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Natural Regeneration of Bush Areas in W.A.

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Since European settlement, large areas of native bush have been cleared for townsites, farms, roads and communications. Native trees that remain in and near these disturbed areas are not regenerating, and their population is being further decimated by old age, drought, strong winds, road-widening and other factors.

This large scale loss of trees is removing protection to the valuable topsoil, reducing wildlife habitats, and ruining the beauty of the area. To arrest this problem it is essential to protect and manage the areas of woodland which have been retained on farms, along road verges, and as reserves in townsites, so that they will regenerate and thus continue to survive.

Natural regeneration is a cheap way of replacing large areas of degraded bush, and requires minimal effort if the techniques in this Information Sheet are followed.

Fencing

Regeneration of some eucalypt species in **assured rainfall areas,** can be achieved simply by fencing an area around the tree or clump of trees to exclude domestic stock; and ensuring there are no rabbits in the vicinity. Regeneration may occur from seed on the ground, but it is advisable to have a ripe crop of fruit on the tree at time of fencing. The fence should extend two to three tree heights from the base of the tree or clump in each direction (see Figure 1). Some trees such as *Eucalyptus calophylla* (marri), *E. rudis* (flooded gum) and *E. loxophleba* (York gum) can regenerate readily with this limited preparation.

However, most species do not necessarily regenerate after simply fencing off an area: additional preparation is often required.

Weed Control

On established farmland slow-growing native species cannot compete against the introduced pasture grasses. The removal of weed competition is most important for the regeneration of native vegetation. However, it can be very difficult to achieve without detrimentally affecting the native seedlings as well. The control of weeds must be assured well into the first summer after germination of native species, for successful regeneration.

Cultivation

Cultivation is one effective technique for controlling weed competition, but problems can occur. Cultivation for weed control must be carried out when weeds are actively growing, and at this time seed has already dropped from the ripe fruit on the trees. Cultivation at this time will bury the majority of old seed as well as the new seed too deep for germination. If some germination occurs the unburied seed will grow vigorously, but results are unpredictaable.

The best technique to use is to cultivate for weed control one winter, and allow the ground to lie fallow during the summer months. Weed germination will be reduced the following winter. If fallowing is timed to coincide with a ripened fruit crop, and good weed control achieved, regeneration of native vegetation should follow.

Herbicides

Weed control can also be assisted by spray topping pasture weeds the spring before the summer/ autumn seedfall with contact herbicides such as paraquat/diquat (Sprayseed) or glyphosate (Roundup) to reduce the seed bank.

The use of residual herbicides amongst existing native vegetation is not recommended.

This method has its limitations in areas of high rainfall and old pasture areas where the weeds are aggressive and the weed seed bank is strong. The following techniques will ensure more reliable results for a wider range of species and conditions.

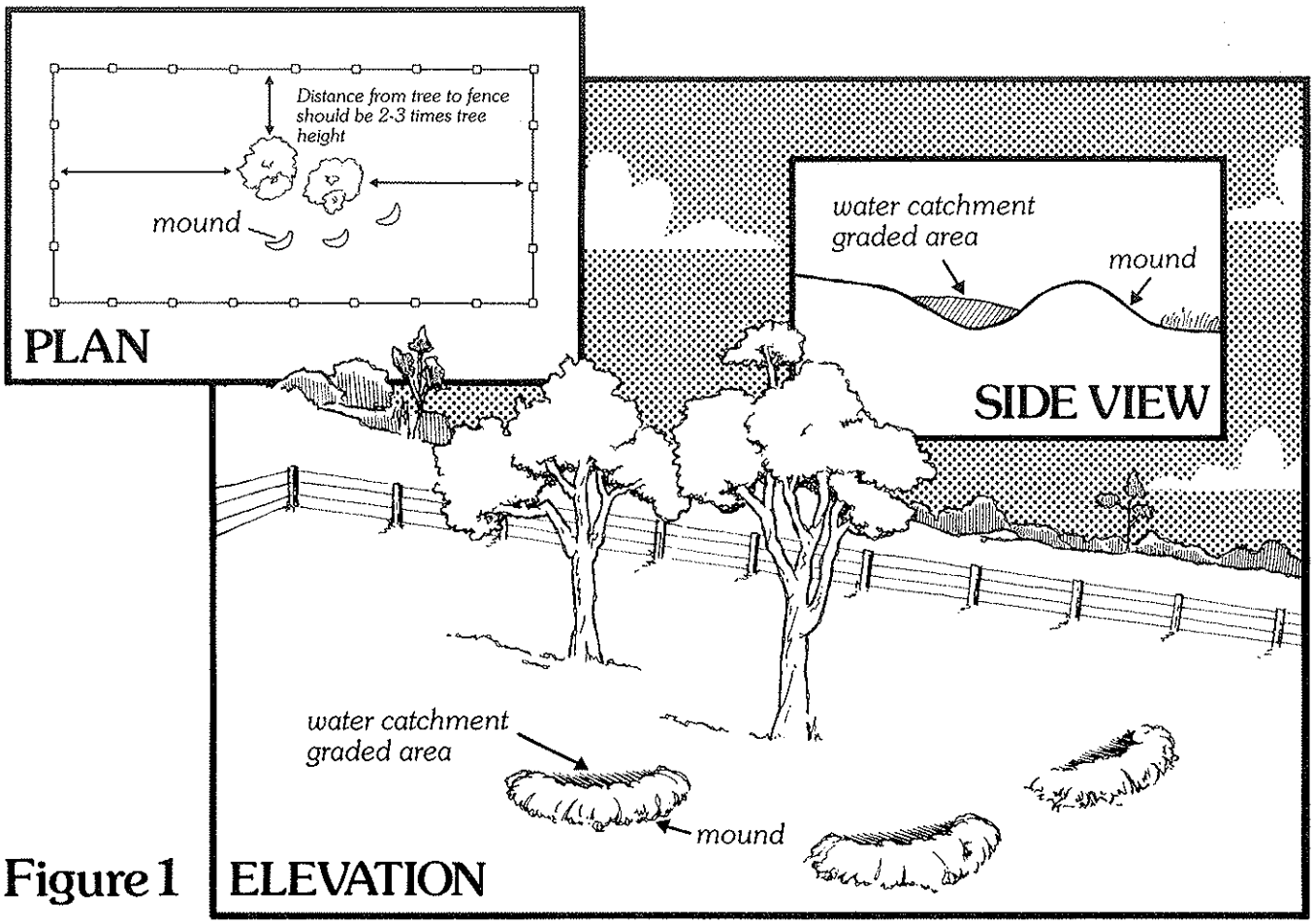

Figure 1

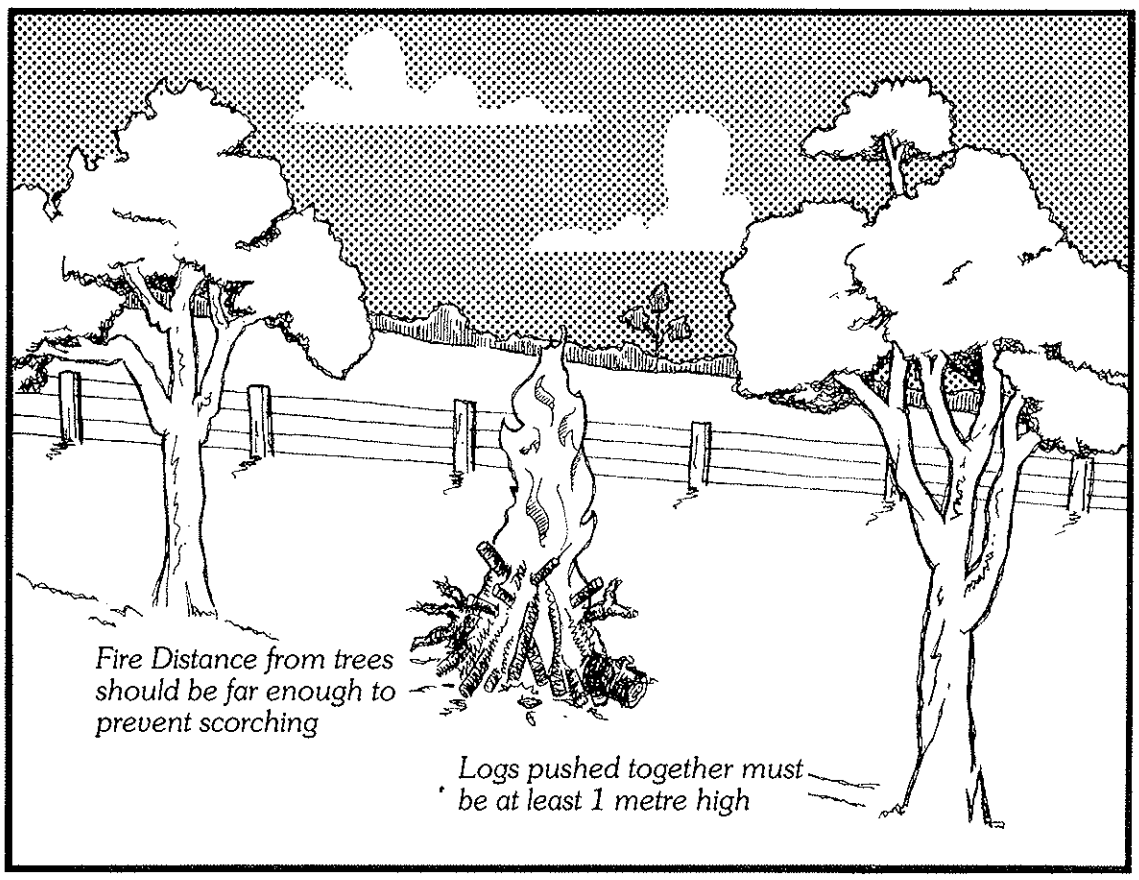

Figure 2

Graded Surface

The most successful way to remove weed competition is to grade strips of the top 5 to 7 cm of soil to one side along the contour after the weeds have shed their seed (December-January). Seed from the surrounding trees and shrubs will drop onto the bare ground during late summer and autumn and will germinate without weed competition after the winter rains. It is desirable to rip the graded strips at 1 m widths to give germinating seedlings a better chance to develop strong taproots. If this cannot be done without damage to parent trees the graded surface should be tyne cultivated.

Water Harvesting

Water harvesting is used to increase the amount of available water to germinating plants as well as to provide a collection point for seed that would normally be washed away. It can be a valuable addition to all methods of regeneration described in this Information Sheet.

Water is harvested by building small crescent-shaped banks across the flow of surface water; that is, on the contour. They should be short — say 10 m — to avoid excessive overflows that may cause erosion. They can be constructed by using a backblade or roadgrader to bare strips 1 m or more wide. Move the top-soil down hill to form a curved bank that will hold water. In heavier soils the bare area should be ripped with a chisel plough to improve water penetration.

Water harvesting is especially valuable in the drier zones of the wheatbelt, and on erodable slopes.

Burning

The yearly burning of natural areas of bush is detrimental to the stands. Burning of a weed-infested stand of natural bush area will only promote a better weed crop, which will compete with and kill any germinating native seedlings, unless the fire is hot enough to partially sterilise the soil and kill any weed seed present.

To achieve a relatively high intensity fire, old stag trees and dead timber are removed to create openings in the stand. This material is heaped over an area in sufficient quantity to ensure a fire hot enough to kill weed seed in the top 5 to 7 cm of soil. The area of the fire-heap will depend on the size of the openings and available fuel. Fire-heaps can be in windrows or in clearings with a diameter of 5 m or more. The height of the fire-heap is the important factor, and should be no lower than 1 m of reasonably compressed fuel. The stacks of fuel need to be far enough away from the trees to prevent damage, and should be fired in late summer or early autumn. The seed capsules of banksias, hakeas, and eucalypts are all triggered by fire.

If trees close to the fire-heap have a good crop of ripe fruit the heat of the fire will dry out the capsule valves, causing the fruits to open and release seed a day or so later. The cool ashes left by the fire form a fertile seedbed for the regenerating bush.

After burning, it is wise to augment the supply of eucalypt seed by removing branches carrying ripe fruit from nearby trees and laying the branches on the cooled ash-bed. The branches should be widely distributed over the ash-bed, making sure the edges, where the most successful germination will occur, are well covered. The fruit will open and deposit the seed before the winter rains. In windy situations use a heavy branch to anchor the smaller seed branches.

Eucalypt fruit is ready for harvesting when the capsules develop a reddish-brown or grey colouring, and the valves turn brown. Most eucalypts carry a series of crops in various stages of development. Branches with older more mature fruit with the valves unopened should be chosen.

If seed is not available locally it can be purchased from seed merchants, and broadcast by hand over the ash-beds. The seed can be mixed with weed-free sand to assist broadcasting. In exposed situations the placing of branches at random around the broadcast seed will prevent the seed blowing away.

Rainfall is the most important factor for successful regeneration from seed. In rural areas which have periodic droughts it is advisable to regenerate natural bush stands in sections over a period of years to ensure success.

Summary

- The area must be fenced to keep stock out.
- Rabbits, if present, must be controlled.
- The trees should be checked for ripe fruit. If ripe fruit is not present in the stand then it will need to come from an outside source — other trees, branches, or picked fruit; or from a reliable seed merchant.
- Weed competition must be eliminated.
- Water harvesting and high intensity burning will increase the chance of successful regeneration.

Timetable for Regeneration