Guide to photo monitoring of ecological restoration projects funded by the NSW Environmental Trust

Before

After

Image source – Tweed Landcare Inc. (2017)

Filling Biodiversity Gaps Connecting Tweed Coast to Border Ranges Stage 2 (2015/RR/0071)
Brannian / Sharman Property before and after weed control in a steep gully
Photographs taken by Bushland Restoration Services

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Guide to monitoring of ecological restoration projects

This guide has been developed to assist you to establish and maintain photo monitoring processes for Environmental Trust (Trust) funded projects. Since the Trust funds projects that include a wide variety of activities aiming to improve the environment, there is no 'one size fits all' approach to monitoring. However, the Trust does expect all grantees to establish and maintain photo monitoring for their ecological rehabilitation projects.

This guideline includes the following:

- Guidance on how to establish and maintain your photo monitoring points;
- A completed example of what your group / organisation is expected to submit to the Trust including comparable photographs progressively added during each Stage Progress Report until it is ready for the Final Report;
- A link to a downloadable blank version of the photo monitoring template.
- An explanation of the various fields contained in the blank photo monitoring template version; and
- A blank data sheet (master photo monitoring data recording sheet) used to collate and keep track of the data recorded for each photo monitoring point.

If your project involves monitoring of vegetation and fauna, guidelines on Rapid Assessment Monitoring and Transect Monitoring are also available from the Trust.

The Trust have staff available to help with designing an appropriate monitoring program for your project and can be contacted by telephoning (02) 8837 6093, or by email info@environmentaltrust.nsw.gov.au.

Why monitor?

- Monitoring your project is important for a few reasons:
- It allows you to assess the impact your project has in a measured, visual way, enabling your group or organisation to make adaptive management decisions, and recognise and celebrate your successes.
- It provides the Trust with a quantitative and qualitative appraisal of what your project is achieving, because monitoring information is relayed to the Trust in your progress reports.
- It helps to build a body of data which informs the wider NRM community of the effectiveness of approaches to restoration, whether through innovative or standard practices.

Ultimately monitoring will give you evidence of progressive change that then allows you to evaluate how well you have done, what effect your project has had and the quality of the outcomes you have generated. This then provides you with clear and meaningful information to include in your reporting to the Trust.

Photo monitoring

Photo monitoring is a quick and relatively easy way of measuring change in the natural environment. A series of photos are taken from a fixed location at regular intervals with the aim of visually showing improvement in vegetation condition. Photo monitoring will show broad-scale changes within the framed area but is unlikely to enable fine scale, quantitative assessments to be made.

NOTE: Photo monitoring is essential for all ecological restoration projects funded by the Environmental Trust.

How to establish and maintain photo-points

Step 1: Choose your location

Your photo-points will stay the same for the duration of your project, so you should select fixed locations from across your sites which clearly demonstrate the management issues being addressed through your project activities.

There is no minimum or maximum number of points required, however generally speaking, the more complicated your management issues are and the larger your site is, the more you should provide.

TIPS

Consider proximity to tracks or roads for future accessibility.

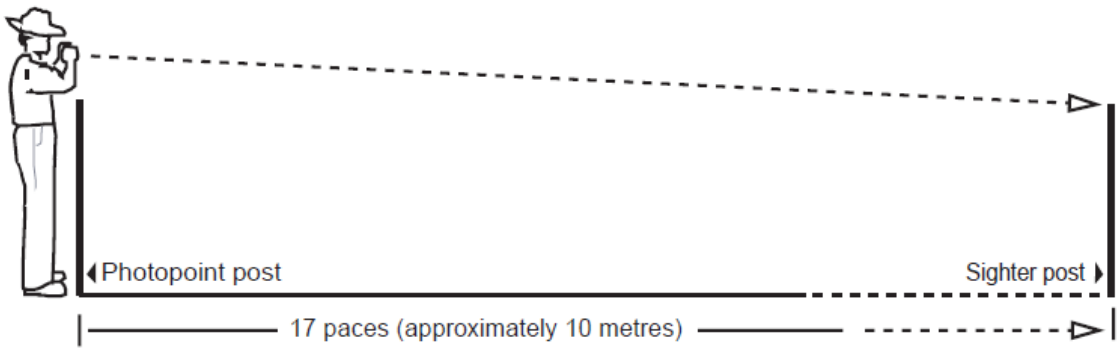
Consider potential vegetation regrowth that may obscure the clarity of future photos taken from the same location.

Consider integrating photo-points with your other monitoring methods (Rapid Assessment and/or transects / quadrats).

Step 2: Mark the location

Install a physical marker (e.g. star-picket, tomato stake, etc.) to mark the point from which a photo will be taken. Then add a sighter post at a set distance (see diagram below).

Attach flagging tape with information including a site reference number, date and aspect. Sites can change significantly following remediation work so this will help with finding the same location at a later stage. Capturing a GPS point using a handheld GPS or smart phone is also a handy method of retracing the approximate location of a photo-point and is highly recommended.

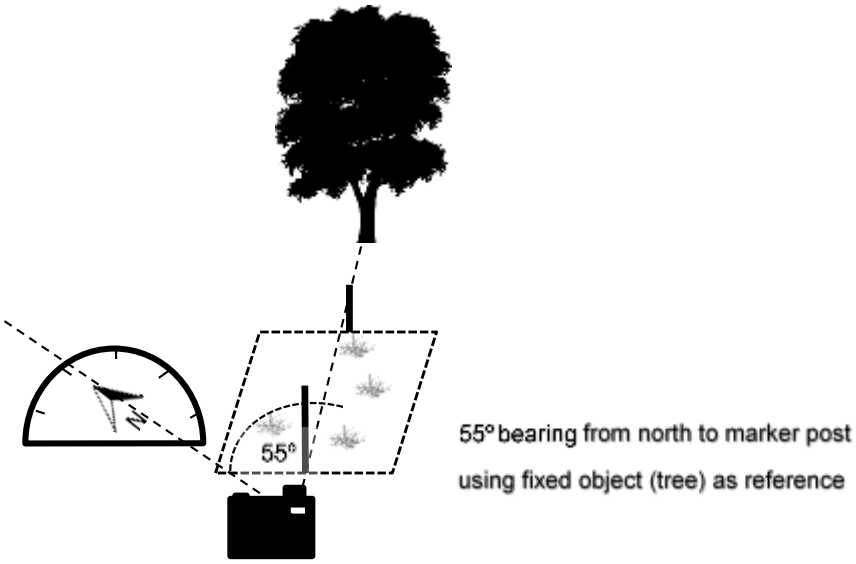


Source: Grodecki & Van Willing, 2010

Step 3: Take the photo

While standing at your marker post, use a compass or GPS to take bearing from due north to the centre of your photo frame (see diagram below). Take a few shots from the marker post (select the best/clearest shot later).

If taking multiple images as part of a panorama, record bearings from north for each image and take sequential photographs (from either left to right or right to left) allowing for each image to overlap so that no gaps exist in the panorama.



REMEMBER

There is no minimum or maximum number of required photo points you can or need to establish. The important thing is to capture images that are representative of your work site.

TIPS

- Try to include a fixed reference object such as a distinctive tree, fence-post etc. in the photo for future reference (note in the example provided the consistent location in the centre background of the large white-trunked tree)
- Consider taking a mix of photos which show your site at a broad scale (landscape) as well as incorporating some of your monitoring plots (transects and/or quadrats). Use the same digital camera and settings (e.g. zoom, light settings, etc.) each time you take photos.
- Take along copies of the original photos for reference when returning to the photo-points to help match the field of view contents.
- Light cloudy days are ideal when sunlight is weaker and shadows from vegetation are less pronounced.
- Avoid taking photos during mist, when dark clouds are passing over or when vegetation/landscape are in mountain

Step 4: Record field data

It is important to record notes when you take each photo which will later help to explain what is being shown in the photo.

Record all information relevant to your photos in photo monitoring template (refer to Appendix 1) immediately after each photograph is taken. This can be transferred into your master photo monitoring data recording table file prepared for each site (refer to Appendix

2). Accurate field notes are a back-up to e-files in case photo file names are labelled incorrectly or become mixed up.

Information for collection includes the photo point reference number, site and zone identification numbers, date and image number (from camera).

Step 5: Repeat

Photo monitoring is most effective when images are captured using a recurring timeframe. It is essential that monitoring stations are established pre-work (baseline) and then revisited 12 months later to show the changes resulting from the on-ground works.

Follow-up photos should then be taken annually at the same time of year as your baseline photo. You can choose to take additional photographs at the same station on a seasonal basis (i.e. summer; autumn; winter; spring) or on a six-monthly basis. Take care to repeat and follow the directions outlined in Steps 3 and 4, being mindful that the same field of view inclusive of the original bearing and reference points are maintained.

Appendix 1

Photo monitoring example using the Trust template

ET Project ref #:	**Photo Point #:**	**Site / Zone # / Name:**	**Bearing:**	**Latitude:** (decimal degrees)	**Longitude:** (decimal degrees)
2018/RR/0099	**PP1**	**Site 1 / Zone 5 / Smith**	**90° (East)**	**-33.5041**	**150.4487**

Baseline (before)	**End of Stage 1**	**End of Stage 2**	**Final**
Date: 3/07/2014	**Date: 30/07/2015**	**Date: 29/07/2016**	**Date: 1/08/2017**
Description: Baseline photo prior to Lantana splatter. Tracks have been cut to allow access.	**Description:** Twelve months after primary Lantana splatter. Early regeneration evident.	**Description:** Two years after primary treatment and follow-up poison. Colonising species increasing.	**Description:** Three years after primary and two follow-up treatments. Significant natural regeneration.
			
Comments: 95% Lantana coverage. Some native canopy species observable (Red Ash, *Trema*)	**Comments:** Lantana coverage now <10%. Bleeding heart, Bracken and *Trema* initial regen response.	**Comments:** Lantana coverage now <5%. Giant Stinging Tree germination recorded.	**Comments:** Lantana no longer present. Adjusted photo location to capture scope of regeneration.

Download blank template

A blank version of this document can be downloaded and edited from the following link.

Explanation of template fields

Field		Description
1.	ET Project ref #:	Your Environmental Trust grant reference number (e.g. 2018/RR/0099)
2.	Photo Point #:	Each of your photo points are to be given an identification number (e.g. PP1)
3.	Site / Zone # / Name:	This will also correspond with the photo point location in your project map. (E.g. Site 1 / Zone 5 / Smith)
4.	Bearing	Compass bearing of direction of photo (e.g. 90°)
5.	Latitude / Longitude:	Enter data as Decimal Degrees and limit to 4 decimal places. e.g. -33.1234 and 150.1234. (Please do not enter as degrees, minutes, seconds format.)
6.	Baseline (before)	This photo should capture pre-work condition of your selected monitoring location. Your baseline photo should be taken during your projects site assessment and planning activities.
7.	End of Stage 1	This photo is to be taken at the completion of your stage 1 activities and submitted with your stage 1 progress report.
8.	End of stage 2	This photo is to be taken at the completion of your stage 2 activities and submitted with your stage 2 progress report.
9.	Final	This photo should be taken at the end of your project and submitted with your final report.
10.	Date	Enter the exact date the monitoring photo was taken.
11.	Description	For each photograph, describe the scene. Include useful information such as targeted weed species and density, regeneration response, significant species, etc.
12.	Comments	**This is optional.** Where relevant, provide additional higher level detail for each photo (e.g. unexpected weed responses, problems encountered, etc.)

Appendix 2

Example of record keeping using photo monitoring master data sheet

ET Project ref #:	2018/RR/0099		
Site / Zone # / name:	**Latitude / Longitude:**	**Bearing:**	**Photo point #:**
Site 1 / Zone 5 / Smith Site 1 / Zone 3 / Smith Site 1 / Zone 1 / Smith	-33.5041 / 150.4487 -33.5034 / 150.4481 -33.5050 / 150.4510	90 deg 275 deg 180 deg	PP1 PP2 PP3
Date	**Photo Point #**	**Camera Image #**	**Description**
3/07/2014	PP1	DSC2018P1	Baseline photo prior to Lantana splatter. Tracks have been cut to allow access.
3/07/2014	PP2	DSC2018P2	Baseline photo showing Paspalum infestation in gully.
3/07/2014	PP3	DSC2018P3	Baseline photo of Camphor Laurel at head of gully.
30/07/2015	PP1	DSC2019P1	Twelve months after primary Lantana splatter. Early regeneration evident.
30/07/2015	PP2	DSC2019P2	Twelve months after Paspalum overspray. Follow-up spray required.
30/07/2015	PP3	DSC2019P3	Twelve months after drill & fill of mature Camphor. Early regeneration evident.
Click or tap to enter a date.			
Click or tap to enter a date.			

Download blank master data template

A blank version of this document can be downloaded and edited from the following link.

Explanation of master template fields

Field		Description
1.	ET Project ref #:	Your Environmental Trust grant reference number (e.g. 2018/RR/0099)
2.	Site / Zone # / Name:	This will also correspond with the photo point location in your project map. (E.g. Site 1 / Zone 5 / Smith)
3.	Latitude / Longitude:	Enter data as Decimal Degrees and limit to 4 decimal places. e.g. -33.1234 and 150.1234. (Please do not enter as degrees, minutes, seconds format.)
4.	Bearing	Compass bearing of direction of photo (e.g. 90°)
5.	Photo Point #:	Each of your photo points are to be given an identification number (e.g. PP1)
6.	Date	Enter the exact date the monitoring photo was taken.
7.	Camera Image #	The digital reference number assigned to the photo by your camera.
8.	Description	For each photograph, describe the scene. Include useful information such as targeted weed species and density, regeneration response, significant species, etc.