides an overview of the key principles that underpin successful plantation establishment techniques, along with examples of how approaches may vary in application.

This information is introductory in nature and is intended to support informed decision-making by landholders. Site specific conditions along with experienced expert advice from a forestry consultant should always be considered when selecting establishment techniques.

Undertaking forestry activities needs to be conducted in accordance with the Forest Practices Code. Information on the Forest Practices Code is available from the Forest Practices Authority and advice should be sought from a [forestry consultant](#).

What is best practice forestry establishment?

Best practice forestry establishment aims to maximise the survival of planted seedlings and provide ideal conditions to enable rapid growth. It includes:

- planning ahead to optimise timing of activities.
- matching tree species and genetics to the site.
- undertaking cultivation techniques suited to soil, climate and topography.
- aligning planting design and density with future management objectives (e.g. pulpwood, sawlog, shelter).
- implementing timely and effective control of weeds, pests and diseases.
- monitoring outcomes and adapting management as required.

There is no single method that applies across all sites. Practices that are effective on one site may not produce the same results elsewhere.

Principles of good establishment

1. **Planning**

Forestry establishment requires the coordination of several activities including site selection, selecting and ordering seedlings, weed and browsing control, cultivation and fertilisation considerations. Successful planning and implementation outcomes of each of these activities are dependent upon proper sequencing and timing. For example, deep ripping of dry soils will assist in breaking up hard pans vs smearing when conducted in wet soils. Allowing time for ordering, availability of resources (equipment, labour) and weather conditions are all important considerations.

2. ***Match species to site***

Selection of tree species and genetics is critical and must account for rainfall, soil type, frost risk, drainage, fertility, and overall planting objective.

3. ***Prepare the site appropriately***

Location specific site preparation should enable early root development with good soil contact with the seedling's roots, improve access to moisture and nutrients, reduce competition from weeds and promote optimal growth. The limiting factor of a site may or may not be modified by an establishment technique. For example, in a high-altitude site, cold conditions cannot be modified and there may be a limit to growth rates, however species choice will be important in this situation (e.g. cold tolerate species).

Good soil contact is achieved with appropriate cultivation to produce a fine tilth. Factors to consider with soil cultivation include soil type, rockiness and vegetation cover including root material.

Improved access to water and nutrients can be achieved with cultivation techniques such as ripping to improve subsurface conditions (drainage/root access/water retention), mounding (large mounds to improve drainage/no mounds to reduce drought stress), and fertiliser applied at or post planting based upon soil fertility.

4. ***Manage competition***

Competition from weeds, particularly grasses, can reduce early growth significantly as weeds can outcompete seedlings for moisture, nutrients and light. Control of competing weeds for up to two years after planting is essential for both good tree survival and growth

Weed competition can be reduced with:

- pre-cultivation control (assists breakdown of soil during cultivation);
- pre-planting control with non-selective herbicides (removes new germinating growth following cultivation); and
- post-plant weed control (with the use of selective herbicides dependent upon species).

Browsing animals such as wallabies, possums, deer, rabbits and livestock can reduce growth rates, deform stems, or cause complete seedling loss. Effective management may include:

- exclusion through fencing, tree guards and seedling stockings; and
- population control by reducing numbers.

The level of intervention required will vary depending on site conditions (including the surrounding landscape) and local animal populations. Early, ongoing and proactive management is critical to achieving high survival rates and uniform growth.

5. ***Align planting design with objectives***

Planting density (known as stocking rate) and layout should reflect intended management objectives. Considerations may include wood production, mid-rotation management (e.g., post-planting weed control, pruning, thinning), other on-farm benefits (shelter, biodiversity, carbon) and interaction with other farm enterprises (infrastructure, access, cropping and livestock).

6. ***Protect and monitor seedlings***

Young trees require ongoing monitoring so management decisions can respond to the observed tree/seedling performance as well as changing site conditions. Monitoring should focus on competition from weeds, damage from browsing animals, nutrient deficiencies and any disease symptoms. Successful establishment often depends on maintaining effective weed control and minimising browsing pressure. Management options may include fencing, population control measures where appropriate, and the use of protective seedling socks or guards, particularly in areas where browsing pressure is expected to be high.

What good establishment looks like

Well-established forestry typically demonstrates high and uniform survival, even growth, minimal weed competition, stable root systems and growth rates consistent with site capability.

Application across different sites

The following examples illustrate how approaches may be adapted across common Tasmanian settings.

General Forestry sites (Moderate Rainfall and Fertility)

Links to additional information:

Case Study no. 15 – Chester: Utilising non-commercial rough sandy banks with trees for live-stock shelter

Case Study no. 17 – Logan: Higher lambing survival rates from paddocks protected by trees

Key considerations:

- soil type and soil impediments (compaction, erosion risk, hard pans).
- current vegetation (pasture vigour and type).
- expected browsing pressure.

Moderate rainfall areas typically support a wide range of plantation species.

Ripping and mounding (cultivated planting lines) are generally effective where soils and terrain permit.

Weed control remains a key factor influencing early growth and should be maintained up to two years post planting.

Planting densities are typically aligned to intended management approach (e.g. lower densities for shelterbelt only plantings vs higher densities for timber production with mid rotation management such as thinning).

Exclusion of browsing animals or reduction in browsing animal population levels will be critical for success.

High Productivity Sites (High Rainfall and High Fertility)

Link to additional information:

Case Study no. 9 – Gunningham Farms: Planting trees to increase shelter, biodiversity and aesthetics

Key considerations:

- weed control.
- soil type and drainage (water logging).

Higher rainfall, deeper soils and favourable growing conditions support faster establishment and higher growth rates.

More intensive management practices may be justified, including:

- higher initial stocking rates to maximise wood production.
- planned thinning and pruning regimes to maximise value.
- alternative high value species.

Ripping and mounding (cultivated planting lines) where soils and terrain permit may improve drainage and maximise early growth.

Higher fertility and rainfall will also increase weed growth, therefore good pre-plant weed control can reduce the need for post-plant weed control.

Exclusion of browsing animals or reduction in browsing animal population levels will be required on most sites.

Low Productivity (Low Rainfall and Marginal Sites)

Link to additional information:

Case Study no. 16 – Winton Estate: Mitigating strong winds impact to provide shelter for crops & livestock

Key considerations:

- weed control.
- soil type and drought.
- expected browsing pressure.

Shallow soils, poor fertility, exposure or variable moisture availability can limit growth. Establishment techniques that can improve any of these factors will be beneficial.

Establishment should focus on:

- selecting species suited to site constraints particularly moisture availability;
- balancing economic inputs into establishment vs potential wood harvest returns;
- evaluating the value of the trees for their multiple benefits to a farming system rather than just an economic wood return; and
- timing planting to maximise moisture availability for new seedlings.

Cultivation techniques can enhance moisture retention on site. Small or no mounds result in less aerated and elevated soil that seedlings are planted into. Deep ripping can aid rainfall penetration and retention on site. Ripping and smudging can also be used with soils that are free draining allowing the plants to access fine tilth and moisture.

When a planting season is experiencing below average rainfall, consideration should be given to operations which can aid in available water including water cartage and water crystals. Both these practices can be costly when trying to mitigate the risk of low rainfall, so planning is crucial.

Reducing early competition is critical on dry sites to realise growth in planted seedlings and should be maintained for at least two years post planting.

On lower fertility sites, fertilising at or after planting may be critical for early growth and should be considered alongside soil testing to identify potential nutrient deficiencies.

When selecting seedlings for the planting, ensuring the plants are hardened to similar conditions of your site is important. Within Tasmania, landholders have two options when selecting seedling type; open rooted seedlings which are grown in an open field prior, and containerised stock which is grown in forestry tube cells outside.

Planting density may be reduced to reflect expected lower growth rates and management intent.

Uniformity may be harder to achieve, and monitoring is important to identify underperforming areas early.

Supporting Tools and Information

PFT resources include:

- [Forestry guides](#) (operational guidance).
- [Farm & Forest Mapper](#) (Woodlot Tool).
- [Expert forestry consultants](#).
- Economic Analysis Tool (coming soon to Farm & Forest Mapper).
- [Tree Species List](#).

These tools support site-specific planting decisions.

SUMMARY

Best practice planting is achieved through understanding the site, selecting appropriate species, and applying establishment techniques suited to conditions and objectives.

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