DEPARTMENT OF CONSERVATION
AND LAND MANAGEMENT

SILVICULTURE SPECIFICATION 2/89

TREEMARKING AND REGENERATION IN WANDOO WOODLANDS

1. PREAMBLE

Wandoo most frequently occurs in open woodlands characterised by clumps of regrowth, groups of mature trees and large gaps. The lack of secondary storey and the low scrub understorey enhance its open nature. The wandoo forest is valuable for many purposes (recreation, catchment protection, timber production, conservation of flora and fauna and honey production) and State forest management practices must ensure conservation of all values.

The clumped distribution of wandoo trees reflects their dependence upon ashbed for regeneration and possibly the limited capacity of those sites. The importance of linking several steps (seed, ashbed, burning and long term protection) to achieve regeneration after timber harvesting is demonstrated by the scarcity of regrowth in some cutover stands, and the successful restocking of areas where correct procedures are followed.

Havel (1975) recognises 3 site-vegetation types (M,L,Y) where wandoo is the dominant species. These range considerably in fertility, structure and moisture storage. Variations to this specification may be required to meet the distinct needs of each site.

These specifications apply to logging and regeneration operations taking place in areas where timber production is a compatible land use.

2. BROAD OBJECTIVE

To conserve the multiple use values of the wandoo woodland.

3.0 SILVICULTURAL OBJECTIVE

1. In areas where timber production is a compatible land use the silvicultural objective is to produce wandoo stands which will contain three age/size classes: veterans (>50cm DBH), intermediate trees (25-50cm DBH) and regrowth (<25cm DBH)
2. A fully stocked stand of this kind should contain about $5m^2$/ha in each class or, in the case of regrowth, the capacity to eventually produce $5m^2$/ha.
3. Protect water, fauna and aesthetic values of the Wandoo forest.

STRATEGIES

3.1 To selectively cut and regenerate adequately-stocked stands so that they will contain a mixed size/age structure with a capacity for continued growth and productivity.

3.2 To protect all retained growing stock from damage during harvesting and regeneration operations.

3.3 To regenerate understocked areas.

3.4 To prevent damage to sensitive regeneration during fuel reduction burning operations.

3.5 Maintain fauna habitat.

4. TREES SUITABLE FOR RETENTION

4.1 REGROWTH (<25cm DBH) - advanced growth, sapling or pole sized wandoo which has not been damaged and with the potential to grow into a sawlog.

4.2 INTERMEDIATE (25-50cm DBH) - trees with a well-formed crown; preferably containing or with the potential for a sawlog.These may also serve as seed trees in regeneration areas if their crown is large and healthy.

4.3 VETERAN (>50cm DBH) - trees which are healthy and likely to live for many years. Where regeneration is required these also serve as seed trees and a wide, healthy crown is required.

4.4 FAUNA HABITAT - veterans or large intermediates with one or more branch stub or other holes. Sufficient crown to remain vigorous for many years.

5. TREEMARKING

5.1 Adequately Stocked Stands

i. DEFINITION
An adequately stocked stand contains at least 8m²/ha of retainable wandoo trees, or if less than 8m²/ha, it contains gaps of less than 20 metres diameter between groups of trees suitable for retention.

ii. Using a 1-factor relascope (Appendix 1), mark to retain 8m²/ha of retainable wandoo trees. Preferably 1m²/ha [3 s.p.ha] fauna habitat, 3m²/ha [10 s.p.ha] veterans and 4m²/ha [40 s.p.ha] of intermediates. A lower retained basal area (to 6m²/ ha) is acceptable in stands which are well stocked with regrowth.

5.2 Stands Requiring Regeneration

i. DEFINITION
Regeneration is required when gaps between retainable wandoo trees are greater than 20 metres and the basal area of retainable trees is less than 8m²/ha.

ii. Mark to retain trees at 4m²/ha at a maximum spacing of 40 metres between retained trees suitable as seed trees. Desirable minimum composition: 2m²/ha veterans (including 1m²/ha fauna habitat), 2m²/ha intermediates.

iii. Where existing debris and harvesting would not provide for ashbed creation, additional trees are to be marked for felling. Such trees should be damaged, unthrifty or taken from well stocked groups. Unthrifty trees include those with more than 50 per cent of the crown dead.

Note where tops are greater than 25m from a potential seed tree artificial seeding will be required.

6. MANAGEMENT OF TOPS

Tops disposal is critical in wandoo stands. Wandoo crowns are sensitive to fire damage and trees burn down relatively easily. Bole damage provides an entry site for termite and fungal attack.

6.1 All tops must be snigged at least 10 metres from all retained trees and regrowth clumps.

6.2 Where ashbed is required for regeneration:

- bunch small tops and debris so that ashbeds will be at least 2 metres in diameter;
- cut or crush tops so that the crown lies relatively flat to facilitate complete burning of the wood, and;
- spread tops at an approximate spacing of one per 400m² (20m x 20m) of gap.

6.3 Where tops are not required for regeneration they should not be pushed up and burnt but left for potential fauna habitat.

7. SITE PREPARATION

Where there are insufficient tops available to create ashbeds at the required density and there are no suitable or available trees to fell, it is necessary to artificially prepare the soil for regeneration.

Blade off all understorey to expose mineral earth over a 3-4 metre diameter area and rip compacted soil. Prepare one area per 400m^2/ha of gap.

8. SEED PREDICTION

A prediction of the seed crop is required to determine whether natural seed fall will be sufficient for regeneration. The task should be undertaken during the summer prior to burning. Details of seed prediction procedure are included in Appendix 2.

If the crop is insufficient regeneration burning must be held over until seed is available, or seed must be applied manually to each ashbed.

A moderate or good seed crop should provide an adequate stocking to all seed beds and regeneration burning should proceed that autumn.

9. REGENERATION BURNING

These burns are undertaken to provide suitable conditions for new seedling regeneration but it is essential to also protect retained trees from damage during this burn.

As wandoo is sensitive to bole and crown damage from fire, burning objectives must be considered carefully in areas where both regeneration and protective burning are required.

9.1 Protection of Retained Trees

Retained trees, in particular clumps of regrowth, must be protected from fire during regeneration burning. Where there are at least an average of 5 clumps per hectare over a minimum 5 hectare area, one of the following must be undertaken:

burn the clumps under mild condition (ROS<20/hr); or
exclude the patches from the burn.

9.2 Regeneration Burning

Burning for regeneration is conducted in autumn under conditions which obtain complete log removal but do not cause significant damage to retained trees.

Wandoo seed matures in late summer and natural seed shed commences soon after.It is preferable to burn in early autumn whenever natural seedfall is being used.

Where artificial seeding is to be used burning may occur later in autumn.
A detailed prescription for regeneration burning is given in Appendix 3.

10. ARTIFICIAL SEEDING

Where natural seed fall is predicted to be inadequate or there is a poor stocking of seed trees, artificial seeding should proceed as follows:

10.1 Ashbeds

Sow in July-August at the rate of 250-300g of seed per hectare of ashbed. Sow only on ashbeds but avoid thick white ash, particularly where the tree's bole has burnt away. (Sowing time will be refined following further trials).

10.2 Prepared Seed Bed

Scarify prepared seedbed and spread bulked seed and fertiliser. Each hectare of prepared seedbed to receive 250-300g of seed and 470kg of fertiliser, comprising 400kg of DAP, 50kg of KCl and 20kg of trace elements.

11. ESTABLISHMENT SURVEY

A survey for the establishment of seedlings is required 12 months following the burn. Its purpose is to determine the success of the regeneration treatment and where, if any, infilling is required.

Standard: 10 seedlings per ashbed on 50 per cent of ashbeds is the minimum acceptable standard.

12. INFILLING

Where insufficient seedlings are established, infill by planting each understocked ashbed in June to bring stocking up to 10 per ashbed.
Space seedlings evenly and fertilise with 200g of diammonium phosphate in tablet form.

13. PROTECTION OF REGENERATION

Clumps of wandoo regeneration are sensitive to fire for many years. In the lignotuber stage regular burning of regrowth is acceptable, but once saplings are formed they are easily damaged even by a mild fire. As they grow taller the clumps accumulate litter fuel more rapidly than the surrounding open grassy woodland. However as the grasses are only ready for burning late in the spring, a single lighting then will invariably result in damage to trees in the clumps.

13.1 Fire Exclusion

Once regeneration establishes dynamic growth it must be excluded from fire until it has reached a height and bark thickness where it will not be damaged by a mild fire. This is at least 10 years following the regeneration burn.

13.2 Two-Staged Burning

Once clumps of regrowth are able to withstand fire they may be burnt only under the mildest conditions. At such time [usually during winter] the surrounding forest will not burn, hence two lightings may be necessary to achieve satisfactory fuel reduction.

14. RECORDS - H.O.C.S.

The following record of silvicultural work is required.

H.O.C.S. - Sawlog Cutting
- Regeneration - note the year, technique and the proportion of the area regenerated.

Master burning plan - note areas which are not to be burnt and those which require a two-staged burn.

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Reference

HAVEL, J.J. (1975). Site Vegetation Mapping in the Northern Jarrah Forest (Darling Range). 1. Definition of Site-Vegetation Types. Forests Department Bulletin 86.

APPENDIX ONE

CONSTRUCTION OF A 1-FACTOR RELASCOPE

MATERIALS: SMALL PIECE OF PERSPEX, STRING 80-90CM LONG

1. Cut perspex to 6mm diameter (at least 30mm long).
2. Drill a hole at one end of the perspex and pull the string through it.
3. Hold perspex so that it is exactly 30cm from your eye while an assistant ties the string tightly at the back of your neck.

Note: If you wish to hold the relascope further from your eye when using it, at 45cm the perspex must be 9mm diameter and at 60cm - 12mm diameter.

APPENDIX TWO

SEED PREDICTION

EQUIPMENT: BINOCULARS, RIFLE

AIM: To determine prior to burning whether sufficient seed is present in the crowns of seed trees for regeneration.

1. Timing

Seed prediction should be undertaken in late summer, ideally a few weeks before burning. If burning is delayed into April, seed monitoring should be repeated.

2. Sample sites

Select 10 different sites where seed tree regeneration will be required. These sites should cover the range of conditions within the area to be regenerated.

3. Assessment of the Capsule Crop

Examine, with binoculars, the seed trees at each site. For each site subjectively rate the quantity of capsules on the seed trees as either light, moderate or heavy. Enter on the attached form.

4. Assessment of Seed Quantity

From one tree in each site, selected in 2 above, shoot down sample branches and remove 25 capsules. Place them in a marked and sealed envelope. Forward all samples to the Seed Store for assessment of seed quantities and fill in results on the attached form.

5. Results

Where 4 or more sites are likely to yield poor results the burn should either be deferred or artificial seeding used.

If it appears that one site type (eg sandy soils) is consistently providing poor results further investigation is warranted. Artificial seeding may then be confined to only a specific portion of the area.

WANDOO SEED PREDICTION SURVEY

BLOCK _____ DATE OF SURVEY_____

COUPE_____

SAMPLE SITE	CAPSULE CROP *	SEED QUANTITY[a]	LIKELY SUCCESS[b]
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

NO. OF POOR SITES = _____

If number of poor sites exceeds 3 either:- 1. Defer the burn, or
2. Plan to arfificially seed.

*Capsule crop = light, moderate or heavy

a. Seed Quantity = low (<100seeds/gm), intermediate (100-200 seeds/gram), high (>200 seeds/gm).

b. Likelihood of seeding success.

		CAPSULE CROP		
		LIGHT	MODERATE	HEAVY
SEED QUANTITY	LOW	POOR	POOR	SATISFACTORY
	INTERMEDIATE	POOR	SATISFACTORY	GOOD
	HIGH	SATISFACTORY	GOOD	EXCELLENT

APPENDIX THREE

WANDOO REGENERATION BURNING PRESCIPTION

OBJECTIVE: Provide conditions suitable for natural regeneration of wandoo by burning tops to provide ashbeds and stimulate natural seedfall.

As a regeneration burn is of greater intensity than required for fuel reduction, and wandoo is susceptible to fire damage, retained trees need to be protected. In particular young regrowth and pole groups should be excised from the burn as in Section 9.1

As it is an autumn burn at a relatively high FDI, protective buffers/edges will need to be carefully considered.

DESCRIPTION:

FOREST TYPE; Wandoo, predominant height 20-25 metres.
SCRUB TYPE; 6
SLOPES; Generally flat to mild, occasional steep slopes on minor valleys.
FUELS; Litter/scrub 2-4 years old (3-5 tonnes per ha), tops 1-2 years old.
Presciption acceptable scorch 10-12 metres (preferred at lower end)
ROS range 28-40m/hr (4:1 wind ratio)
MIN SMC 7-9%
Lighting at 1400 to 1500 hours
SDI greater than 1400