

Photographic Monitoring of Vegetation

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Introduction

All managers need to keep records, so that they can assess how they are doing, and adjust management if necessary. Records of things like stocking rates, fertiliser application- and of course cash flow- are a necessary part of managing a farming business. But the records of how the land itself is coping with management are not always taken, because they are less easy to quantify. To do this, it is advisable to **monitor**, that is, to observe and keep a record of change in something over time. The results of monitoring can be used to **evaluate** performance.

Monitoring is the process of undertaking periodical assessments or surveys, recording results, and periodically 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. So that this can be done, the records need to be consistent, comparable, and easily interpreted by any interested person.

Why should we monitor vegetation?

As land managers, it is necessary to understand how and why the land and its vegetation is behaving over time, and the human memory is not as accurate as we would like to think!

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

Revegetation - site planted 1992



A May 1994
Site two years after planting. The Black and Golden Wattles have grown at a fast rate.



B December 1998
Site six years after planting showing shrubby layer of wattles. Photos: Felicity Nicholls

- 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

Which all adds up to

- Developing a better understanding of cause and effect in managing vegetation.

For monitoring vegetation, either remnant vegetation or revegetation sites, a simple yet very useful method is to take a series of photographs, called ‘photopoint monitoring’.

Monitoring short-term changes



A September 2001



B March 2002

This photopoint was set up to monitor the affects of allowing cattle into the area. Note the drying out of the wetland and the trampling of the edge by cattle. The cattle have also grazed the aquatic plants.
Photos: Felicity Nicholls

Monitoring long term changes



A October 1986



B October 1992



C June 2000

Recognisable trees can be used as reference points. It was originally thought that the tree on the left was about to die.

Note:

The two feature trees have hardly changed in size or health over these 14 years

The shrubby melaleucas have become quite dense

Photos: CALM WA

What is Photopoint Monitoring?

A snapshot is a record of a particular site at a particular time. Any picture tells a story, but to get a good monitoring photo takes a little bit more thought.

Photos are best used for monitoring relatively slow changes to vegetation. They build up into a valuable record to hand on to new owners, or to the next generation of the family. Evidence of good management may be useful when dealing with financial institutions! What photos do not do is give exact details of species and sites, so each photo needs a precise set of notes to go with it.

When to use Photopoints

Use photopoints to take the guesswork out of recalling how the country used to look.

Use photopoints to monitor events such as:

- Fencing to remove stock
- Fire
- Storm events- flood/wind/hail/frost
- Weed control
- Feral animal (eg rabbit) control
- Revegetation – both direct seeding and planting
- Effect of landcare works
- Changes in the water table
- Wind and water erosion

Setting up the Photopoint

Which site/s to choose?

The aim of doing photo monitoring is to use the photographs as an easy method of comparison to record change over time so, when you take the initial photo, have clear in your mind what change you expect, eg saline area revegetated, weeds replaced by native vegetation etc.

Your photo site needs to illustrate a distinct feature, for example:

- Exact location of *Phytophthora* Dieback front
- Boundary between burnt/unburnt vegetation
- Extent of salt/waterlogging/erosion/weed/rabbit affected area
- Good example of particular vegetation community
- The growth and health of one particular representative plant
- Direct seeding of revegetation site
- Strand line on flood bank

The location should be carefully chosen to illustrate that ONE FEATURE. The more specific the photo is, the easier will be the interpretation of a sequence of photos.

Choose a recognisable site

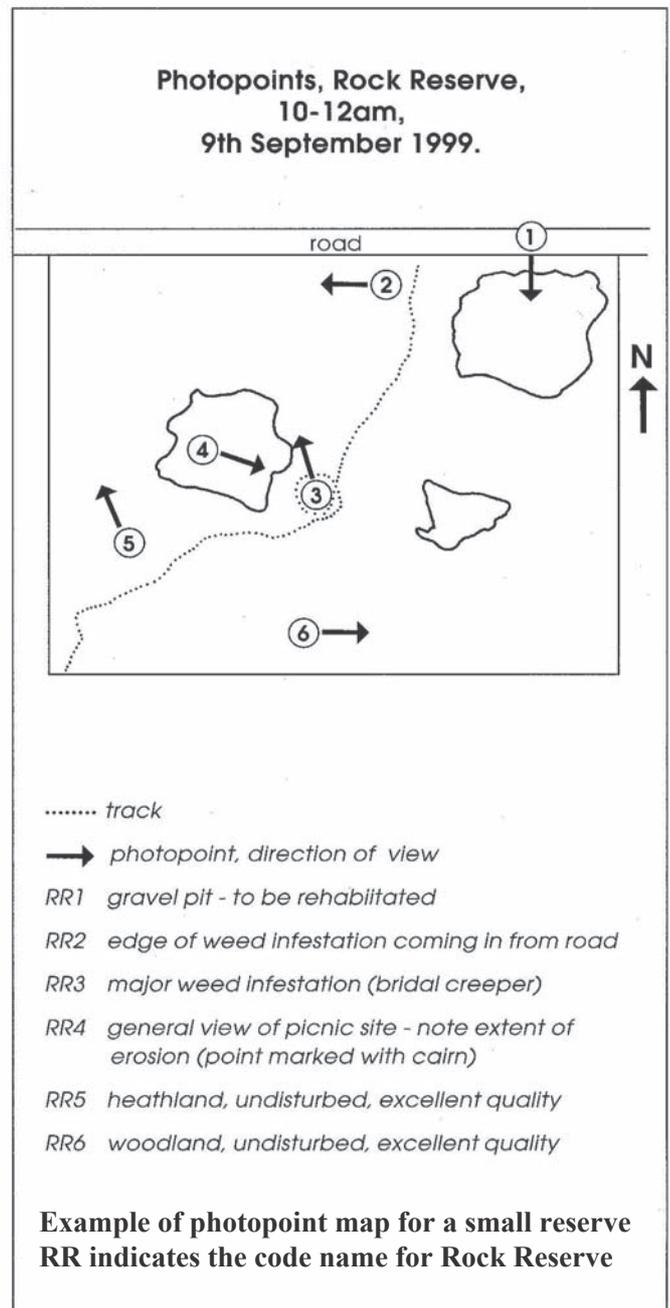
You, and perhaps somebody else, will need to return to the site in future years, therefore, the site must be clearly recognisable. Either use a particular tree, fence post or range of hills for a guide or, better still, mark the site with stakes.

If appropriate, locate the site fairly close to a track for ease of access.

Set it up so that the view from the camera to the point of interest is uncluttered – remember, young tree/shrub vegetation will get taller as it grows.

Note site on map

Locate the site on the main map you are using so that future observers can easily return.



Locate the position and direction of view of each photo on a mudmap (or overlay on an aerial photo), especially if you are taking more than one picture in a particular piece of bushland.

Mark the site

If using a fence post, rock or tree as a marker, it should be identified in some way – paint is the most long-lasting (but remember that smooth-barked eucalypts shed their bark, so marks on a tree trunk are not permanent).

If the site is on private land, or away from interference by vandals, permanent marker posts can be used. Place two posts (eg star pickets) 10m apart in the direction the photo is to be taken, the first is the camera post, the second the sighter post.

Mark the sighter post with a code number that is specific to that site. An aluminium tag could be used for a label, but it must be firmly fixed, so that it cannot be removed - by ravens for example. Paint could be used on a fence post or star picket, or waterproof marker pen on a dropper.

If vandalism is a possibility, put a small marker peg close to the large one. These probably will not be removed and so help in relocating the exact site of the photo.

Take the Photo

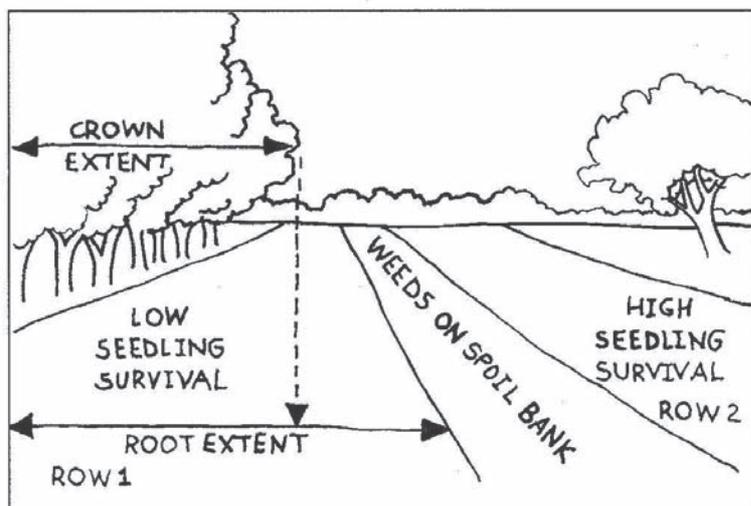
As an option you can lean a databoard against the sighter post. The easiest to use is a clipboard with paper on which is written the site number and date. The writing needs to be large enough to be read on the

Example of a notebook page



Code Number: CB3
Location: Nicholls Gully, Cottles Bridge
Date: 25/5/2001 14:30
Weather: Overcast, no wind, mild
Direction: Due North East (45°)
Purpose of photo: To record the effectiveness of blackberry control
Dominant species: Candlebark, Red Stringybark
Site management: Stock removed in 1989. This will be followed by weed control, erosion control and revegetation.
Site observations: Blackberry patch after it was sprayed in December 2000. No more signs of foxes in den. Tunnel erosion may be a concern. Quickly replace black berries with local native plants.
Fauna information: Grey Kangaroos feed in the gully floor. Wedgetailed Eagle has nest in one of the Candlebarks.
Photographer: Felicity Nicholls

Direct Seeding Trial



Annotate tracing to highlight features of the site.

Make notes such as:

- site preparation was scalping
- weeds on intervening spoil bank
- low seedling survival caused by competition from existing trees.

shadow patterns for estimating the density of woodland cover, for example. It is best to have the sun at an angle to the photograph; directly in front of, or directly behind the photographer is not advisable as it will reduce the amount of detail the photograph can show.

What to record in your field notebook

When you start taking the sequence of photos for a particular site, or a specific project, start by recording:

- Date, time, weather
- Location (perhaps use a GPS)
- Direction (try and use a compass for a precise reading)
- Management history of the site, eg when cleared, when fenced, when planted, last fire, when gravel extraction ceased, etc.
- Reason for taking that photo
- Slope, aspect, soil type, soil condition, eg litter layer, algal crusts etc.
- Erosion, salinity, stock pads, ringbarking or other grazing damage
- List dominant plants
- Note any relevant fauna information
- Photographer

Take the original photo out into the field to try and help align the future photos.

developed photo.

Some cameras have the capability of recording the date on the photograph. For monitoring photographs, this can be useful, as long as it does not detract from an important feature of the photo.

Use a camera with a standard lens, 50mm or 55mm, as this is closest to the image as seen by human eyes. Do not use a wide angle or a telephoto lens, as this alters the perspective of the photo and makes it difficult to repeat.

Sometimes an elevated position, eg standing on the back of a utility, can give the best results, especially if you wish to show understorey density. Try to choose a clear, sunny day for photography, as this will give good

Photopoints in bushland habitat

If you wish to show changes in bushland, it is very useful to make a tracing of the photo and annotate it with plant species information and notes of the specific feature you wish to monitor.

Photopoints in revegetation projects

These should be specifically related to the planting or seeding plan for that project so that they can show eg:

- Growth rate of a particular species
- Effectiveness of a particular weed control treatment
- Change at soil type boundary, etc.

Again, a tracing of the photo with notes attached may be useful. Annotate the drawing with information such as year planted, preparation works and species lists.

Using photos for evaluating projects

To use photopoints for evaluation, it is necessary to systematically compare the elements shown in the photographs with performance against the objectives of the project. To do this properly, the photos need to be combined with quantitative (measured) information taken at the time of photography and recorded in the field notebook. For example:

- Count the number of surviving seedlings
- List the species of plants appearing after fires
- Record the number of bird species.

Acknowledgements

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Further Reading

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Monitoring river/stream restoration



A Early eighties
The severely eroded gully showing bare banks, muddy water and hardly any remnant vegetation.



B 2001
The gully was fenced to control stock, weed control was carried out and local indigenous trees and shrubs were planted. Natural regeneration from the planted stock is now occurring.

Photographic Monitoring of the restoration of the eroded gully on Robert and Rosalind Ellinger's property near Drysdale. The photos record changes over time, which the human memory has difficulty doing accurately. Looking at the changes over time can also make all the efforts of restoration worthwhile. Top Photo: Rosalind Ellinger. Bottom Photo: Elise Jeffery.