



Australian Government
Department of the Environment

Vegetation Assessment Guide



© Commonwealth of Australia, 2013.



Vegetation Assessment Guide is licensed by the Commonwealth of Australia for use under a Creative Commons By Attribution 3.0 Australia licence with the exception of the Coat of Arms of the Commonwealth of Australia, the logo of the agency responsible for publishing the report, content supplied by third parties, and any images depicting people. For licence conditions see: <http://creativecommons.org/licenses/by/3.0/au/>

This report should be attributed as '*Vegetation Assessment Guide*, Commonwealth of Australia 2013'.

The Commonwealth of Australia has made all reasonable efforts to identify content supplied by third parties using the following format '© Copyright, [name of third party]'.

Disclaimer

The views and opinions expressed in this publication are those of the authors and do not necessarily reflect those of the Australian Government or the Minister for the Environment.

Table of Contents

Glossary	ii
Abbreviations	iii
Introduction	1
When to undertake monitoring	2
Equipment	2
Monitoring approach	3
Controls	3
Desktop identification of vegetation type	4
Recording and Submitting Data	5
Locating your start points in the field	5
Establishing your plots and transects in the field	6
Measuring native and exotic ground cover	7
Recording evidence of exotic fauna	8
Measuring overstorey and midstorey projected crown cover—native	9
Measuring overstorey and midstorey projected crown cover—exotic	10
Record crown type (CT) of native overstorey—native	10
Record plant species diversity	11
Data management	11
References	11
Appendix A—Indicative height thresholds for major vegetation groups	12
Appendix B—Crown type cover visual reference card	15
Site Details	16
Field Sheet 1: Ground cover	17
Field Sheet 2: Evidence of exotic fauna	18
Field Sheet 3: Overstorey and midstorey projected crown cover	19
Field Sheet 4: Crown Type	20
Field Sheet 5: Species Diversity	21
Field Sheet 6: Exotic species	22

Glossary

Bare ground	Ground that does not support living vegetation, cryptogams or exposed rock.
Canopy	The structural layer of foliage of the overstorey or midstorey in a forest, woodland, shrubland or heathland community at full development for a vegetation type.
Crown Type	The percentage of the ground that would be shaded by a vertical projection of foliage, branches and other life forms in the overstorey.
Cryptogams	Mosses, lichen, algae, ferns.
Department	The Australian Government Department administering the programme.
Exotic species	A plant or animal species that is not indigenous to any part of Australia.
Ground cover	The percentage cover of all elements of the ground layer.
Ground layer	The lowest layer of vegetation generally comprised of grasses, sedges, forbs, herbs, prostrate shrubs or seedling trees.
Midstorey	The middle layer of a vegetation community usually consisting of shrubs and small trees that grow below the canopy of the overstorey. Midstorey must meet a height threshold for each vegetation type.
Organic litter	Detached wood or leaf matter lying on the ground.
Overstorey	The tree canopy in a forest or woodland community. Overstorey must meet a height threshold for each vegetation type.
Plot	Quadrat within which ecological attributes are sampled in the field. Standard dimensions are 20 metres x 20 metres.
Project area	The area your project covers.
Project site	The site where you are undertaking activities within your project area. Some project areas and sites may be the same.
Projected crown cover	The proportion of the ground covered by the vertical projection of the tree crown, or more simply, the width of the tree crown.
Recruitment	Regeneration of plants following seed fall and germination and includes seedlings, saplings and other advanced regrowth.
Transect	A linear sampling unit at a predetermined start point, using a predetermined compass bearing that is established using a 50 m tape.
Treatment site	A site that is located in vegetation within which a specific intervention or activity is being carried out.

Abbreviations

CT	Crown Type
MVG	Major Vegetation Groups within the NVIS
NVIS	National Vegetation Information System
PCC	Projected crown cover



Introduction

Monitoring the change in condition of native vegetation is important for natural resource management programmes at both the project and programme scale. At the project scale, monitoring vegetation allows project participants to observe the response of ecological indicators such as ground cover and native plant diversity to specific interventions such as grazing control or weed management. At the programme scale, the data from a range of projects can provide information on the overall performance of the programme, across interventions, vegetation types and geographic regions.

This Guide provides practical instructions for carrying out standard vegetation condition assessments for funded projects. It describes how to establish your vegetation condition monitoring sites in your project area, how to set up a transect and plot, or series of transects and plots, and how to record data on vegetation cover and exotic fauna.

Before you begin this monitoring, you should read this Guide to understand what is required. Please ensure you have the correct equipment and follow the steps outlined.

When to undertake monitoring

As a minimum, this monitoring should be undertaken before project works begin, a baseline, with a repeat survey undertaken toward the end of the project, after all works have been completed. However, surveys can be undertaken annually if desired. The monitoring described in this Guide should be undertaken at the appropriate time as described below:

- North of the Tropic of Capricorn—April to June.
- All other parts of NT, Qld and WA, and SA—August to November.
- Northern NSW (north of Newcastle)—August to November.
- ACT, Vic, and southern NSW (other than alpine zones)—October to December.
- Mainland alpine zones (above 1600 metres), and Tas—November to December.

Projects north of the Tropic of Capricorn will submit data with their **annual report** while all other projects will submit theirs with the **mid-year report**.

Equipment

The following list of equipment is required to undertake the Guides monitoring in the field:

- 50 metre tape: Required to establish the transect, this tape is left in place during monitoring.
- 20 metre tape: Required to establish the plot.
- Compass: Required to determine your transects bearing and to establish the plot.
- GPS device (if available): Required to record start point latitude and longitude.
- 45° set square or clinometers: To determine tree height.
- Flagging tape: May be required to help identify boundaries of the plot.
- Seven marker pegs, per transect/plot and a hammer.
- Sampling staff or 1 metre ruler: Required for detection of exotic fauna evidence and measuring native and exotic ground cover.
- Sighting tube (roughly 10 cm long and 4 cm diameter): Required to measure crown type.
- Field sheets: Either using a tablet device or printed versions of the sheets found at the back of this Guide. You may need multiple copies of each field sheet.
- Botanical field guide/s relevant to your region and vegetation type: May assist in determining native or exotic vegetation for ground cover and species diversity measures.

Monitoring approach

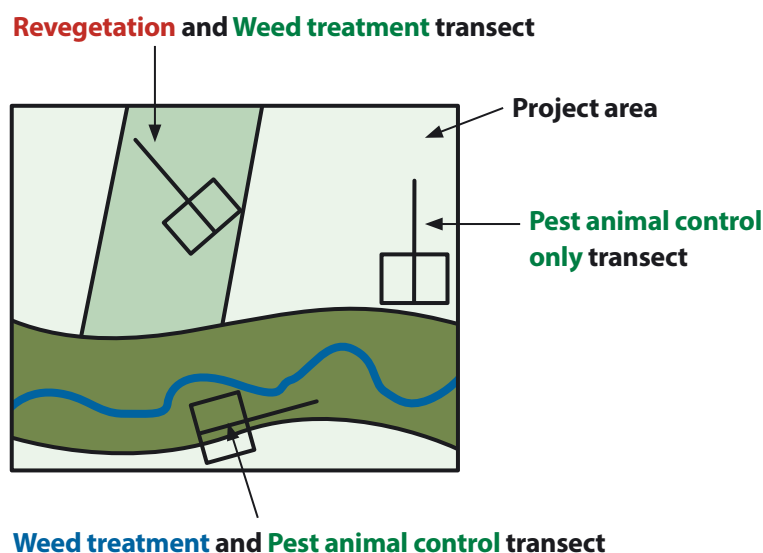
The transects for your project will be at least one 50 metre straight line starting from a predetermined start point and run along a compass bearing. Each transect will also require a plot, a 20 metre by 20 metre square with the transect running through its centre, see Figure 1. As described below and in Figure 1, you may need to establish more than one transect and plot in your site depending on the activities you are undertaking.

The sampling locations should be representative of all projects activities. If the project involves a range of activities with the aim to improve vegetation condition, for example, weeding, revegetation and pest animal control, the sampling site/s will need to represent this. If one site has all these activities being undertaken, then 1 sampling site may suffice. However, if the weeding, revegetation and pest control are happening at three separate sites, all these sites will require sampling.

Controls

A control site, representative of the vegetation being managed at the intervention site/s, is also required when possible. A control site should be situated where no project activities are being undertaken. The data from the control sites will allow the project participants and the Department to differentiate change as a result of the project's intervention from those that have occurred because of other factors. As far as possible, control sites should be similar to the intervention site before the intervention, and located as close to the intervention site as practicable. If multiple vegetation types are being managed, each will require a control site. Projects who, because of property size or vegetation constraints for example, cannot establish a control site on their property will not require a control site.

Figure 1: The number of transects and plots you will have to complete is dependent on getting a representative sample across all vegetation condition related activities.



If your project has multiple sites you will need to select the site most indicative of the project's work to carry out Vegetation Assessment monitoring. Projects will need to establish monitoring transects and plots based on the project area. These details are:

- <10 ha 1 intervention site transect and plot, 1 control site transect and plot
- 10—100 ha 3 transects and plots, 1 control site transect and plot
- > 100 ha 5 transects and plots, 2 control sites transect and plot

Desktop identification of vegetation type

Before you begin any fieldwork, you should review *Appendix A—indicative height thresholds for major vegetation sub-groups* and ensure you know which vegetation group your project fits within. After mapping your site in the Departments online reporting tool, you will be able to view your NVIS major vegetation sub-group. For instructions on mapping a site refer to the online reporting tools user guides which can be found here—www.nrm.gov.au/funding/merit/user-guides.html

Once your site is established, simply click on the site to reveal the following screen, under 'NVIS major vegetation subgroup' you will find a reference to the appropriate grouping for your site.

The screenshot shows the MERIT web interface for 'test site 1'. The header includes the Australian Government logo and the MERIT title. The navigation bar has links for Home, About, Help, and Contacts, along with user information (Andy Westcott), My projects, Administration, and Logout. The main content area displays the site details for 'test site 1', including a description field, metadata fields (External id, Type, Area, State/territory, Local government area, NRM, Locality), and the NVIS major vegetation group and subgroup. The NVIS major vegetation subgroup is highlighted with a red box: 'Eucalyptus open forests with a grassy understorey'. Below this, there is a section for 'Projects associated with this site' showing a project 'P Brenton test project 2'. To the right of the site details is a map showing the site location with a red pin. The map is labeled 'Map' and 'Satellite'. At the bottom, there is a section for 'Activities at this site' with a table of activities.

Type	Description	From	To	Status
Community Participation and Engagement	Community participation and engagement	22-05-2014	22-05-2014	Finished
Vegetation Assessment - Commonwealth government methodology	Site 1, vegetation assessment	01-10-2014	01-10-2014	Planned

Recording and Submitting Data

Data will be submitted via the Departments online reporting tool, <https://fieldcapture.ala.org.au/>. This can be done in two ways. The first is to enter the data directly into the online reporting tool while in the field using a tablet device. To do this follow these steps:

- Prior to undertaking field work, you will need to ensure you have worked with your grant manager to have the appropriate number of ‘Vegetation Assessment—Commonwealth government methodology’ forms added in your “plans & reports” tab. See the online reporting tool user guide for instructions, www.nrm.gov.au/funding/merit/user-guides.html
- Map your site, see online reporting tool user guide for instructions. www.nrm.gov.au/funding/merit/user-guides.html
- Map your site in the online reporting tool to determine the NVIS major vegetation sub group, see the ‘Desktop identification of vegetation type’ section above for instructions.
- You will require internet access in the field to be able to enter the data.
- In the field simply access your project and under the ‘Plans and Reports tab’ click on the appropriate ‘Vegetation Assessment—Commonwealth government methodology’ form. This will display the field sheets on your tablet.
- Undertake the vegetation condition assessment as described in this Guide and enter the data directly into the form. See online reporting tool user guide for instructions. www.nrm.gov.au/funding/merit/user-guides.html
- Once completed, save the form.

Alternatively, record the data onto the field sheets at the back of this Guide, noting several copies may be required. Once back in the office this can be manually transferred to the online form in the Departments online reporting tool. To do this you will have to ensure you have worked with your grant manager to have the appropriate number of ‘Vegetation Assessment—Commonwealth government methodology’ forms added to your “plans & reports” tab.

Locating your start points in the field

Use Site Details sheet to record start points

You should locate your transect and plot in an area that is most representative of your project. To do this you must establish and record a start point at least 50 metres away from the edge of your project area to ensure edge effects will be limited, ensure that an entire transect and plot will fit within the area selected. The further away from the edge of the site you place your start point the better. Record the location of your start point using a GPS, mapping program on a portable device such as a tablet, or simply by inserting a marker peg for future surveys.

Once you have established your start point record a compass bearing which will determine the direction of your transect.

Establishing your plots and transects in the field

Use Site Details sheet to record compass bearing, site number

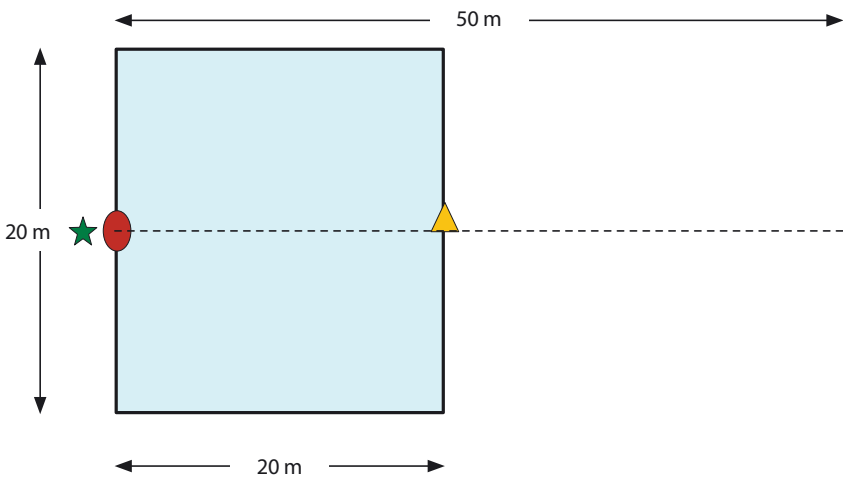
At your start point, insert a marker peg and appropriate identification that can allow the point to be easily located for future surveys.

From the start point measure 20 metres with your 50 metre tape along the defined compass bearing. Be aware that a metal marker peg may interfere with your compass bearing. At the 20 metre point, insert an alignment marker peg. This will assist you in ensuring the transect is straight over the full 50m.

Continue to run the 50 metre tape along the established bearing past the alignment marker and place a third marker peg at the end of the tape. You now have your transect established as shown in Figure 2.

Mark out your 20 metre x 20 metre plot as shown in Figure 2. The transect runs through the centre of the plot. Mark the plot sufficiently (e.g. highly visible flagging tape at 5 m intervals in densely vegetated areas) along each side to ensure you are able to easily discern where the plot ends during monitoring.

Figure 2: Establishing a transect and plot



Sampling unit		Attributes measured	
★	Photo point	Point from which plot was located and oriented, and from which plot image is recorded 5 metres back behind reference point	
●	Start point	Reference marker post with ID tag attached	
▲	Alignment Point	Alignment marker positioned 20 metres from reference point along the transect	
□	Plot	Species diversity, survivability	
----	Transect	Native and exotic crown cover	Cryptogram
		Native and exotic groundcover	Rock
		Crown type	Bare ground
		Organic litter	Exotic fauna

Measuring native and exotic ground cover

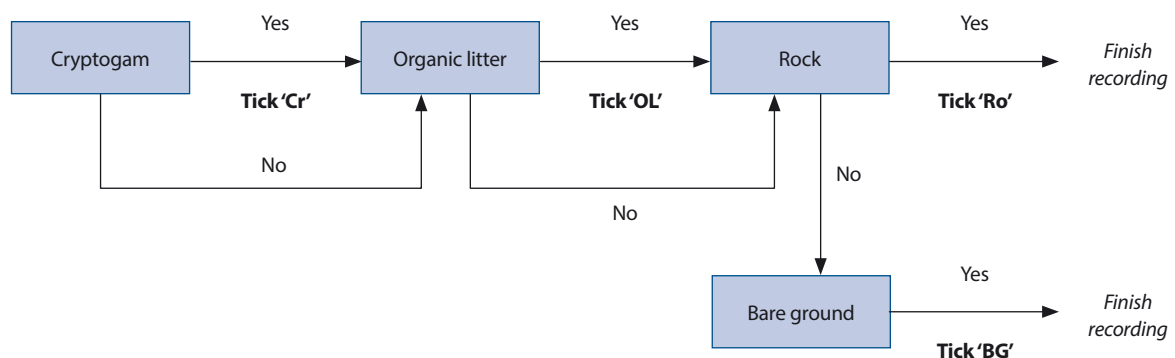
Use Field Sheet 1

At each metre along the transect, beginning at 1 and ending at 50, take a sampling staff or a one-metre ruler and hold it vertically next to the tape with the bottom resting on the ground. If the staff touches a native plant (indigenous or naturalised native) and/or an exotic plant, at a height between 0 and 1 metre record the number and type of plants touched. Species is not necessary just if the plant is native or exotic. For example, if the staff touches one *Acacia*, record it in the “Na” column as “1”.

- If the sampling staff touches a fern, record it as a cryptogam.
- If the staff clearly does not touch a living plant at ground level follow the logic in Figure 3 and record one, two or three of the following ground layer elements: cryptogam (e.g. moss, lichen), organic litter, exposed rock, or bare ground.
- If you intersect open water (e.g. flooded wetland or a temporary pond), record its presence and the ground cover (using the logic in Figure 3) that is evident to the best of your ability.

Sampling any vegetation community should be avoided immediately following locally heavy rains or floods. Record all ground cover data on Field Sheet 1.

Figure 3: The logic below will guide you on recording ground cover



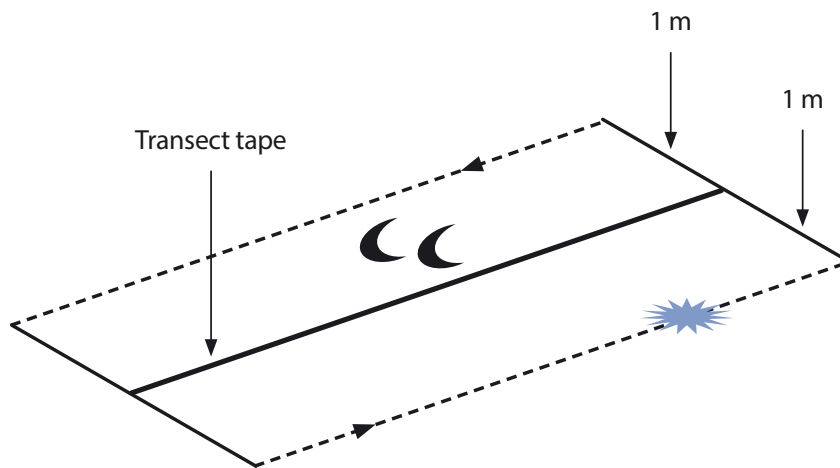
Recording evidence of exotic fauna

Use Field Sheet 2 to record exotic fauna

This form is optional for projects funded after 2013, these projects should instead select the 'Pest animal survey' form in the Departments online reporting tool.

To record presence of exotic fauna you will need to identify their evidence one metre either side of the transect. To do this, stand at 0 metres (start point) and hold the sampling staff or 1 metre ruler in front of you at right angles to the transect and parallel to the ground, ensuring one end of the staff is lined up with the transect. Walk the length of the transect and record any evidence of exotic fauna. When you reach 50 metres, turn around and repeat the process on the other side of the transect from 50 metres to 0 metres, as shown in Figure 4.

Figure 4: Measuring exotic animal evidence



You should record evidence of exotic fauna tracks, scats, warrens, diggings or other traces, including those that are partly within the 1 metre threshold, in the 'exotic' section of Field Sheet 2. A field guide such as *Tracks, Scats and Other Traces* (Triggs, 2005) may help in identifying evidence of exotic fauna. If possible, remove the evidence you have recorded to ensure you will record fresh evidence the next time you do a survey.

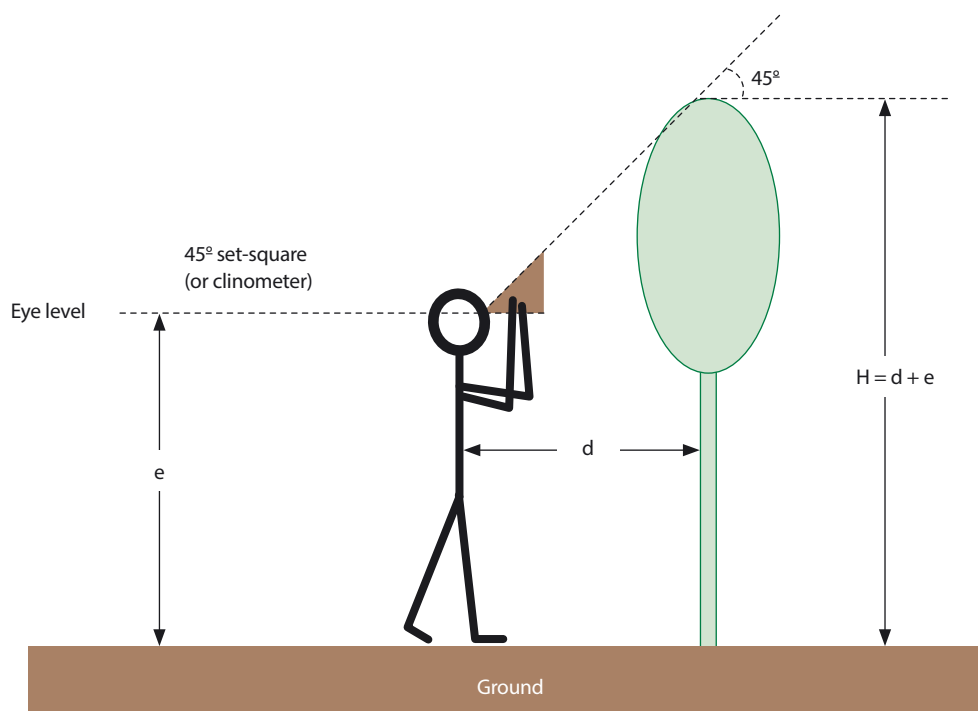
Measuring overstorey and midstorey projected crown cover—native

Use Field Sheet 3 to record projected crown cover—*If your transect is in a revegetation site it is unlikely you will have any significant data to record however you must record “zero” if there is no projected crown cover.*

If you are within a vegetation type that normally comprises a native overstorey, you will need to measure its projected crown cover (PCC). This includes all native overstorey species including naturalised natives (i.e. native vegetation outside its natural range) along the transect that achieve the minimum height threshold for your vegetation type. You will need to refer to Appendix A to check what the thresholds are for your National Vegetation Information System (NVIS) Major Vegetation sub-group. Do not include overstorey species that are shorter than this, and do not include tall midstorey species if the vegetation type possesses a distinctive midstorey.

If unsure of the height of a tree you can estimate its height using a 45° set square or clinometer as shown in Figure 5. In the Figure 5 example, the person has approached the tree until the top point of the set square is aligned with the top of the tree. Assuming the eye level of the person is 1.8 metres and they are 5 metres from the tree. The height of the tree can be estimated with this formula: 5 m + 1.8 m = Tree height of **6.8 metres**.

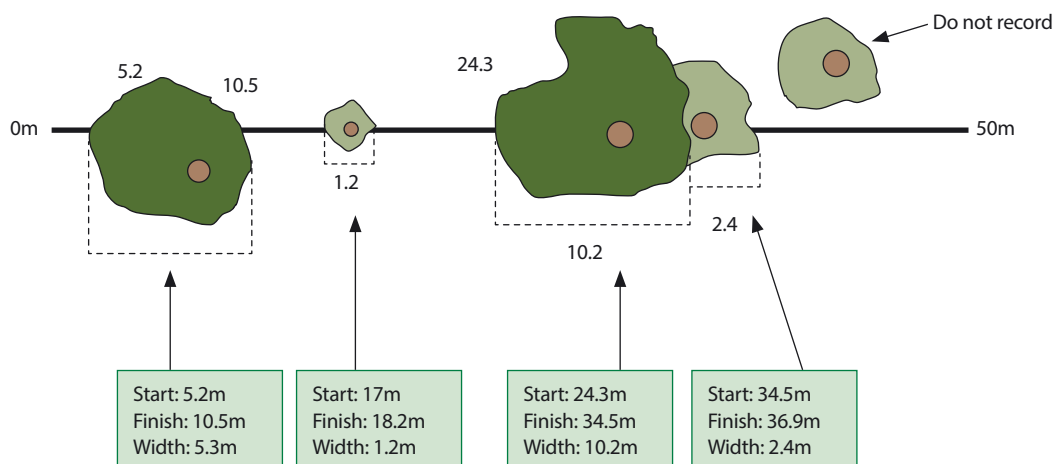
Figure 5: Measuring tree height (Height = eye level + distance from tree)



Ensure you measure the heights of trees that appear to be close to the overstorey height threshold to determine whether they need to be sampled.

To estimate PCC, walk along the transect tape and record all distances along it that the living canopy of all native overstorey plants start and end directly above the tape. You should record the distance from where the tree overlaps the transect to where it finished overlapping, not necessarily the actual width of the tree. Figure 6 illustrates this process. Enter data on Field Sheet 3. Repeat the process for native midstorey plants if applicable.

Figure 6: Measuring projected crown cover along a 50 metre transect



Note: that if the canopies of trees overlap you should measure the width of the tallest tree and begin counting the shorter tree where the taller tree finishes as illustrated above. The PCC for the transect is calculated using the widths, for example: $5.3 + 1.2 + 10.2 + 2.4 = 19.1 \text{ m} / 50 = 0.382 \times 100 = 38.2\%$. This process should be repeated for midstorey species.

Measuring overstorey and midstorey projected crown cover—exotic

Use Field Sheet 3 to record exotic PCC- *If your transect is in a revegetation site it is unlikely you will have any significant data to record however you must record "zero" if there is no projected crown cover.*

The process described for measuring native PCC is repeated for the exotic overstorey and midstorey PCC, if applicable. Enter data on Field Sheet 3.

Record crown type (CT) of native overstorey—native

Use Field Sheet 4 to record CT, if your transect is in a revegetation site it is unlikely you will have any significant data to record however you must record "zero" if there is no projected crown cover.

Locate up to 10 points along the 50 metre transect that are each at least 3 metres apart and at which the native overstorey canopy is directly overhead. The results from the projected crown cover monitoring will help to determine these points. Ensure that at each point no clear sky can be seen around the edge of the canopy when viewed through a sighting tube. The tube will have a similar diameter and length to a toilet roll. Two or more points on the transect may be positioned under the canopy of the same tree, as long as the points are spaced at least 3 metres apart.

As with the projected crown cover method it is important that you only include trees that achieve the overstorey height threshold for your NVIS Major Vegetation Sub-Group as shown in Appendix A.

At each point, record the distance along the transect from the start point. Then record the CT at that point by looking vertically upwards through a sighting tube and estimating cover by reference to the printed field chart in Appendix B. Record the result on Field Sheet 4.

Record plant species diversity

Use Field Sheet 5 and 6

All overstorey, midstorey and groundcover species, both native and exotic, will be recorded in the plot.

To record species diversity walk the plot from side to side ensuring you cover the whole plot recording all native and exotic species encountered on Field Sheet 5. **Only record each species identified in the plot once.** Record each native species as Species 1, Species 2, Species 3 etc. Continue this numbering for each new native species identified. For exotic species, follow the same methodology but label each new species identified as Exotic 1, Exotic 2 etc and also record on Field Sheet 5. You may need to take multiple copies of Field Sheet 5 into the field. If known, record the common and botanical names of the exotic species identified on Field Sheet 6.

Data management

Data can be uploaded into the Departments online reporting tool at any point and can be submitted when the relevant reporting period opens. Guidance on this process is available on the online tool. The data will not be used as a measure of success or otherwise of an individual project but as one of several indicators to gauge the relevant programmes impact on the broader environment.

References

Triggs, B. (2005). *Tracks, scats and other traces: a field guide to Australian mammals*. Oxford University Press.

Appendix A—Indicative height thresholds for major vegetation groups

NVIS Major Vegetation Group	NVIS Major Vegetation Subgroup ¹	Height thresholds (m)		
		Overstorey	Midstorey	Ground layer
Rainforests and Vine Thickets (MVG 1)	Temperate rainforests	>15	1–15	<1
	Tropical or sub-tropical rainforests	>20	1–20	<1
	Dry rainforests	>5	1–5	<1
	Vine thickets	>2	1–2	<1
Eucalypt Tall Open Forests (MVG 2)	Eucalyptus tall open forest with a dense broad-leaved and/or tree-fern understorey (wet sclerophyll)	>20	1–20	<1
	Eucalyptus tall open forest with a fine-leaved shrubby understorey OR Eucalyptus tall open forests and open forests with ferns, herbs, sedges, rushes or wet tussock grasses	>20	1–20	<1
Eucalypt Open Forests (MVG 3)	Eucalyptus open forest with a shrubby understorey	>10	1–10	<1
	Eucalyptus open forest with a grassy understorey	>10	1–10	<1
Eucalypt Low Open Forests (MVG 4)	-	>5	1–5	<1
Eucalypt Woodlands (MVG 5)	Eucalyptus woodlands with a shrubby understorey OR Eucalyptus woodlands with a chenopod or samphire understorey	>10	1–10	<1
	Eucalyptus woodlands with a grassy understorey OR Eucalyptus woodlands with ferns, herbs, sedges, rushes or wet tussock grassland OR Eucalyptus woodlands with a hummock grass understorey	>10	1–10	<1
Acacia Forests and Woodlands (MVG 6)	Brigalow (Acacia harpophylla) forests and woodlands	>10	1–10	<1
	Other Acacia forests and woodlands	>8	1–8	<1
	Mulga (Acacia aneura) woodlands and shrublands +/- tussock grass +/- forbs OR Mulga (Acacia aneura) woodlands and shrublands with hummock grass	>5	1–5	<1
Callitris Forests and Woodlands (MVG 7)	Callitris forests and woodland (Eastern occurrences)	>10	1–10	<1
	Callitris forests and woodlands (mallee, arid and semi-arid occurrences)	>4	1–4	<1
Casuarina Forests and Woodlands (MVG 8)	Casuarina and Allocasuarina forests and woodlands	>8	1–8	<1
	River Oak forests and woodlands	>15	1–15	<1
Melaleuca Forests and Woodlands (MVG 9)	Melaleuca open forests and woodlands	>8	1–8	<1

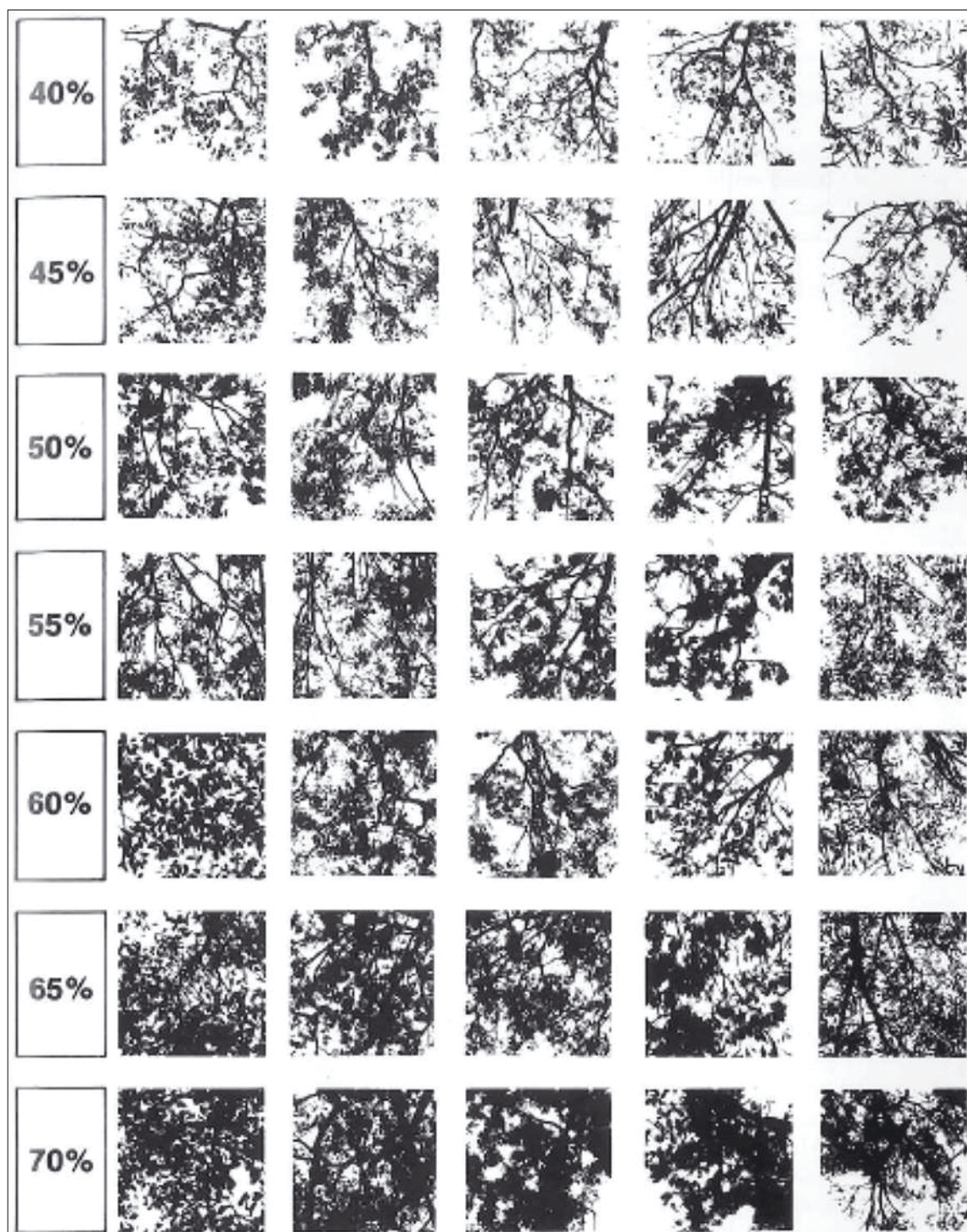
NVIS Major Vegetation Group	NVIS Major Vegetation Subgroup ¹	Height thresholds (m)		
		Overstorey	Midstorey	Ground layer
Other Forests and Woodlands (MVG 10)	Banksia woodlands OR Leptospermum forests and woodlands OR Other forests and woodlands	>10	1–10	<1
	Tropical mixed species forests and woodlands	>10	2–10	<2
Eucalypt Open Woodlands (MVG 11)	Eucalyptus open woodlands with a grassy understorey OR Eucalyptus open woodlands with shrubby understorey	>8	1–8	<1
	Eucalyptus low open woodlands with tussock grass OR Eucalyptus low open woodlands with hummock grass OR Eucalyptus low open woodlands with a shrubby understorey OR Eucalyptus low open woodlands with a chenopod or samphire understorey	>4	1–4	<1
Tropical Eucalypt Woodlands/Grasslands (MVG 12)	Tropical Eucalyptus forests and woodlands with a tall annual grassy understorey	>10	2–10	<2
Acacia Open Woodlands (MVG 13)	Mulga (Acacia aneura) open woodlands and sparse shrublands +/- tussock grass OR Mulga (Acacia aneura) open woodlands and sparse shrublands with hummock grass	>2	1–2	<1
Mallee Woodlands and Shrublands (MVG 14)	Mallee with hummock grass OR Mallee with a tussock grass understorey OR Mallee with a dense shrubby understorey OR Mallee with an open shrubby understorey	>4	1–4	<1
Low Closed Forests and Tall Closed Shrublands (MVG 15)	Low closed forests or tall closed shrublands (including Acacia, Melaleuca and Banksia)	>4	1–4	<1
Acacia Shrublands (MVG 16)	Acacia (+/- low) open woodlands and sparse shrublands with a shrubby understorey OR Acacia (+/- low) open woodlands and sparse shrublands with chenopods OR Acacia (+/- low) open woodlands and sparse shrublands +/- tussock grass OR Acacia (+/- low) open woodlands and sparse shrublands with hummock grass	>2	1–2	<1
	Other Acacia tall open shrublands and shrublands	>4	1–4	<1
Other Shrublands (MVG 17)	Melaleuca shrublands and open shrublands OR Casuarina/Allocasuarina shrublands (C. equisetifolia, A. littoralis, A. verticillata) OR Other shrublands	>3	1–3	<1
	Lignum shrublands and wetlands	n/a	>1	<1
	Other sparse shrublands and sparse heathlands	n/a	>1	<1

NVIS Major Vegetation Group	NVIS Major Vegetation Subgroup ¹	Height thresholds (m)		
		Overstorey	Midstorey	Ground layer
Heathlands (MVG 18)	Heathlands	n/a	>1	<1
Tussock Grasslands (MVG 19)	Temperate tussock grasslands	n/a	n/a	<1
	Mitchell grass (Astrebla) tussock grasslands and Blue grass (Dichanthium) and tall bunch grass (Chrysopogon) OR Other tussock grasslands	n/a	n/a	<1
Hummock Grasslands (MVG 20)	Hummock grasslands	n/a	n/a	<1
Other Grasslands, Herblands, Sedgeland and Rushlands (MVG 21)	Sedgeland, rushes or reeds OR Wet tussock grasslands with herbs, sedges or rushes, herblands or ferns OR Other grasslands	n/a	>1	<1
	Saline or brackish sedgeland or grasslands	n/a	>0.5	<0.5
Chenopod Shrublands, Samphire Shrublands and Forblands (MVG 22)	Saltbush and/or Bluebush shrublands	n/a	>1	<1
	Mixed chenopod, samphire +/- forbs	n/a	>0.5	<0.5
Mangroves (MVG 23)	Mangroves (northern)	>5	0.5–5	<0.5
	Mangroves (southern)	>2	0.5–2	<0.5
Other Open Woodlands (MVG 31)	Callitris open woodlands OR Melaleuca open woodlands OR Other open woodlands	>4	1–4	<1
	Casuarina and Allocasuarina open woodlands with a shrubby understorey OR Casuarina and Allocasuarina open woodlands with a chenopod shrub understorey OR Casuarina and Allocasuarina open woodlands with a tussock grass understorey OR Casuarina and Allocasuarina open woodlands with a hummock grass understorey	> 4	1–4	<1
Mallee Open Woodlands and Sparse Mallee Shrublands (MVG 32)	Open mallee woodlands and sparse mallee shrublands with a dense shrubby understorey OR Open mallee woodlands and sparse mallee shrublands with a sparse shrubby understorey OR Open mallee woodlands and sparse mallee shrublands with a tussock grass understorey OR Open mallee woodlands and sparse mallee shrublands with a hummock grass understorey	>4	1–4	<1

1 Adapted from NVIS Major Vegetation Subgroups version 4.1
www.environment.gov.au/erin/nvis/publications/pubs/mvs-preferred.pdf

Appendix B—Crown type cover visual reference card

Different leaf shapes shown in separate columns arranged from large to small. Most Australian vegetation is between 40 and 70% foliage cover.



Site Details

(Complete this sheet for each site sampled)

Recorder: _____
Project ID: _____
Date: _____
Site number: _____
Start point latitude: _____ and Longitude: _____
Compass bearing: _____

Field Sheet 1: Ground cover

Na = native plant; Ex = exotic plant; OL = organic litter; Cr = cryptogram; BG = bare ground;
Ro = rock; W = water

Point (m)	Na	Ex	Cr	OL	BG	Ro	W
<i>e.g</i>	<i>1</i>		<i>2</i>				
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							
50							
Total							

Field Sheet 2: Evidence of exotic fauna

[illegible]

Field Sheet 3: Overstorey and midstorey projected crown cover

Only complete this part if the vegetation type has a distinctive canopy and/or midstorey

Transect (projected crown cover—overstorey species)

Native overstorey			Exotic overstorey		
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____

Transect (projected crown cover—midstorey species)

Native overstorey			Exotic overstorey		
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____
Start (m) _____	End (m) _____	Width (m) _____	Start (m) _____	End (m) _____	Width (m) _____

Field Sheet 4: Crown Type

Only complete this part if the vegetation type has a distinctive overstorey

	Distance along transect (m)	CT (%)
Tree canopy 1		
Tree canopy 2		
Tree canopy 3		
Tree canopy 4		
Tree canopy 5		
Tree canopy 6		
Tree canopy 7		
Tree canopy 8		
Tree canopy 9		
Tree canopy 10		

Field Sheet 5: Species Diversity

[illegible]

Field Sheet 6: Exotic species

List common and / or botanical names, if known, of exotic species identified in the plot.

[illegible]

