FIELD DAY NOTES

‘Invest in trees for your future’

Friday 29th March 2019
Chris Franks and Graham Freeman properties
Milabena, North West Tasmania

Your MC for the day is Ian Chalk, Convenor of the North West Tree Growers Group.

Private Forests Staff are available to assist with any question or issues you may have and include:

- Penny Wells, Chief Executive Officer
- Martin Moroni, Manager Business Development
- Phillip Bishop, Operations Manager
- David Bower, Private Forest Advisor
- Tracey King, Administration Officer
ABOUT Private Forests Tasmania (PFT)

Private Forests Tasmania was established in 1994 as a statutory authority under the Private Forests Act (1994). PFT has a Board consisting of Directors who are appointed for their practical knowledge, industry, commercial and technical expertise in forestry and reports to the Minister for Energy and Resources.

PFT is the only government-funded authority established in Australia to specifically promote, foster and assist the private forestry sector on forestry matters. We provide strategic and policy advice to Government on private forestry issues and represent Tasmanian private forest owners’ interests nationally.

PFT works to facilitate and expand the development of the private forest resource in Tasmania in a manner which is consistent with sound forest and land management practices. This includes advising and assisting private landowners in the management of native forests and the establishment and management of plantations on private land. We work closely with private landowners and major stakeholders to develop and deliver a wide range of services to ensure sustainable forest use.

Burnie: The Harris Building, State Growth Offices, Level 2, 49 Cattley Street, Burnie 7320
Ph: (03) 6477 7389

Launceston: State Government Offices, 171 Westbury Road, Prospect 7250
Ph: (03) 6777 2720

Hobart: 30 Patrick Street, Hobart 7000
Ph: (03) 6165 4073
Email: admin@pft.tas.gov.au
Web: www.pft.tas.gov.au

ABOUT North West Tree Growers Group

For some time, Members of the North West Private Tree Growers Group have been concerned that the current harvesting of private wood on the N.W. Coast is unsustainable.

With current prices for both hardwood and softwood resource, market signals should encourage significant planting on private land. That however, is not the case, leading to today’s field day, highlighting what is actually happening in the market place, and on the ground, for private wood.

Another major concern is the lack of planting of speciality timbers.

With the right trees and management, such plantings provide long term financial rewards and are best suited to farm wood lots. They provide farm shelter, aesthetics and environmental values during the longer rotation.

Today’s field day, hosted by Chris Franks and Graham Freeman, may enlighten folk on the potential rewards that we see evolving in the market place for growing plantation softwood and special species timber.

Like modern architects, we see an enormous future for wood, the most sustainable and renewable resource available.

The North West area is blessed with both soil and rainfall that makes it the envy of tree growers both nationally and internationally. We have just so many areas both on farm and on private land that are very suited to tree growing that is currently lying idle or unproductive.

Our hope is that today we can show you the financial benefits of tree growing for both the land owner and the wider community.

Our thanks to Private Forests Tasmania and our hosts Chris and Graham for making the day possible.

Ian Chalk
Convenor - NW Private Tree Growers (0419 337 355)

The best time to have planted some trees is 20 years ago - The second best time is today.
STOP 1  Recently harvested *Pinus radiata*

9:30am  Registration / Tea & Coffee
Please register your attendance with Tracey at the registration desk, collect your name tag, hard hat and hi visibility vest. Help yourself to a warm drink.

10:00am  Welcome and Introduction by MC – Ian Chalk (NWTG)

10:05am  Speaker 1 - Penny Wells

10:15am  Speaker 2 - Chris Franks
Recently harvested & replanted 11ha *Pinus radiata*

10:25am  Speaker 3 – Kent Lyon, Tas Land & Forest
Harvesting of 11ha *Pinus radiata* – harvesting figures

STOP 2  *Cupressus Macrocarpa*

10:40am  Speaker 4 – Chris Franks
*Cupressus macrocarpa* - history of the block

10:45 am  Speaker 5 – Martin Moroni, PFT
Alternative tree species for Tasmania

STOP 3  *24 year old Pinus radiata*

11:20am  Speaker 6 - Chris Franks
History of block – possible harvesting operation in progress

11:35am  Speaker 7 – David Bower, PFT
‘Trees to thrive ... do the five’

12:00pm  TRAVEL TO FREEMAN PROPERTY (5 minutes drive)
104 Kimberleys Hill Road, Milabena

STOP 4  *Sequoia sempervirens*

12:10pm  LUNCH

12:30pm  Speaker 8 - Graham Freeman
*Sequoia sempervirens* – history and agroforestry

12:50pm  Speaker 9 – Martin Moroni, PFT
Agroforestry – Shelterbelts increase agricultural productivity and farm income

1:30pm  CLOSE – MC

Please return your hard hats and safety vests to Tracey
From stop 1 on unnamed Road, head west back to Myalla Road.
• Turn left onto Myalla Road.
• Travel approximately 2km and turn left onto Lapoinya Road.
• Travel approximately 1.3km and turn right onto Kimberlys Hill Road.
• Follow the signage to Freeman property.

Any problems locating the field day, please phone Tracey on 0436 631 846.
OVERVIEW

When I purchased this block at Milabena in 1994, it was a 131ha, degraded grazing property with poor fencing and a very large wallaby population. Approximately 45ha of native bush and several plantations of Radiata pine and *Eucalypt Nitens*, all of which have long since been harvested.

The aim of the venture at the time was to convert all of the degraded farmland into commercially viable plantation forestry. Initially, along with the plantations that were already established, approximately 27ha of Radiata and approximately 28ha of *Eucalypt Nitens* were planted in 1995 without any encumbrances.

STOP 1 – Recently harvested *Pinus radiata* plantation

**Speakers:** Chris Franks, landowner
Kent Lyon, Tas Land & Forest

In November 2018, 11ha of intensively managed Radiata pine (planted in 1995) was harvested and re-established straight away without any prep work at all.

The plantation produced a stumpage of $404,000, i.e. $36,700 per hectare to the grower at 23 years of age. The total tonnage was 6,554 tonne or 596 tonne per hectare with a cart distance to the wharf of approximately 50km.

It turns out that the re-established pine planted through the harvesting slash has ‘taken’ quite well and at this stage the stocking is approximately 980 seedlings per hectare which if maintained will provide ample trees for final selection down the track, wallabies permitting.

STOP 2 – *Cupressus Macrocarpa* Plantation

**Speakers:** Chris Franks, landowner
Martin Moroni, Private Forests Tasmania

In 2001 the first of two *Cupressus Macrocarpa* plantations were established replacing 6ha of *Eucalypt nitens* that were harvested.

The Macrocarpa seedlings were raised from seed collected myself. The seedlings were planted between stumps after a broadcast burn and residual weed control on old stump rows. Every 5th row was planted with *Eucalypt Nitens* as a nurse row. Urea fertilizer was applied to individual trees at age
6; unfortunately, to a certain extent, this back fired as it encouraged possums to strip bark to feed on the extra sap flow in certain areas within the plantation.

Selected trees have been variable pruned with most final crop trees being lifted (pruned) at least 4 times, many 6 times. Thinning has been to waste and has been ongoing as time permits.

![Four year old macrocarpa stripped by possum browsing](image1)

![Pruned branches tied over trunk to assist with browsing control](image2)

Notes

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Alternative tree species for Tasmania

Currently within Tasmania the choice of commercial plantation species is limited to 4 main species: *Eucalyptus nitens*, *Eucalyptus globulus*, *Pinus radiata* and *Acacia melanoxylon*, plus several minor, and largely untested, species: *Cypress species*, *Sequoia species*, *Pseudotsuga menziesii* and *Pinus species*.

What is the need for alternative species?
- Better match to site.
- Species matched to different silvicultural systems e.g. Macrocarpa underplanted beneath eucalyptus.
- Expand the potential forest estate into areas not conducive to current species.
- Supplement native speciality species that are becoming more difficult to acquire.
- Replace imports.
- High value / small volume of cabinet species.
- Naturally durable timbers that can replace treated timbers in certain situations, especially where there is increased concern regarding chemicals.
- Naturally durable products that have ready market acceptance including: poles, posts, decks, boards etc.
- Improved market & product diversity (local, national & international).
- Increased value & returns.
- Manage risk within a plantation estate (FWPA report).

Background

The limited choice of tree species available for plantations has been identified within Tasmania (PFT, landowners & companies), nationally (CSIRO) and regionally (NZDFI, NZFFA) - Extract from Private Forests Tasmania’s *Farm Forestry Series – Eucalypts, Info Sheet No. 1 - Overview* (2004) - 8 eucalypts & hybrid are mentioned as possible with the disclaimer: *NB Many of these alternative species have been planted in Tasmania on a trial basis by Private Forests Tasmania, landowners and other organisations* - but 15 years later do we have any other species?

Landowners have requested that more species are trialled for areas that are currently considered to be too dry to establish, especially with regard to the production of naturally durable timbers, for example:

<table>
<thead>
<tr>
<th>Species</th>
<th>In-ground Durability</th>
<th>Frost &amp; drought tolerant</th>
<th>Comments</th>
<th>Potential Timber uses</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Allocasuarina cristata</em> / <em>leuhammeri</em></td>
<td>1</td>
<td>Yes</td>
<td>Very good firewood &amp; possible fodder</td>
<td>Cabinet timber, fencing, decking, flooring</td>
</tr>
<tr>
<td><em>Callitris endlicheri</em> / <em>glaucophylaa</em></td>
<td>2</td>
<td>Yes</td>
<td>Very strong durable native Cypress</td>
<td>Cabinet timber, fencing, decking, flooring</td>
</tr>
<tr>
<td><em>Chamaecyparis nootkatensis</em></td>
<td>1</td>
<td>Yes</td>
<td>Slow starter **</td>
<td>Cabinet timber, fencing, decking, cladding, flooring</td>
</tr>
<tr>
<td><em>E. argophloia</em></td>
<td>1</td>
<td>Moderate</td>
<td>Good results from NZ (Attachment 4)</td>
<td>Cabinet timber, fencing, decking, cladding, flooring</td>
</tr>
<tr>
<td><em>E. cladocalyx</em></td>
<td>1</td>
<td>Moderate</td>
<td>Major sp. in South Australia (Attachment 5)</td>
<td>Cabinet timber, fencing, decking, cladding, flooring</td>
</tr>
</tbody>
</table>
### Durability Class Table

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>E. sideroxylon</td>
<td>1</td>
<td>Very strong durable</td>
<td>Ironbark</td>
<td>Cabinet timber, fencing, decking, cladding, flooring</td>
</tr>
<tr>
<td>Robinia pseudoacacia</td>
<td>1</td>
<td>Highly prized in Europe esp. Hungary (personal experience 1994 &amp; Attachment 6)**</td>
<td>Cabinet timber, fencing, decking, flooring, musical instruments</td>
<td></td>
</tr>
</tbody>
</table>

Extract from Report on Durable Species with Potential for Farm Forestry, Smith, R.S., 2015 (Unpublished PFT internal report for landowner).

Companies have been exploring and have shown interest in alternative plantation species for establishment in Tasmania, including innovative silvicultural options such as underplanting eucalypt plantations with Cupressus macrocarpa.

Recent discussions with Sarah Whitfield (2015) at the [CSIRO’s Australian Tree Seed Centre](https://www.atsc.org.au) (ATSC) indicated that CSIRO are extremely interested in expanding the choice of plantation species for Australia.

New Zealand has identified the need for alternative species to extend their plantation estate in their dryland areas:

“The [New Zealand Dryland Forests Initiative](http://www.nzdfi.org.nz) (NZDFI) is a commercially-oriented research and development project. It aims to develop genetically improved planting stock and management systems for ground-durable eucalypt species suited to New Zealand’s dryland regions……. Five species have been selected as the focus for tree improvement work:

- E. argophloia - Western white gum
- E. bosistoana - Coast grey box
- E. globoidea - White stringybark
- E. tricarpa - Red ironbark
- E. quadrangulata - White-topped box gum

A number of secondary contenders may be considered in future. These include E. camaldulensis and E. cladocalyx. [www.nzdfi.org.nz](http://www.nzdfi.org.nz)

The following species have been the focus of Proseed (see [http://www.proseed.co.nz/](http://www.proseed.co.nz/)), the principal tree seed supplier to the NZ forest industry, their focus is on producing improved seed for forestry use:

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<tr>
<td>E. bosistoana</td>
<td>1</td>
<td>Fairly</td>
<td>Proseed sp.</td>
<td>Fencing, decking, cladding, flooring</td>
</tr>
<tr>
<td>E. quadrangulata</td>
<td>1</td>
<td>Warmer, moist areas</td>
<td>Proseed sp.</td>
<td>Fencing, decking, cladding, flooring</td>
</tr>
<tr>
<td>E. macrorhynca</td>
<td>3</td>
<td>Yes</td>
<td>Proseed sp.</td>
<td>Fencing, decking, cladding, flooring</td>
</tr>
<tr>
<td>Acacia falciformis</td>
<td>Durable</td>
<td>Yes</td>
<td>Proseed sp.</td>
<td>Fencing</td>
</tr>
<tr>
<td>Cupressus sempervirens</td>
<td>Durable</td>
<td>Yes</td>
<td>Proseed sp. **</td>
<td>Cabinet timber, fencing, decking, cladding, flooring</td>
</tr>
<tr>
<td>Cupressus torulosa</td>
<td>Durable</td>
<td>Yes</td>
<td>Proseed sp. **</td>
<td>Cabinet timber, fencing, decking, cladding, flooring</td>
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How does Tasmania’s suite of 4-5 commercial plantation species compare to the New Zealand situation?

<table>
<thead>
<tr>
<th>Source</th>
<th>Number of species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species choice for the high country of the South Island of New Zealand</td>
<td>5</td>
</tr>
<tr>
<td>Species choice for afforestation of difficult sites New Zealand</td>
<td>11</td>
</tr>
</tbody>
</table>

The New Zealand Farm Forestry Association promotes more than a dozen alternative species for plantation use and their subsidiary, the Farm Forestry Timbers Society Inc. are actively promoting and distributing locally grown alternative plantation specialty timbers in New Zealand:
Origins & Provenance

Previous projects to identify alternative tree species for Tasmania e.g., work by David De Little, Brad Potts, Mark Hunt et al has, in part, focused on fast-grown, commodity plantation species and/or large commercial forestry plantations. It is proposed that a new focus should not only identify species, but identification of specific provenances and potential high value timbers.

Local and overseas experience (NZ, Europe etc.) has shown that the correct provenance is critical in successful species selection e.g. Douglas fir, Lodgepole pine, oak species, Blackwood, eucalypts, etc. This may address some of the deficiencies, and species failures, of previously trialled alternative species.

Origin/provenance in species choice it is essential to consider the origin and provenance of the plants which may best suit the site. Tree species which occur over wide geographic areas develop
sub-populations with slightly different characteristics which may, for example, be related to altitude and day length. These populations are usually not physically distinguishable from one another but each one is just a little better suited to its own particular environment. Seed from these populations or ecotypes is usually better adapted to grow in a similar environment to that in which its ancestors grew. In order to realize a tree's maximum potential growth it is clearly wise to use plants on a site to which they are best suited.

There are a few basic factors governing the choice of seed origin (Lines, 1987, provides a detailed discussion):

1. broad climatic matching is generally required between the origin and the site on which it is to be planted, but the principle should not be too strongly emphasized;
2. day-length at the place of origin usually exerts a strong influence on flushing and growth cessation, but there may be some compensating effect of elevation on this effect; and
3. edaphic factors may have some influence.

Extract from Practical Forestry for the Agent and Surveyor, Cyril E. Hart. 1993 Alan Sutton publication.

Definitions of Origin and Provenance

The origin of FRM (Forest Reproductive Material) describes that part of the natural range of the species from which the material originally derived. The term provenance is used to describe the location of the source from which the reproductive material was collected.

(Retrieved 21/12/17 https://www.forestry.gov.uk/forestry/infd-66sg9r)

Therefore the importance of selecting and/or trialling the correct seed origin and provenance is as important as the correct species choice. It is highly likely that many species that have been previously trialled and failed were the wrong origin/provenance and were wrongly discarded as not being a suitable species.

Potential tree species for Tasmania

Private Forests Tasmania is currently exploring opportunities for alternative species in Tasmania and is in the process of updating the Private Forests Information Series No.14 – Tree Species List.

From a combination of published sources, local knowledge and international experiences a new species list of >40 species with varying site requirements, attributes and timber properties has been compiled that may have the potential to grow and be used for timber production in Tasmania. There may be other species not listed that are also suitable for wood production.

How do we choose appropriate alternative species?

- Landowner objectives
- Resources
- Markets
- Site conditions
- MODELS?

Appropriateness and adaptability of NZ species choice models:

- Species choice for the high country of the South Island of New Zealand; and
- Species choice for afforestation of difficult sites New Zealand
a. **Species choice for the high country of the South Island of New Zealand**

This species selection system is built for people who have a specific area of land where they would like to establish trees. The aim is to recommend "best bet" species which have a good chance of success.

The following screenshots are from the Species choice for the high country of the South Island of New Zealand (see [http://www.forestry.ac.nz/euan/sppchc/sppchc.htm](http://www.forestry.ac.nz/euan/sppchc/sppchc.htm)).

![Species choice for the high country of the South Island of New Zealand](image1)

![Species choice for afforestation of difficult sites New Zealand](image2)

b. **Species choice for afforestation of difficult sites New Zealand**

Extract from: [http://www.forestry.ac.nz/research/afforestation.shtml](http://www.forestry.ac.nz/research/afforestation.shtml)

**Afforestation of difficult sites**

* A project supported by the Foundation for Research, Science and Technology and the Ministry of Agriculture and Forestry
* Principal Investigator: Mark Bloomberg
To meet its national and international carbon commitments, New Zealand needs to increase the land available for carbon sequestration forests (carbon forests), by creating new forests on lower value (“difficult”) land which would not normally be considered by plantation forest investors. The vision is to help landowners afforest at least 30% of this potential area by 2021, which will sequester ~ 21 million tonnes of CO2 (with a potential value of $500 million) per year, once fully established. The carbon forests planted on “difficult” land also have the potential to achieve sustainable land use objectives such as soil and water conservation.

However, because lower-value land is “difficult,” it will have moderate to serious limitations to tree growth and forest management. “Limitations” are site characteristics which result in slower tree growth and/or greater risk of catastrophic damage to stands, or which make forest management more difficult or more costly. Such limitations may mean that forests planted for carbon sequestration or sustainable land use objectives do not meet those objectives or, at worst, fail completely to deliver either biological or legal/economic objectives.

A decision support system is needed which allows forestry decision-makers to:
1. Identify site limitations to tree growth and to management on "difficult" land.
2. Evaluate the magnitude of those limitations.
3. Estimate the effects of limitations on management of planned forests.
4. Decide if the site limitations allow achievement of afforestation objectives.

Therefore this project will provide a decision-support system, which uses field assessment of potential afforestation sites as input information. The system will be designed to allow accurate field assessment by forest managers and other land management professionals, rather than by scientific or technical experts. This system will provide New Zealand forestry investors with the information they need to identify and evaluate limitations on intended sites for carbon forests.

The proposed research will contribute to MAF Plan of Action Goals:

- New Zealand forests are widely used in reducing the impacts of climate change.
- Forestry is fully integrated into land use decisions, to help deliver sustainable land management outcomes.

So, the NZ situation of expanding the forest estate on predominantly marginal, agricultural land is similar to Tasmania, albeit the objectives are different.

The following screenshots are from the Species choice for afforestation of difficult sites New Zealand (See: http://www.treesandstars.com/euan/sppchc/).
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#### Why? Wilddings

<table>
<thead>
<tr>
<th>Species</th>
<th>Overall score</th>
<th>Productivity</th>
<th>Cold limitation</th>
<th>Water limitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. nitens</td>
<td>41</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Radiata pine</td>
<td>40</td>
<td>Low</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>Ponderosa pine</td>
<td>21</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Corianca pine</td>
<td>19</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>F. laevisata</td>
<td>19</td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
</tr>
</tbody>
</table>

- Estimated potential productivity (assuming good nutrition) = **Low**
- Estimated nutritional status (from C:N ratio) = **High**
- Estimated response to P fertilisation = **High**
- Estimated mean annual temperature = 9.9 degrees C.
- Estimated erosion susceptibility = **unknown**

#### Estimated daily maximum and minimum temperatures by month

[Graph showing temperature variation over the year]

#### Estimated available soil water by month, with E. nitens LAI=3

[Graph showing soil water availability over the year]

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**Field Day Notes – ‘Invest in trees for your future’ - PFT & NWTG, Milabena – 29th March 2019**

- **Why? Wilddings**
  - **Species**
    - E. nitens: Overall score 41, Productivity Low, Cold limitation Medium, Water limitation Medium
    - Radiata pine: Overall score 40, Productivity Low, Cold limitation Medium, Water limitation Low
    - Ponderosa pine: Overall score 21, Productivity Low, Cold limitation Low, Water limitation Medium
    - Corianica pine: Overall score 19, Productivity Low, Cold limitation Low, Water limitation Low
    - F. laevisata: Overall score 19, Productivity Low, Cold limitation High, Water limitation Medium
  - Estimated potential productivity (assuming good nutrition) = **Low**
  - Estimated nutritional status (from C:N ratio) = **High**
  - Estimated response to P fertilisation = **High**
  - Estimated mean annual temperature = 9.9 degrees C.
  - Estimated erosion susceptibility = **unknown**

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- **Estimated daily maximum and minimum temperatures by month**

[Graph showing temperature variation over the year]

- **Estimated available soil water by month, with E. nitens LAI=3**

[Graph showing soil water availability over the year]
STOP 3 – *Pinus radiata* Plantation

**Speakers:**
- Chris Franks, landowner
- David Bower, Private Forests Tasmania

Another 10ha radiata pine plantation planted at the same time as stop 1 with exactly the same management strategy. This block has been pencilled in for harvest in April of this year making it 24 years of age at that time.

It’s a great opportunity to see a plantation right before harvest with a fair degree of certainty of the financial outcome. The plantation will showcase high lift to 6.4 m pruned logs, the effect of final stocking on log diameters and hence financial outcomes in the current export market place.

**Notes**

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1. Order stock and fence the block

   Protect your trees, control the game

   ...sheep and cattle just the same

   This is about planning ahead, allocating resources, assessing risks and risk management

   - Allocate resources (time and money) for tree establishment project in farm budget. Consider appointing a project manager (professional or anointed family member).

   - Plan ahead and **order seedlings 1 year ahead of time**. Select appropriate species for the site.

   - Calculate the area and number of seedlings required and tell the nursery when you expect to collect your seedlings. ...use a GPS if available.

   - **Fence the area to exclude livestock and other browsing animals.** Shooting or poisoning may also be necessary.

   ![Seedlings in greenhouse](image)

   Most nurseries grow to order. Your trees will take at least 6 - 8 months to germinate and grow to size.
Order seedlings 10 – 12 months ahead of planting.

**Even the best fences require maintenance**

![Wallaby Proof Fencing](image)

2. **Spray before you cultivate**

   *Then spray again, use simazine and glyphosate*

   **Four of the most important operations…weed control, weed control, weed control & cultivation**

   *Weed control 101 - Pre cultivation*

   Spray weeds in the spring before the year of planting or keep site grazed to prevent seed set in weeds.

   Ensure **weeds are sprayed at least 3 months prior to ploughing to allow root release.** This is essential on ex-pasture sites.

   *Weed control 201 – Pre plant*

   Before planting, **knock down any newly germinated weed seedlings and apply residual herbicide** in order to prevent weed seeds germinating in the season after planting.
Rip, or rip and mound the site if possible, whilst soil is dry (Summer or Autumn).

Allow soil to ‘settle’ prior to planting. Note, some sites will be better spot cultivated or not cultivated if soil and water conservation measures dictate.

In order to protect soils and water, some areas require spot cultivation or no cultivation at all.

Smudging cloddy mounds and applying residual herbicide in one operation.

Smudging creates good tilth, makes planting easier and improves effectiveness of herbicides.
3. **In moist soil plant your trees**

   **Late in winter, to avoid the freeze**

   Plant seedlings in late winter or early spring when soil is moist.

4. **Monitor, control each weed**

   **....Two years’ freedom is what trees need**

   Management of the plantation in the period after planting often determines the success or failure of a project. Ongoing management of weeds and browsing damage is often neglected.
Weed control 301 - Post Plant

Control weeds around the seedlings for at least 2 years after planting, mulching or spot spraying with appropriate herbicide can be effective.

Some 40% growth loss in first year due to weed competition.

Leaving site preparation to the last minute.

- A problem arising 2 months after planting
5. Manage, and measure growth

Commit to this, just take the oath

- Fill in misses as soon as practical.
- Manage pests.
- Measure tree growth on a regular basis.
- Prune and thin to produce high value timber products.
- Seek advice.

Manage to avoid browsing damage

Measure and manage to produce high value products......crops, livestock or wood products
## Calendar of Events for Tree Establishment Projects in 2019

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</thead>
<tbody>
<tr>
<td>Weeds</td>
<td>Pre cultivation spray (Knock down only)</td>
<td>Pre cultivation spray (may commence in previous Spring) (Knock down only)</td>
<td>Post cultivation spray1, if required (Knock down)</td>
<td>Post cultivation spray2 (Include residual herbicide such as Simazine or Oxyfluorfen)</td>
<td>Monitor Post plant weed control if required</td>
<td></td>
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<tr>
<td>Cultivation</td>
<td>Disc, rip &amp; mound</td>
<td>Smudge if required</td>
<td></td>
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<tr>
<td>Browsing</td>
<td>Begin assessment</td>
<td>Begin Control Program</td>
<td>Control Program and Monitoring</td>
<td>Control Program and Monitoring</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>Planting</td>
<td>Order Seedlings</td>
<td>Plant when soil is moist</td>
<td>Apply fertiliser if required</td>
<td></td>
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Note: Ideally, operations such as seed collection, ordering of either seed or seedlings, and even initial weed control and cultivation, may be better undertaken prior to January in the year of establishment.
Trees to Thrive, Just do the Five

1. Order stock and fence the block
   Protect your trees, control the game
   …Sheep and cattle just the same

2. Spray before you cultivate
   …Then spray again; with simazine and glyphosate

3. In moist soil plant the trees
   …Late in winter to avoid the freeze

4. Monitor, and control each weed
   …Two years’ freedom is what they need

5. Manage, and measure growth
   …Commit to this, Just take the oath
Stop 4

Graham Freeman’s Property – 104 Kimberleys Hill Road, Milabena

Phone: 0400 194 871       Email: gmfreeo@gmail.com

Please note, a 4WD is recommended for travel to the actual field site (not lunch area). Please see Tracey if you need to carpool. Unfortunately, there is no disability access to the field site area for which we apologise.

OVERVIEW

The Freemans have succeeded in showing that trees and farming can be successfully integrated in a property’s whole farm plan. The benefits from trees compliment the farm’s ultimate production potential, as well as achieving maximum multiple land use from the environmental aesthetic and amenity benefits.

Graham came from the Montumana farming area and in 1979 he purchased a 64.8 hectare property here at 109 Kimberleys Hill Road, Milabena, 12km south of Montumana, and 19km south west of Wynyard.

In 1988 the Freeman family leased a dairy property nearby for 6 years and during this time they built their house on their property.

They continued to expand their own farm by purchasing adjoining properties. In 1996 they increased their farm to a sustainable unit of 182 hectares, concentrating on cattle grazing and relinquished the dairy lease property.

The property consists of a mosaic of large flat grazing paddocks on the main Kimberleys Hill Road ridgeline, separated by different levels of steep rocky short slopes.

Its elevation is 300m asl, rainfall, 1,500 mm/year, it snows 1-2 falls per year and has a prevailing south westerly wind. The soil is predominantly high fertility red/brown clay soil from tertiary basalt with several small outcrops of quartz sandy loamy soils.
MANAGEMENT OF THE PROPERTY

The primary production is cattle grazing, buying 6 month old Angus calves, feeding for 12 months to 400-450 kg. Currently they have 101 hectares of grazing pasture with a carrying capacity of 200 head. In 2005/06, with an approved Forest Practices Plan (FPP), 20 hectares of the native forest at the southern end of the property was cleared and harvested and sown into new pasture increasing the grazing area to a total of 121 hectares and boosting the carrying capacity to 300 head.

There are about 45 hectares of previously cut-over wet sclerophyll native forest left, comprising of Stingy bark (Eucalyptus obliqua) with scattered Blackwood (Acacia melanoxylon) which has been left for future selective harvest when the regrowth achieves merchantable size. This will allow the Freemans the medium term option to provide additional revenue for situations like a severe droughty year, replacement of farm machinery or a holiday away from the farm.

The Freemans aim to manage their property efficiently for environmental and economic benefits, with the full intention to achieve maximum land utilisation on their property. The property has quite a sizeable total area of steep rocky short slopes which separate the many grazing paddocks. Planting these slopes with commercial tree species will provide both environmental and economic benefits.

BENEFITS OF TREE PLANTING

Economic benefits include financial returns from:
1. Sale of wood products when plantation mature.
2. Increased grazing return of better conditioned and faster growing Angus cattle provided by the sheltering benefit from the cold winters south-westerly wind.
3. Shading for stock on hot summer days.
4. Increased grass growth/biomass through reduced soil moisture loss from reduction in prevailing winds by shelterbelts.

Environmental benefits:
1. Prevention of soil loss by erosion from the steep rock slopes.
2. Improving water quality around dams and streams.
3. Increasing amenity and aesthetic values of the local landscape.

PLANTATION ESTABLISHMENT AND MANAGEMENT

In 1982 Graham started planting out a couple of areas of short steep rocky slopes on the western section of the first property. Due to his interest in specialty timber species, he selected Coastal Redwood (Sequoia sempervirens) and Swamp or Stringy Gum (Eucalyptus regnans).

Later, during the period 1995 to 2004, he re-started his planting program to utilise the remaining available non-farming land, as well as reforesting areas where mature stands had been harvested.

The commercial specialty timber and amenity species planted included:
- Monterey Cypress (Cupressus macrocarpa);
- Mexican Cypress (Cupressus lusitaniae);
- Leyland Cypress (Cupressocyparis leylandii);
- Radiata pine (Pinus radiata);
- Blackwood (Acacia melanoxylon);
- Western Red Cedar (Thuja plicata);
- Douglas Fir (Pseudotsuga menziesii);
- Shining Gum (Eucalyptus nitens);
- Western Hemlock (Tsuga heterophylla);
- Stringybark (Eucalyptus meulleriana);
• Lodgepole Pine (*Pinus contorta*);
• Himalayan Cypress (*Cupressus torulosa*);
• Japanese Cedar (*Cryptomeria japonica*).

The total established plantation area is about 14 hectares. The extensive locations of these species established on the property are shown in the aerial photograph on page 30.

In 2001, during the latter part of the plantation establishment period, the Freemans obtained some grant funding from the Natural Heritage Trust, as part of the Integrated Farm Forestry Project which was administered by Private Forests Tasmania (PFT). The project involved the establishment and management of plantation and/or shelterbelts on cleared agricultural land for environmental and economic benefits. PFT assisted the Freemans prepare a stand development plan for their 2002-2004 new planting sites. The grant funds were put towards the costs of material for wallaby-proof fencing, seedlings and fertiliser at planting. Graham provided all the labour. One condition of the funding project was that the Freemans must commit to self-fund and establish at least one hectare of plantation in the first year of the plan. The plan outlines all the establishment, silvicultural regime and management requirements for the agreed sites and species.

With the valuable skills as a qualified chainsaw operator, and with his knowledge from the plantation management of the older stands, Graham was able to carry out all the works, diligently adhering to all environmental, safety and Forest Practices Code requirements. Site preparation generally involved chainsaw felling of scrub and scattered native trees, followed by excavator removal, dragging and heaping the slash down slope onto the lower paddocks, which were left to dry and then burned. The cleared slopes were sprayed with a glyphosate and brush killer mix and followed by a burn. Graham erected vermin proof fences around each planting site. Spade hand-planting was the only option.

Fertiliser at 150 grams per tree of di-ammonium phosphate (DAP) was applied 6-8 weeks following planting. A follow up second and third year spray was applied around seedlings where required. For stands established for maximum clearwood production, Graham adhered strictly to the stand development plan and carried out all silvicultural and thinning work as scheduled.

**CHOOSING SUITABLE SPECIES**

Since the first property purchase in 1979, Graham has had a vision to grow and harvest his own specialty timber. With only the knowledge from books and trees and timber, he took some considerable risks and decided in 1982 to plant his two stands of Coast Redwood and Swamp or Stringy Gum. Due to the available surplus seedling stocks at the then Forestry Commission Perth Nurseries, he was fortunate to obtain these seedlings at a cheap price. A large range of specialty timber species were planted in subsequent years with seed stocks from the Woodlea Nursery in Scottsdale.

One of the early establishment risks encountered was native animal browsing. Due to several unfortunate breaks along the erected perimeter fence of the 1995 planting of Leyland Cypress and Radiata Pine nurse crop, very high browsing losses resulted in many of the Leyland Cypress seedlings. With less Radiata seedling loss, Graham fortunately ended up with a very promising Radiata Pine stand which he has diligently pruned and thinned on schedule. Growing on high fertility red basalt soil, these pines achieved an average diameter of breast height (DBH) of 30cm in 2006 (at age 11). This stand will be harvested in another 13 or so years, yielding large high premium clearwood veneer logs, which were highly demanded by the then Gunns Veneer Processing Plant in Somerset. In 2007, a comparable 2007 high stumpage price of $120 per cubic metre was paid for 28 year old pruned logs (average DBH 60-65cm) from a small 1.3ha stand at the Elliot Agricultural Research Station.
ESTIMATED FINANCIAL RETURN – Coastal Redwood as at 2013

Estimated harvest product values, volumes and financial return for Coastal Redwood as at 2013.

This information is an edited version of the full report prepared by Private Forests Tasmania. Growth measurements were taken by Private Forests Tasmania staff in 2013 and analysed using the Farm Forestry Toolbox (a computer model program) to determine management regimes and options for the Coastal Redwood (Sequoia sempervirens) stand.

This stand of Coastal Redwood is 37 years of age as at 2019.

Table 1: 1982 Coastal Redwood Stand Summary (January 2013)

<table>
<thead>
<tr>
<th>2013 Data</th>
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</thead>
<tbody>
<tr>
<td>Age</td>
<td>30.5 years</td>
</tr>
<tr>
<td>Mean DBHob</td>
<td>49.0 cm</td>
</tr>
<tr>
<td>Stocking</td>
<td>375 stems/ha</td>
</tr>
<tr>
<td>Basal Area</td>
<td>71.2 m²/ha</td>
</tr>
<tr>
<td>Mean Dominant Height</td>
<td>18.7m</td>
</tr>
<tr>
<td>Mean Annual Increment</td>
<td>15.7 m³/ha</td>
</tr>
<tr>
<td>Total Volume</td>
<td>$479 m³/ha</td>
</tr>
<tr>
<td>Stand Value</td>
<td>$45,737/ha/ha</td>
</tr>
</tbody>
</table>

Financial Analysis and Returns

The operational costs (Notes, table 3) and the current log prices (Notes, table 4) were analysed by the Toolbox for a range of clearfell age classes with 5% discount rate. The returns for the various clearfell ages are summarised in Table 2.

Table 2: Revenue, Net Present Value and Internal Rate of Return (January 2013)

<table>
<thead>
<tr>
<th>Clearfall age</th>
<th>Revenue ($)/ha</th>
<th>NPV ($)/ha</th>
<th>IRR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>$50,021</td>
<td>$8,821</td>
<td>11.71%</td>
</tr>
<tr>
<td>35</td>
<td>$59,498</td>
<td>$8,342</td>
<td>10.54%</td>
</tr>
<tr>
<td>40</td>
<td>$68,715</td>
<td>$7,341</td>
<td>9.43%</td>
</tr>
<tr>
<td>45</td>
<td>$76,899</td>
<td>$6,158</td>
<td>8.51%</td>
</tr>
<tr>
<td>50</td>
<td>$84,200</td>
<td>$4,955</td>
<td>7.75%</td>
</tr>
</tbody>
</table>

Based on assumptions of 2013 market log prices, log grade and growth model volume projection, revenue increases with longer clearfell age. This is due to increased projected volumes and the higher ration of higher value pruned log and sawlog.
Potential Clearfell Age

Graph 1: Net Present Value of 1982 Coast Redwood (January 2013)

The NPV is graphed against Clearfell age in Graph 1. The ideal harvest age is where NPV peaks, which is just before age 30 (about $9,000/ha). This investment return is further supported by the high IRR return of 10.85% (see table 2).

Notes:

- Two growth monitoring plots were established in the stand of Coast Redwoods measured.
- The growth plot data, along with fixed assumption like log types (e.g. peelers, pruned sawlogs, export logs, pulp logs etc.), log prices and the operational costs (e.g. costs of land preparation, planting, seedlings, pruning and thinning, fertiliser, etc.) were analysed with the Toolbox to estimate the Net Present Value (NPV) and Internal Rate of Return (IRR%) for each of the clearfelling ages using a discount and compound rate of 5%. The exercise was repeated for a range of clearfelling ages for each stand. The financial outcomes are reported separately below.
- Using NPV and IRR in decision making – One important decision for a tree grower is to estimate the clearfell harvest age so as to maximise the returns on money invested. The Toolbox financial analysis estimates the NPV and IRR. In long term forestry investments, many foresters prefer to harvest trees at the clearfall age when the NPV is highest. This is based on fixed assumptions of current log prices, operational costs, log mix and estimated log volumes. The ideal harvest age is when the NPV peaks. Remember that any changes to one or more of the fixed assumptions will alter the NPV values accordingly.
- IRR is determined by finding the interest rate or discount rate that equates the present value of benefits with the present value of costs. The higher the indicated IRR on the investment, the more attractive the project as it maximises the return of monetary capital. **A note of caution:** It is advisable not to use IRR by itself as a deciding factor but rather to use it to supplement NPV results especially for long term investments like a rotation of trees. There are other factors in decision making including market access, potential price movements, cash flow preferences, tax etc.
- Disclaimer – The growth models used in the Toolbox are developed from industrial research data which is limited in its range of age, site quality, stocking and thinning effects. All models are imperfect and you are strongly advised to seek professional advice from Private Forests Tasmania before investing on the strength of results from this program.
Log Grades
Due to unavailable date in Australia, Cypress 2013 log prices and specification from New Zealand sales (see table 4) were used. Cypress and Redwood have similar wood properties and end-uses.

Table 4: Log Grade Set of Coastal Redwood in Milabena

<table>
<thead>
<tr>
<th>Name</th>
<th>Code</th>
<th>Length Min (m)</th>
<th>Length Max (m)</th>
<th>SED Dub Min (cm)</th>
<th>SED Dub Max (cm)</th>
<th>Value $/m³</th>
<th>Preferred Length Step (cm)</th>
<th>Overcut Length (cm)</th>
<th>Pruned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sawlog Peeler</td>
<td>A SP</td>
<td>2.7</td>
<td>6.0</td>
<td>30.0</td>
<td>999.0</td>
<td>120.00</td>
<td>30</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Knoty Sawlog</td>
<td>A</td>
<td>2.7</td>
<td>11.0</td>
<td>30.0</td>
<td>999.0</td>
<td>80.00</td>
<td>30</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Small sawlog</td>
<td>K</td>
<td>2.7</td>
<td>11.0</td>
<td>20.0</td>
<td>999.0</td>
<td>50.00</td>
<td>30</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Firewood</td>
<td>F</td>
<td>2.4</td>
<td>11.0</td>
<td>10.0</td>
<td>999.0</td>
<td>10.00</td>
<td>10</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Waste</td>
<td>X</td>
<td>0.0</td>
<td>999.0</td>
<td>0.0</td>
<td>999.0</td>
<td>0.00</td>
<td>□</td>
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Disclaimer: This information was prepared in June 2013 by Private Forests Tasmania. Every reasonable endeavour has been used to ensure that the material was accurate at this time. No legal responsibility can or will be accepted by Private Forests Tasmania for the accuracy, completeness, or relevance of such information to the user’s purpose. Before undertaking any significant forestry or revegetation project it is recommended that you seek personal professional advice from private Forests Tasmania on the particular matter.
Freeman property
Extensive plantings with diverse variety of species
Shelterbelts increase agricultural productivity and farm income

Private Forests Tasmania, the CSIRO and University of Tasmania, collected data from four Tasmanian farms.

We measured pasture growth, crop growth and climate variables in unsheltered areas of paddocks.

Property locations:
- Quamby Plains, Hagley
- Formosa, Cressy
- Woorak, Epping Forest
- Mt Vernon, Kempton

A good shelterbelt
- Oriented perpendicular to prevailing or damaging winds
- Is long, tall, no gaps.
- Has a porosity of ~40-60%
The Experimental design

Example: Formosa property, Cressy

- ~25ha paddock
- Tree row on the western boundary ~1ha
- Pasture established across the whole paddock Autumn 2016
Impact of shelter on pasture production - Formosa property

- Whole-paddock assessed spring of 2017.
- The sheltered western half of the paddock had 30% more biomass (3.3 t/ha) than the unsheltered eastern half (2.6 t/ha).
- The 25 ha paddock (including 1 ha of trees) is effectively growing the same quantity of pasture as a 28 ha unsheltered paddock.

Shelter improves Lucerne yield – Woorak property

- 300% increase in Lucerne hay yield.
- Increased income by $1,133 (~$147/ha) across the sheltered 7.7ha paddock area.
The average wind speed was halved by shelter at Woorak

**Effect of shelter at each transect**

**Net effect of shelter over full transect**
Shelter reduces wind speed – Formosa

- Shelter is effective on both high and low wind days.
- On a high wind day, the average wind speed in the sheltered zone is similar to that in the open area of a low wind speed day.
- Most sheltered zone is 75 and 120 m from trees (5-12 tree heights).

Low wind day (10th percentile, 35 km wind run)

High wind day (90th percentile, 153 km wind run)

Impact of shelter on evaporation

Over the whole 300m transect, shelter reduced evaporation by 15-20%, irrespective of season.
Potential water savings

Total measured evaporation was:

- 1,778 mm at Formosa; 1382 mm at Woorak.
- Shelter from the tree belt reduced evaporation across the whole transect:
  - Formosa: 240 mm; Woorak: 106 mm.
- Across the whole sheltered area of the paddocks, this equated to:
  - Formosa: 35.9 ML; Woorak: 21 ML.
- Note that evaporation only occurs in practice when water is in the system, so actual evaporation will be lower

Image Model

- Imagine is a bio economic model.
- Account for costs and benefits of incorporating trees into agricultural systems.
- We have adapted it to commercial agroforestry systems in Tasmania.
- Estimate benefit of agroforestry to farm income.
• 4 products/benefits from the trees are accounted for:
  1. Timber (including thinning’s).
  2. Shelter effect on agriculture.
  3. Carbon.
  4. Amenity.
• Costs include fencing, planting, site preparation and weed control.
• Knotty sawlogs (no pruning).
• 25 year rotation modelled.

Modelled cumulative returns from a 1ha *Pinus radiata* shelterbelt in a 25ha pasture at Cressy

Outline

• Climate change and forests.
• The role of forests in greenhouse gas mitigation.
• Carbon and forest management – show me the money.
• Conclusions.

Conclusions

• Planting trees in shelterbelts is profitable, diversifies farm income, increases non-tree production while producing a crop of trees.
• To realise the benefits trees must be planted in appropriate locations and be done properly.
USEFUL INFORMATION FOR LANDOWNERS

Primary Processor Directory

Private Forests Tasmania has a comprehensive list of Primary Processors operating within Tasmania. The directory has been primarily developed to help private forest owners with logs for sale to identify potential buyers. As well as enabling the forest owner to more easily locate and contact primary wood processors, it also identifies the log types purchased by them. The directory also helps the listed primary wood processors to source logs from the Tasmanian private forest estate.
This directory is available from the Private Forests Tasmania website www.pft.tas.gov.au under the PUBLICATIONS > MARKET INFORMATION tab.

Selling Wood from Private Forests

If you are looking to sell the wood from your forests, you will find a useful information sheet on Private Forests Tasmania’s website to assist you. Please visit www.pft.tas.gov.au under the PUBLICATIONS > MARKET INFORMATION tab.

Establishing & managing your plantations

Private Forests Tasmania’s website provides extensive information sheets on establishing, pruning and thinning your plantations as well as selecting species & site, farm shelter, weed control, tree planting plans and much more. Select the Farm Forestry Information Sheets, or Private Forests Information Sheets drop down tabs on the PFT home page.

Nurseries

You will need to order your seedlings at least 12 months in advance.

- **Woodlea Nursery - 49 Wish Wilson Road, SCOTTSDALE TAS 7260**
  Ph: (03) 6352 7262  Email: info@woodleanursery.com.au  Web: www.woodleanursery.com.au

- **Sustainable Timer Tasmania – 15960 Midland Highway, PERTH TAS 7300**
  Ph: (03) 6398 7000  Email: peter.moore@sttas.com.au  Web: www.sttas.com.au

- **Habitat Plants – 240 Jones Road, LIFFEY TAS 7301**
  Ph: (03) 6397 3400  Email: info@habitatplants.com.au  Web: www.habitatplants.com.au

- **Todd & Kelly Rayner – Rock Hill Estate, 80 Quinns Road, ELENDALE TAS 7140**
  Ph: 0418 881 124  Email: trayner@activ8.net.au  Web: NA

- **Forico Nursery - 20 McKays Road, SOMERSET 7322**
  Ph: (03) 6435 0755  Email: forico@forico.com.au

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