

Natural Regeneration

Natural regeneration refers to the natural regrowth of native species from self-sown seeds or vegetative sources in cleared or disturbed areas. This Note shows that encouraging natural regeneration is one of the most effective means of bringing back the bush.

If you have a cleared area or disturbed site on your property that you would like returned to bushland, then natural regeneration may be the answer.



Naturally regenerating pioneer species, such as native raspberries (shown above), play an important role in habitat restoration.

Natural regeneration versus revegetation

Revegetation: *Is the use of direct seeding or planting to re-establish vegetation on sites that are usually highly disturbed or devoid of naturally occurring vegetation and, therefore, have very limited capacity for natural regeneration (refer to Land for Wildlife Note V3 - Revegetation Principles).*

Natural Regeneration: *Is the recovery of native vegetation through natural processes (i.e. natural regrowth) on sites which are generally less disturbed, although weeds may be present. These sites contain some seed-producing trees on site or close by, seedlings or seeds in the soil.*

Natural regeneration is cost effective and can have lower labour inputs than revegetation. It results in the regeneration of vegetation communities which are composed of locally appropriate and often diverse plant species. Natural regeneration preserves local genetics and helps maintain biological diversity. For these reasons natural regeneration, where conditions indicate it will be successful, is always preferred over revegetation.

Natural regeneration is only an option when there is a nearby seed source or the seed bank in the soil is still viable. Natural regeneration on some sites may also require considerable patience as results may not be apparent for a year or more; so give it a chance before rushing to plant. In areas that have been cleared for long periods of time and where there is little surrounding bushland, revegetation may be the only option.

Basic principles of natural regeneration

1. Work from good (least weeds) to bad areas (least natives). It is much easier and has better long term results.
2. Disturb the soil as little as possible. This principle recognises the fact that disturbed ground favours the growth of weeds.
3. Allow the rate of regeneration to dictate the rate of weed removal, this ensures that regeneration areas remain a manageable size.
4. Small but frequent weed maintenance efforts are often more effective in the long term than infrequent big weed control efforts.
5. If working on a large area, divide it into management zones to make the work more efficient and manageable. Zones can be delineated according to terrain, access, types of weeds present and level of disturbance.

Limiting factors

There are several factors that limit natural regeneration. Six factors are discussed in detail below.

1. Competition from weeds

A very common problem affecting natural regeneration is the dominance of weed species. Weeds typically out-compete native species in disturbed environments by occupying space and using available nutrients and water. Weed control is often one of the most important issues for successful natural regeneration. Weed control is imperative to ensure that native regeneration has a chance to persist and flourish.

Get to know your weeds and concentrate your efforts on those weed species that are a real threat to the regenerative capacity of your bushland. For example, some herbaceous annual weeds can take a lot of time and energy to control for minimal benefit.

Controlling weeds can be done in many ways including manually, mechanically or by using chemical and/or biological means (refer to *Land for Wildlife Note EW2 - Weed Control Methods*). It is important when undertaking weed control that you choose methods that will have the least impact on regeneration. Hand pulling and cut stump techniques, although labourious, are often the best for minimising impacts on non-target species.

Areas dominated by introduced grasses are notoriously difficult to regenerate because of the thick sward that grasses produce thus preventing seed germination and out-competing shrub and tree species. Attempt to reduce the prevalence of grasses by breaking the seed-setting cycle. Where possible remove introduced grass species before they set seed. Alternatively, you may choose to 'crash' graze the site or slash introduced grasses prior to seed-setting. This will reduce competition and create gaps in the following seasons for native plant seeds to germinate.



Natural regeneration occurring following the removal of cattle from a site.

2. Grazing and browsing

Natural regeneration is often hindered by grazing from livestock, pest animals (e.g. hares, rabbits and deer) and even native wildlife (e.g. wallabies and kangaroos). For domestic stock the most simple and effective way to reduce their impact is to fence off the area that you are trying to regenerate. Make sure that the fencing style matches the animals you are aiming to exclude and that it is wildlife friendly (refer to *Land for Wildlife Note G4 - Wildlife Friendly Fencing and Netting*).

Alternatively, if fencing is not an option, reduce stocking rates and/or limit grazing to times when the plants are not actively growing or producing seeds. This will reduce grazing impacts and may allow partial regeneration and give seedlings time to establish.

You may need to consider using tree guards to reduce the impact of browsing by pest animals and native wildlife. While this can increase costs and labour, it can be an effective way of protecting seedlings until they are sufficiently established. Numerous variations of tree guards are commercially available. You may need to search around to find the type that best suits your circumstances. Alternatively, by placing used fertiliser bags (or something similar, that have been opened at both ends) over three or four tall wooden stakes, this can be an effective way of protecting seedlings.



3. Limited seed supply

If there is relatively mature bushland close by to your site, you can expect natural regeneration to occur. Depending on site variables, vegetation type, seasonal factors and site history, this can take time. If natural regeneration is slow, it may be a case of seed predation by ants and other insects. Seeds of some species will require a light raking of the soil to stimulate seed germination.

Alternatively, revegetation may need to be considered when there is a lack of seed supply (refer to *Land for Wildlife Note V3 - Revegetation Principles*).

4. Soil condition

Soil compaction, erosion, lack of soil fauna and changes in soil chemistry are all common problems that affect natural regeneration. Stock exclusion via fencing will reduce compaction over time. Compaction binds soil particles together so that germination is restricted and root growth reduced. It is also generally related to a reduction in soil fauna and beneficial fungi. Once again a light scarification or raking of the soil can be beneficial. Fire can also be used to create an ash bed and encourage germination but this is only relevant for fire adapted vegetation types.

The reintroduction of a small amount of topsoil from nearby healthy ecosystems that are free of weeds, may help to reintroduce beneficial soil microorganisms and fungi.

Changes in soil chemistry due to the application of fertiliser are also a common feature of cleared and disturbed landscapes. Native species are generally adapted to soil environments with low nutrient levels. Fertiliser application can lead to the dominance of exotic pasture grass species that out-compete natives. Avoid using fertilisers when encouraging natural regeneration. In some instances fire could also be useful in re-establishing a more 'normal' balance in soil nutrients.

In degraded soils where little or no topsoil remains, it is recommended that pioneer species (species that colonise an area after disturbance) such as local native acacias are encouraged. Over time, pioneer species re-condition the soil. Where there is no risk of re-sprouting, you can utilise weeds to provide a light mulch, which can help to trap soil moisture, restart the soil formation processes and assist in the emergence of pioneer plant species.



A severely degraded site where natural regeneration will be difficult to achieve.

5. Fire

Fire regimes can also significantly affect regeneration. If the site has been burnt with a high degree of frequency, i.e. every year or two, then seed sources will be degraded. Reducing fire will not re-establish the seed bank but it will give new seeds a chance to germinate. Alternatively, if you have a long unburnt site, fire may be required to promote seed release and seed germination. The timing for burns is also important. Fire is recognised as both a useful tool and a complex management issue.



An Angophora re-sprouting after a bushfire. Fire can help promote seed release and seed germination in certain plants.

6. Climatic influences

Climates on both global and property scales may affect the success of natural regeneration. Drought, frost, heatwaves and other climatic events will limit the speed, health and resilience of natural regeneration sites.

Use prevailing climatic conditions to your advantage. For example, in good seasonal conditions when soil moisture is high, remove well-rooted weeds. By contrast, when conditions are poor (e.g. during times of drought), you may need to postpone some activities such as spraying of herbicides. This is because during hot, dry conditions plants are under stress and there is little internal movement of liquids around plants limiting the effectiveness of herbicides.

In frost prone areas, plant frost tolerant pioneer species to create a micro-climate so as to provide frost-protection for long-lived tree species.

At windy and exposed sites, leave fallen timber or even introduce fallen logs to provide some protection to seedlings on a micro-scale.

Ongoing maintenance

All sites will require ongoing monitoring and weed maintenance. It is not recommended that regeneration areas be fenced and permanently left without further management. Where possible include gates so that the site can be actively managed for weeds.

What you can do

- ✓ Talk to your Land for Wildlife Officer to see if natural regeneration is an effective option.
- ✓ Prepare a Bushland Management Plan identifying sites suited for natural regeneration.
- ✓ Restrict access to grazing animals (livestock and native animals).
- ✓ Control weeds.
- ✓ Consider the use of fire as a tool to encourage natural regeneration.
- ✓ Take prevailing climatic conditions into consideration when planning activities.
- ✓ Carry out maintenance on an ongoing basis.
- ✓ Regularly monitor regeneration sites to measure progress and to identify emerging issues early.



Regeneration can be aided in some situations by fire. An Acacia species germinating following a bushfire.



*Rainforest pioneer species regenerating naturally where lantana has been controlled and left as mulch.
Photo by Nick Clancy.*

Land for Wildlife is a voluntary program that encourages and assists landholders to provide habitat for wildlife on their properties. For more information about Land for Wildlife South East Queensland, or to download *Land for Wildlife Notes* free of charge, visit www.lfwseq.com.au

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