Restoring native vegetation: regenerate or revegetate?

This note provides an overview of the two basic approaches to restoring and expanding native vegetation and wildlife habitat, and discusses where and when they are best used.

Assisted natural regeneration involves creating the right conditions for damaged ecosystems (communities of plants and animals) to bounce back. It usually includes managing threats such as weeds and grazing, and applying triggers such as fire to stimulate regeneration. This approach is often called 'bush regeneration'.

Revegetation is used where the ecosystem is too damaged to regenerate naturally and the appropriate plants have to be reintroduced, for example by planting or direct seeding.

The choice depends mainly on the health of the vegetation, particularly its capacity to resprout or germinate from seed after the causes of degradation have been removed. Assisted natural regeneration can be the most cost effective and ecologically sound approach because it retains the character and complexity of the local ecosystems. Planting should generally be avoided where natural regeneration is possible.

Vegetation condition usually varies across a property or even within a small patch, so both approaches may be used alongside each other.

Top — Native understorey seedlings and resprouters emerge from the forest floor after a fire. This natural resilience is a valuable tool for restoration. Photo: V Bear. Bottom — Restoration areas that have lost resilience will require planting. Photo: Dept of Primary Industry

Priorities for sustainable vegetation management

FIRST — retain existing native vegetation (avoid clearing). Native vegetation can help protect a site from land degradation, and provide free services such as shade, shelter, habitat for predators of pests, and habitat for pollinators.

THEN — protect native vegetation from degradation (manage threats). On a farm the most important strategy is to fence off native vegetation from adjoining paddocks. This does not necessarily mean locking it up. It does mean that management can be tailored to the needs of the vegetation as well as to production goals. Even fencing off a small area downwind of a large old paddock tree may give good tree regeneration quickly, and keep trees in the landscape for future generations.

LATER — actively manage degraded vegetation (restore, expand and link). In fenced remnant areas it may be necessary to control weeds and manage grazing and even apply other treatments to expand the regeneration. In long-cleared areas, planting or direct seeding can be necessary to link native vegetation patches. However, beware of ill-considered actions. A 'do nothing and watch approach' is often best at first, until it is clear what the threats are and how best to deal with them.

Resilience – the key to improving condition

Native vegetation and individual native plants have 'resilience' — the ability to regenerate after disturbance. This has evolved over thousands, even millions, of years as a response to disturbances such as landslip, flood, grazing, drought and fire.

It is the resilience of the plants, and the associated animals — from large mammals to microscopic soil bacteria — which governs the capacity of an ecosystem to recover when damaged.

Treatment of a site and its plants can either facilitate or obstruct regeneration. Sound land management can provide the right conditions for degraded native vegetation to recover, and become self-sustaining.

Signs of strong resilience include:

older trees, which will shower the site with seed

at least some natives in the shrub layer

native grasses and ground cover plants

native regrowth and evidence of regeneration

natural watercourses

leaf litter, fallen timber, lichen and mosses

intact soil profiles and soil that has had minimal impacts from farming or urbanisation.

Signs of reduced resilience include:

heavy weed loads

introduced pasture grasses

land degradation and soil erosion

salt scalding

few living trees, and signs of dieback

high nutrient levels from fertiliser or farm effluent runoff

stormwater runoff from urban areas and roads

Types of resilience. Resilience can be either in-situ or migratory. When the source of regeneration is the living plants on a site, or the seed they produce, the resilience is in-situ (many plants no longer visible on a site may, in fact, still be present as seeds stored in the soil, waiting for a trigger to stimulate regeneration). When seeds or other plant parts are brought in by wind, birds, flying foxes or other means, the resilience is considered to be migratory.

Weeds and resilience. Environmental weeds compete with native plants for space, water and nutrients, and can reduce resilience by preventing native plants from seeding, and by shading out new seedlings.

Assessing resilience. Even a mown, weed infested or heavily grazed area with no obvious native plants may have some resilience. Assessing resilience well requires skill and experience, for example the ability to identify local native plants at various growth stages, and to determine past disturbances and their effects.

Building resilience. If resilience is strong, the condition of the native vegetation can be improved relatively easily. Simply fencing off an area to control grazing can improve its condition within a few years. However, if a site is dominated by weeds or introduced pasture grasses, has land degradation problems such as scalding or erosion, or has high nutrient levels, these problems need to be remedied before regeneration will be successful.

Using resilience to assist regeneration. Where possible, start with sites that are in good condition, and therefore have the greatest resilience. Regeneration will be quicker, cheaper, and will best represent the plants that originally grew there.

This patch of timber has not been cultivated or heavily fertilised. The presence of old trees and native grasses indicate potential for natural regeneration. Recent grazing regimes have allowed for young trees to establish. Though tiny and degraded, It is likely to be valuable habitat for a range of wildlife, and would benefit from fencing-off to allow additional regeneration and expansion. Photo: OEH/N Pavan

Areas such as corners in treed fencelines and bends in creeks often require minimal new fencing. New plantings, such as windbreaks, shelterbelts or corridors, could be located to take advantage of any existing resilience in the landscape. For instance, try locating fences to include existing isolated paddock trees, clumps of trees, or areas of existing native vegetation regrowth.

Resilience may be different for different layers. Existing grasses and herbs may regenerate well if burned or given a break from grazing, but trees and shrubs in the same patch may be long gone and need to be replanted. The canopy may be able to regenerate from remnant trees in cleared paddocks.

Choosing a vegetation management approach: a basic guide

First assess vegetation condition and hence its resilience. Column 3 suggests the appropriate strategy, with vegetation which is less degraded being more suitable to strategies involving natural regeneration. Where vegetation is more degraded, the appropriate strategy may be either a combination of assisted regeneration and revegetation or revegetation alone.

Vegetation condition	Vegetation resilience	Restoration Approach	Actions	Priority
Near-natural.	Intact.	Protect.	Continue existing management.	1
Little disturbed.	Intact.	Protect.	Continue existing management. Increase protection.	
Modified — generally not deliberately cleared or fertilised, but subject to prolonged disturbance.	Largely intact.	Natural regeneration.	Increase protection. Remove causes of degradation. Monitor to see if regeneration starts or if a trigger is needed.	2
Degraded — likely to have non-native ground cover, and may have been fertilised.	Depleted.	Assisted natural regeneration.	Increase protection. Remove causes of degradation. Provide a regeneration trigger.	3
Highly degraded. Most of the original biodiversity is missing.	Severely depleted.	Assisted natural regeneration for some species. Revegetation.	Increase protection. Remove causes of degradation. Provide a regeneration trigger. Reintroduce plant materials.	4
Totally cleared — native plant communities have been completely removed, and soil-stored seed may no longer exist.	Absent.	Revegetation.	Increase protection. Remove causes of degradation. Reintroduce plant materials.	5

Some threats to native vegetation can be eliminated or managed, while others might need to be accommodated. Common causes of degradation include:

- grazing by livestock or rabbits
- weeds (often a symptom of other problems such as nutrient build-up or overgrazing)
- land clearing, leading to loss of vegetation, and isolation of remnants
- missing habitat features such as nest hollows, understorey, ground shelter
- fertiliser application or drift
- drift from herbicides
- fire that is too frequent or too infrequent
- lack of animals that disperse seed and pollinate flowers
- lack of natural flooding, or excessive, unnatural, flooding.

Red-browed finches regularly roost and nest in this patch of dense, spikey briar rose. Photo: V. Bear

Considering habitat

Regenerating and replanting vegetation may not be enough to meet the needs of native animals – at least not in the short term. Consider re-introducing missing habitat elements, logs, bark, rocks (or alternatives such as concrete slabs pavers, and pipes), and leaf litter.

Although restoration projects provide opportunities to improve and increase habitat, some treatments can also cause unintended damage to habitat. It is important to understand how animals are using the site. It is not always the way people might first expect.

If weeds and other non-native plants are being used for food, shelter and nesting (take the time to find out), consider leaving them until alternative habitat has been established. If there is no other alternative, at least avoid working in these areas during peak nesting season (usually spring and early summer). Large scale weed clearing is best done in a mosaic pattern, so fauna can still use and move through undisturbed areas while other parts of the weedy landscape are being restored.

Dead trees should always be retained, as they provide valuable hollows, perches and crevices.

Beyond the farm gate

There may be projects across the broader landscape that individual landholders can assist with, such as creating wildlife corridors across a large region or through a few properties, planting habitat trees for a particular threatened species, saving the last remnants of a rare woodland type, or a group of neighbours controlling foxes. These projects can also help provide assistance and advice for individual properties.

Useful references

Related Conservation Management Notes:

- Natural regeneration
- Assessing Wildlife Habitat
- Revegetation
- Seed collecting
- Wildlife Corridors

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