researching
Division of Forest Research & Development, Forestry Tasmania

alternatives to clearfelling: issue 1

This newsletter is primarily intended to inform stakeholders with a particular interest in forest management of research on alternatives to clearfelling being conducted at the Warra Silvicultural Trial. The newsletter will appear about twice each year and will also be available via the Warra web site (warra.com). Each newsletter will include a feature topic that discusses some aspect of the research. All key outcomes will be formally published, but because this process is quite protracted the newsletter aims to provide a more rapid means of providing information and allowing comment or feedback.

Clearfelling in wet eucalypt forests

The Forest Practices Code defines clearfelling as 'felling of all or nearly all the trees from a specific area in one operation. The term applies to patches with a minimum diameter greater than four to six times average tree height'. Clearfell, burn and sow (CBS) is the prescribed silvicultural technique for wood production from wet eucalypt forests. Partial harvesting is routinely practised in dry eucalypt forest but is generally considered inappropriate in wet eucalypt forest because the dense understorey impedes regeneration, most stands lack advance growth of eucalypts, there are significant safety concerns for harvesters and an increased risk of wildfire in cut-over forests due to large accumulations of slash. While CBS is a safe and efficient technique for harvesting and regenerating eucalypts, its widespread adoption raises concerns, particularly due to initial aesthetics, a reduction in late successional species and structures, and a decline in the special timbers and leatherwood nectar resource when rotations of about 90 years are used. The Tasmanian Regional Forest Agreement noted a priority for research on 'commercial viability of new and alternative techniques for harvesting and regenerating wet eucalypt forests and maximising special species timbers production and rainforest regeneration where appropriate'. This priority is focussed on alternatives to clearfelling oldgrowth forests.

The Warra trial

The Warra trial was established to compare feasible alternative systems with the CBS system and to develop silvicultural alternatives for areas where habitat, special species timbers or aesthetic values have additional emphasis. The trial is located in 200 ha of tall Eucalyptus obliqua forest and is part of the 15 900 ha Warra Long-Term Ecological Research (LTER) site. The forest is multi-aged due to fires that occurred pre-1800, in 1898 and in 1934. Understoreys range from dense cutting grass and tea-tree on soils with impeded drainage, dogwood and lancewood on well drained soils and rainforest species on long-unburnt areas.

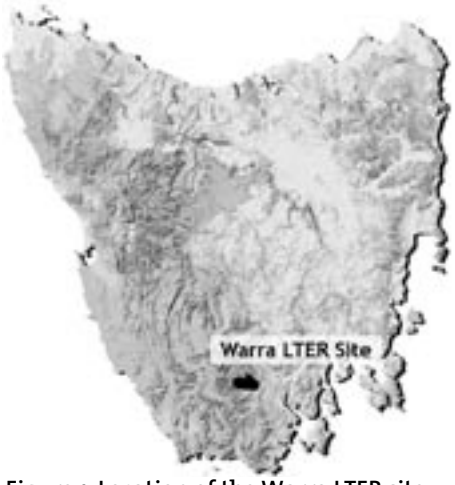

Figure 1. Location of the Warra LTER site.

The alternatives being tested include CBS with understorey islands, stripfells, 10% dispersed

retention, 30% aggregated retention and single tree/small group selection. Two replicates of each treatment are planned. Establishment of coupes began in 1998 and will continue until 2004 (Table1). The coupes are being monitored for timber production rates, worker safety, damage to retained overstoreys, ease of fire management, quality and quantity of timber species regeneration, costs to the forest grower, effects on soil physical properties and biodiversity. A related research study by Melbourne University will determine the social acceptability of the various alternatives. An evaluation of the treatments, based on performance of all coupes over their first three years, will be made in 2007.

Feature Topic: Single tree/small group selection (SGS)

The SGS treatment is an important inclusion in the Warra trial as it has considerable appeal to a concerned cross-section of the public although it has not normally been considered appropriate for wet eucalypt forests by forest managers. The prescriptions for the SGS treatment were developed by a design group which included representatives of the Southern Forest Community Group, the Wooden Boat Guild, an independent silviculturist with knowledge of European selection methods developed for shade-tolerant species, and silviculturalists from Forestry Tasmania. The potential advantages of the system are: increased structural and bio- diversity, retention of aesthetic values, natural seed supply, ongoing supply of special species timbers and no smoke or escapes from regeneration burns. The potential disadvantages are: high safety risk to harvesters, damage to retained trees, high harvest and roading cost, multiple entries with impacts on soil and water values, low growth of shade-intolerant eucalypts and a high fire-hazard posed by unburnt slash.

The design group approved a 9 ha area of multi-aged mixed forest at Warra 5D for the trial site. The standing volume of special species (blackwood, myrtle, leatherwood, sassafras and celery-top pine) sawlogs was about 5 m^3/ha (Table 2) which is above the 2 m^3/ha average typical of oldgrowth eucalypt forest in southern Tasmania. The design group developed the following harvest prescriptions:

- Retain >75% forest cover at all times;
- Establish semi-permanent primary snig tracks;
- Retain the better trees, take the poorer trees;
- Harvest 40 m^3/ha every 20 years (based on a likely growth rate of 2 m^3/ha/yr of merchantable wood;
- No burning, gaps scarified with excavator; and,
- Pile slash on major snig tracks or in windrows in gaps.

There would be five cutting cycles per century and the average stump return time for eucalypt and blackwood might be 100 years and up to 400 years for celery-top pine which has the slowest growth rate of the special species timbers.

Figure 2. Primary snig tracks were cleared to a minimum width of about 9 m to allow an excavator to rotate at least 180 degrees. Slash was piled onto the cleared area to protect the soil and make a semi-permanent extraction path.

Table 1. treatments, objectives and coupe establishment dates

Treatment	Objective	Coupes, established
Clearfell, burn and sow (CBS) Clearfell, high intensity burn, aerially sow with eucalypt seed.	Efficient eucalypt harvest with maximum growth of eucalypt regeneration.	2000, 2001
CBS with understorey islands Up to 5% of the coupe to have dispersed 40m by 20m machinery-free areas.	Efficient eucalypt harvest with retention of small machinery-free zones to increase local survival of understorey flora.	2000, 2001
Stripfell (cable harvested) 250m by 80m strips; low intensity burn, natural seedfall.	Eucalypt harvest with strips of undisturbed forest retained for half the rotation for habitat and seed supply (all species).	2000 (2 coupes)
Dispersed retention 10% basal area retention, low intensity burn, natural seedfall.	Eucalypt harvest with individual eucalypt trees retained for a full rotation for fauna habitat and seed supply.	1998, 2000
Aggregated retention 30% area retention, log one tree length either side of snig tracks, retain aggregates of 0.5 to 1.0 ha, low intensity burn, natural seedfall.	Eucalypt and special species harvest, with patches of undisturbed forest retained for a full rotation for habitat, seed supply (all species) and aesthetics.	2003, 2004
Single tree/ small group selection logging (SGS) (retain > 75% forest cover, permanent snig tracks, harvest 40 m^3/ha every 20 years, mechanical disturbance (no burning), natural seedfall).	Harvest of mature trees while encouraging special species regeneration and maintaining a continuous tall forest cover.	2001, 2003

Table 2. pre-harvest merchantable volumes at Warra 5D

Species	Sawlogs m^3/ha	Pulp m^3/ha	Total m^3/ha
Eucalypt oldgrowth	58	169	227
Eucalypt regrowth	58	90	148
Blackwood	2	6	8
Leatherwood	1	31	32
Myrtle	<1	14	14
Celery-top pine	<1	6	6
Sassafras	0	1	1
Total	121	317	436

Watson's Timber carried out harvesting in May 2001. Safety issues were addressed by rigorous risk assessments, felling of identified hazardous trees (sometimes with explosives) and, where necessary, slowing the rate of timber production. The key harvesting outcomes were:

- More than 80% of the forest cover was retained (Figure 1);
- 48 m^3/ha were harvested (6% special species sawlog, 19% eucalypt sawlog, 75% pulp-all species);
- Damage to retained trees was 5%;
- The harvest rate was 30% of a typical clearfell production rate;
- Gaps (groups) ranged in diameter from 15 to 45 m; and
- About 18% of the forest area was harvested with half under debris heaps and landings and half being potentially receptive seedbed.

The sawlogs were sold by tender, accompanied by an advertising campaign, from the Island Special Timbers yard in Geeveston to determine if there was any discernible premium for timber from non-clearfelling operations. The key financial outcomes from the trial were:

- Tendered sawlog prices were similar to standard contract prices to long-term customers.
- Harvest revenues ($12 400) less harvest costs ($21 146) = - $8 746.
- The grower incurred a substantial financial loss and received no recompense for roading, planning or forest management costs.

The treatment will be initially evaluated at age three years for regeneration and growth and the next cutting cycle is planned for 2021. Discussions with the design group and other stakeholders have suggested the following modifications for the second SGS coupe planned for 2003:

- Harvest costs must be lower, perhaps by using smaller or less machinery;
- Improved track layout to access special timbers within bays;
- Oldgrowth eucalypts, which generate large amounts of slash, will only be felled for high value products (or safety/access); and
- Fuelwood and most slash should be removed (preferably sold) to reduce fire hazards and maximise seed-bed.

A new design group will be formed to choose an appropriate trial site and develop modified prescriptions, which must not compromise worker safety. Design group members will be sought initially from groups with a particular interest in the management of special species timbers and will include people with expertise in special species timber harvesting and processing as well as end users. Other people interested in the trial will be encouraged to have input through design group members.

If you have any comment or suggestions about the research program, would like to be considered as a member of the design group, or want to be included on the mailing list, please contact John Hickey (see below).

Further information:

Hickey, J.E., Neyland, M.G. and Bassett, O.D. (2001). Rationale and Design for the Warra Silvicultural Systems Trial in wet Eucalyptus obliqua forests in Tasmania. Tasforests, 13(2): 155-182. http://www.forestrytas.com.au/forestrytas/tasfor/tasforest_double_issue/155_182.pdf

Or email: John.Hickey@forestrytas.com.au

Figure 3. Warra 5D after the first cycle of single tree/ small gap selection