Guidelines for Consideration of Projects

In recent years restoration works on rural land have become part of the Victorian landscape. These have been carried out by thousands of citizens acting in groups or as individual land holders, through NGO's, through government agencies and through information, trial and advice from scientists. Through observation, hard work and trial and error, such programs and people have developed some sound ideas and principles from which to plan landscape restoration projects. Below, Connecting Country offers a summary of these for guidance in developing new works.

Principles for Restoring Landscape Resilience

1. Increase the extent of native vegetation with an appropriate species mix and enough structural complexity to provide habitat for a range of flora and fauna.
2. Repair ecosystem processes-- for example, nutrient cycling, retention of water, pollination, gene flow, animal movement-- by revegetation (natural regeneration, direct seeding, tubestock); management actions (such as strategic grazing, fire management, soil manipulation, landscape engineering, control of aggressive or invasive species); and maintaining keystone habitat features (e.g. paddock trees, fallen logs, deep pools in streams).
3. Protect – Improve – Enhance – Reconstruct
   • Protect: maintain native vegetation by fencing or sympathetic management.
   • Improve: improve quality of existing native vegetation by removing or controlling threatening processes (e.g., weeds, feral animals, firewood collection, inappropriate fire regimes).
   • Enhance: supplement and enlarge patches of native vegetation by revegetating habitat gaps or buffers (especially around sensitive areas like riparian zones).
   • Reconstruct: create new patches of native vegetation through replanting or manipulation of physical processes to promote natural regeneration. Priority should be given to reconstructing large patches of under-represented vegetation classes.
4. Build landscape diversity – look for variety in patch types, patch shape and size (but larger patches are preferred), patch boundaries and landscape position.
5. Revegetation - try to simulate natural processes by representing original Ecological Vegetation Classes and functional vegetation types (e.g. nectar, seed and fruit producing plants).
6. Promote continuity of vegetation along environmental gradients (e.g. rainfall, geographic, altitudinal, topographic). Connectivity at this scale is important to allow movement in response to changes in resource availability over time, natural catastrophes and climate change.
7. Strategies to counter habitat fragmentation:
   i. Expand area of existing remnants.
   ii. Increase number of patches through reconstruction, particularly between existing patches of native vegetation.
   iii. Create landscape linkages, including corridors (linear strips) and stepping stones (small patches) between existing native vegetation.
   iv. Amalgamate nearby patches to form a single larger patch.
   v. Help movement of native fauna by 'softening' boundaries between landscape elements; maintaining habitat elements (e.g., paddock trees, fallen logs, rocks); strategically arranging different land-use types; reducing intensity of land-use across the landscape (e.g., increasing the area of native pastures); and incorporating refuge areas in high intensity land-use zones.

Guidelines for Landscape Linkages

1. Clearly define the purpose of linkage in terms of species, distance, time and function. A function might be: influencing opportunities for restoration of gene flow or for the dispersal of young.
2. Consider design, dimensions, vegetation type and management required to meet the stated purpose.
3. Linkages should be designed with existing local agricultural activitiy in mind.
4. Retain or strengthen existing natural links where possible rather than create new habitat.
5. Connectivity is much more than 'wildlife corridors'. Stepping stones, alternative land-uses and ephemeral links may also work.
6. Ensure that linkages offer good and diverse habitat quality. Wildlife will not enter linkages if quality is poor, even if destination is pristine.
7. Structural priorities for landscape linkages:
   i. If you're doing corridors, the wider the better – the ultimate test is the maintenance of connectivity.
   ii. Where appropriate, fill in gaps in existing linkages.
8. Location priorities for landscape linkages:
   i. Follow natural movement pathways if known – e.g. migratory routes, daily foraging patterns.
   ii. Follow natural environmental features – rivers, creeklines, drainage lines, ridges, and gullies but attempt to incorporate all habitat types (multiple paths) in one or several links. These are often irregular rather than straight lines between two patches.
   iii. Include existing natural vegetation.
   iv. Unique or irreplaceable linkages should be afforded highest priority.
   v. Locate away from sources of human disturbance, including freeways or roads.
9. Design linkages that encourage wildlife recolonisation from existing source habitats and populations to new or improved ones. The habitat quality in a recipient patch must also be adequate to support populations of species.
10. Re-consider the success of previous works or linkages against their original objectives. Ask whether their effectiveness could be increased as they become part of the landscape, through adaptive management such as provision of nest boxes, habitat manipulation, or increased width.

Ref: "Effective Landscape Restoration for Native Biodiversity in Northern Victoria" Jim Radford, Jann Williams & Geoff Park NCCMA 2006.

Guidelines for Managing Works

Your decision to do some small scale native vegetation management work will ideally be made after consultation with an overall plan of similar works in your district (e.g. Connecting Country at www.connectingcountry.org.au), or with information about similar projects at a landscape scale (e.g. Victoria's Native Vegetation: A Management Framework), or with information about practical details of how to proceed (e.g. Native Vegetation Best Practice Guidelines at http://nvbmp.nccma.vic.gov.au), or through consulting with a person or group of people (e.g your local Landcare Group). Through these sources you will find experience and accumulated knowledge about how to fit a small local project into the ecosystems that function across the whole landscape.
The most important principles are:

1. Use local indigenous species, right down to microsite/niche level. An understanding of bioregional Ecological Vegetation Communities (EVC's) is needed here.
2. Set a goal for the future plantscape: use Victoria's Native Vegetation: A Management Framework and the bioregional Ecological Vegetation Community benchmark.

   • Be prepared to assess your site comprehensively and over time.

   • A Flora and Fauna Survey can be a planning component. This would entail the collection of baseline information about the site's conservation value and would also determine what's actually at the site.
3. Compare your goal to the EVC benchmark – what's missing? – what threats are operating?

   • Build a plan to restore missing elements.

   • Determine actions to protect what you've already got (e.g. deal with threats), then start restoring/rebuilding habitat values.

   • Look at timescales involved – this may influence priorities (e.g. it takes hundreds of years to regrow an old growth tree).

   • Design the equivalent of a biodiversity benefits index, e.g. what can you do to maximise improvements in habitat values for the minimum investment.
4. Make a clear assessment of the country you are working with. In particular, works should be undertaken with the following in mind:

   • Weeds/invasive plants are a severe threat (almost) everywhere

   • Most lower country is over fertile which leads to excessive weed competition and little or no natural regeneration

   • Excessive grazing pressure is almost ubiquitous – wallabies, kangaroos, rabbits and hares as well as sheep and cattle livestock. Over grazing, especially during spring and summer when flowering and seed set/drop is active, is having a severe impact on many herbaceous and shrubby species.

Monitoring and Evaluation

A Changing Landscape-

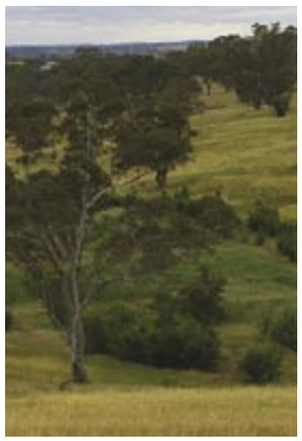
From the diaries of Major Sir Thomas Mitchell:

"The hills presented a bold sweeping outline, and were no longer broken by sharp-edged strata, but crowned with large round masses of rock. Running water was gushing from every hollow in much greater abundance than elsewhere; and, lastly, the timber, which on the other ranges, consisted chiefly of iron-bark and stringy-bark, now presented the shining bark of the blue gum or yarra, and the grey hue of the box. The Anthistiria australis, a grass which seems to delight in granitic soil also appeared in great abundance…I could ride with ease to the summit of the friendly hill, that I had seen from afar, and found it but thinly wooded, so that I could take my angles around the horizon without difficulty…I named the summit Mount Byng. A country fully as promising as the fine region we had left, was embraced in my view from that point. I perceived long patches of open plain, interspersed with forest hills and low woody ranges, among which I could trace out a good line of route for another fifty miles homeward…A broad chain of woody hills connected the coast range with Mount Byng, and I could trace the general course of several important streams through tbe country to the east of it… The sun was setting, when I left Mount Byng, but I depended on one of our natives, Tommy Came-last, who was then with me, for finding our way to the camp; and who, on such occasions, could trace my steps backwards, with wonderful facility by day or night."
September 28 1836. [Mount Byng is Mount Alexander]

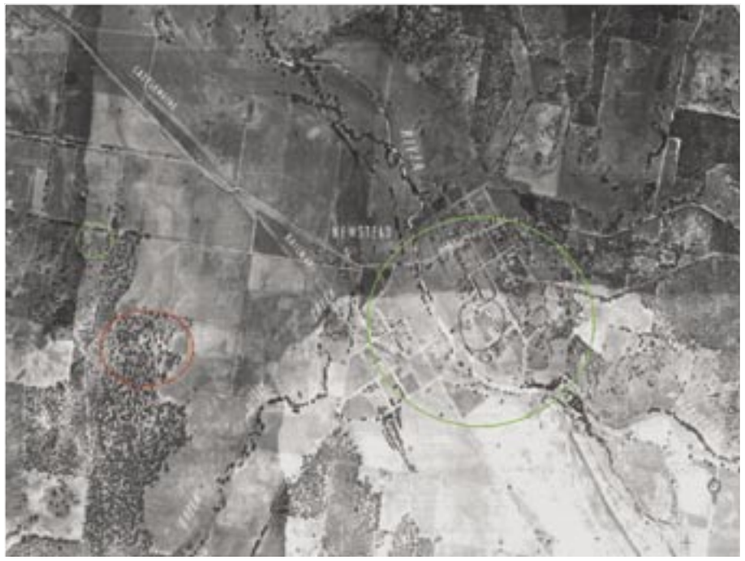
The landscapes of the Mount Alexander region have changed a lot since Major Mitchell passed through: gold mining from the 1850's until the 1930's resulted in vegetation clearance still evident today.

The sequence of air photos on page 40, the first from the late 1940's and the second from 2003 shows how vegetation change has been both positive and negative in different parts of the landscape around Newstead. In the first photo the impact of gold dredging along the Loddon River is clearly visible with extensive regeneration over the past twenty years evident in the second photo. The two smaller circles highlight areas of vegetation loss associated with development and regeneration associated with de stocking and reduced fertiliser application. Aerial photograph resources such as these are an important tool in monitoring vegetation and biodiversity change with many areas of extensive revegetation by landholders and Landcare groups "appearing" on recent imagery.

Left to right: Sutton Grange; Wiry Buttons; Collapsed Mine at Forest Creek; Windmill Grass.



Right: Aerial photograph around Newstead, late 1940s.



Right: Aerial photograph around Newstead, 2003.

Monitoring Environmental Change

"We all monitor the environment. We look, feel, smell and listen."
J Alexandra, S Haffenden, & T White, T" Listening to the Land", ACF 1996

Environmental assessment and monitoring is a critical component of any landscape restoration project. Through monitoring, communities can gain a better understanding of environmental and conservation issues, thereby increasing their knowledge and skills to help protect and enhance local habitat and biodiversity.

Monitoring is the process of undertaking periodical assessments or surveys, recording results, and comparing and evaluating them to determine the effectiveness of actions or the progress of the projects. How frequently this is done, and in what form, will vary according to what is being measured and the purpose of the monitoring. Monitoring is important for two main reasons: it provides feedback on the effectiveness of management actions and hence whether these actions need to be modified, and it enables the determination of whether natural resources are stable, improving or declining.

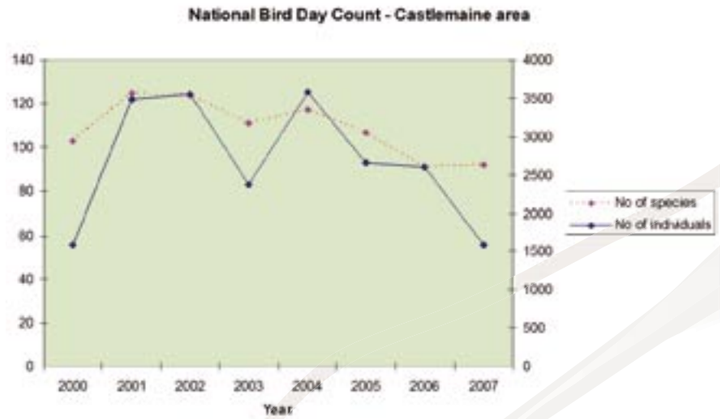
Monitoring can help to:

- Record change over time
- Relate these changes to climate/ environment/management events
- Document the effect of management actions
- Document the extent and severity of (and then recovery after) extreme events eg flood, fire, frost or hailstorm.
- Develop a benchmark against which future performance can be measured
- Use the information gained to determine management actions
- Show up a problem when it is still small
- Support funding applications – and then demonstrate how the grants are being used

Reference: Land for Wildlife Note 43 Photographic monitoring of vegetation (Penny Hussey & Felicity Nicholls, August 2002)

A terrific example of community environmental monitoring has been the work of the Castlemaine Field Naturalists Club in collection of occurrence data for local flora and fauna. One project the Club has undertaken has been an annual National Bird Day Count involving visits to locally significant sites to record bird sightings.

Information such as this is becoming increasingly valuable as we try to understand the impact of habitat loss and the real threat of climate change on our vulnerable bird populations. The graph below shows some preliminary analysis of this data over the past eight years.



Interpretation: There appears to be a slight but noticeable decline in both number of species and number of individuals recorded during National Bird Day counts since 2000. Further analysis is required to associate this trend with factors such as rainfall or eucalypt flowering.

The Community Web Mapping Portal is a key tool that has been developed to support local environmental monitoring and sharing of information for Connecting Country.