ENVIRONMENTAL MONITORING METHOD:
Vegetation Plot Surveys

Each section can be completed separately but you should read all three parts before starting. You need to complete all three parts to finish the monitoring method.

Part 1: Getting Ready

GATHER YOUR GEAR

Equipment required for this part:

☐ Electronic device(s) – charge ready for use and check that it has:
  ▪ ability to take photos
  ▪ data collection systems (app and form) (e.g. Fulcrum)
  ▪ navigation system (e.g. Avenza) and site maps
  ▪ Plant ID apps such as iNaturalist.
☐ Laptop or computer with software for mapping (e.g. QGIS, ArcGIS, Google Earth)
☐ Plant ID books

Remember to check **GATHER YOUR GEAR** lists for Out on Country and Back in the Office. See the full list of equipment needed to complete this monitoring method on the last page.

KEEP IN MIND

Why?
Make sure there is a clear aim for your monitoring project and that the method you have selected will give you the answers you need.

When?
Prepare well before heading out on Country so that you have time to gather equipment or train staff, if needed.

Who?
At least one ranger/staff to plan and prepare.

Training and skills
Staff involved in planning are trained and competent in:

☐ Mapping software (e.g. QGIS, ArcGIS, Google Earth)
☐ Navigation systems (e.g. Avenza, GPS)
☐ Data collection systems (e.g. Fulcrum, datasheets)
☐ Basic knowledge of types plants in the areas to be surveyed.

ENVIRONMENTAL MONITORING METHOD:
Vegetation Plot Surveys

🔓 **Check permissions**

Consult with Traditional Owners, landholders and relevant government agencies and authorities, to determine appropriate access and approvals for environmental monitoring:

1. Where you can go – consult with the owners/managers of the land.
2. What you can do – check if you need scientific licencing, approvals or ethics.
3. What or who can you take photos of
4. What can be done with data and photos – who owns them, where will they be stored and how will data be interpreted and communicated.

ACTIONS

✓ Make a plan and prepare

1. Plan which dates you will do the surveys.
   - This may depend on when plants are in flower as many plants are hard to identify without flowers.
   - If plants only flower after rain, you will need to decide how long after rains this happens. If it only rains in patchy areas on your country, you may need to these different areas at different times.
2. If this is the first year you are monitoring, gather plant records in your area and identify where potential plants of interest are. Such as from Traditional Custodians , Atlas of Living Australia (ALA) or government databases.
3. Select your sites. The number of sites and spacing between them will depend on what your question is and the size of the area you are monitoring. Ideally you have more than one plot in each area you are measuring, allowing you to average the data.
4. Give each site a unique name, and export and save the location data in your data management system
5. Prepare maps of sites/load sites onto navigation devices
6. Plan how you will record information on Country e.g. Fulcrum electronic data forms.
7. Plan your data management system e.g. how you will store images/recordings etc.
8. Check **GATHER YOUR GEAR** lists for Get Ready, Out on Country and Back in the Office (complete list of equipment at end of this document) and get any equipment you don't have.
9. Be clear on how many people will be involved and what everyone needs to do the work.
10. Check the training requirements for Get Ready, Out on Country and Back in the Office steps to ensure that rangers know how to use the devices, data collection apps, navigation systems etc. and how to identify plants.

ENVIRONMENTAL MONITORING METHOD:

Vegetation Plot Surveys

Part 2: Out on Country
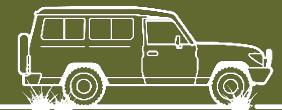
GATHER YOUR GEAR

One set of this equipment for each site:

☐ 4 x permanent ground markers such as small star pickets – to mark corners of plots

☐ Flagging tape – to temporarily mark corners of plots

☐ Datasheets or data collection software

One set of this equipment for each team:

☐ Electronic device(s) – charged and ready to record data, take photos and navigate to sites

☐ Power bank – charged and ready to charge devices (optional)

☐ GPS device and spare batteries (recommended)

☐ Plant identification books

☐ 10m tape measure or premeasured rope

☐ Mallet or picket driver

☐ Pencils, erasers, pencil sharpeners

KEEP IN MIND

When?
Plants are usually only identifiable by their flowers or fruit. Depending on your country, the best time to do surveys may be seasonal or after rains.

Where
Each plot should encompass only one vegetation type, such as woodland, and not be located on the edge of the vegetation type. The plot should be representative of the vegetation in the area.

Who?
Preferably two people, although it is possible for one person to setup and survey a plot.

Training and skills
Make sure everyone knows the plan.

Field staff are trained and competent in:

Vegetation Plot Surveys

☐ Navigation systems (e.g. Avenza, GPS)
☐ Data collection systems (e.g. Fulcrum, paper datasheets)
☐ Someone with knowledge in how to identify plants and how to use plant identification books.

ACTIONS

✓ Set up Plot

1. At the spot you wish to have the plot, either place the first maker in the ground for a permanent plot or put flagging tape on plant for a temporary plot.
   - It is recommended that all four corners of your quadrat are marked with some kind of permanent marker that is suitable to the area and soil substrate in which it is located. Traditionally, star pickets and fence droppers have been used.
2. Using the tape measure or rope measure 10 meters in one direction, then place the second marker.
3. Turn 90 degrees, then measure 10 meters again, and place the third marker, turn 90 degrees and measure the fourth marker.
4. You should now a have 10 x 10 meter square with markers at each corner.
5. Record the plot and site name, date and location.
6. From one corner, take a photo of the plot ID on the datasheet or app and then take a photo into the plot. Record the photo number.
   - Taking a photo of the plot ID before the photo of the plot will help you remember which photo was for which plot later.

✓ Survey the plot

Collect Data about the Plot and its Environment
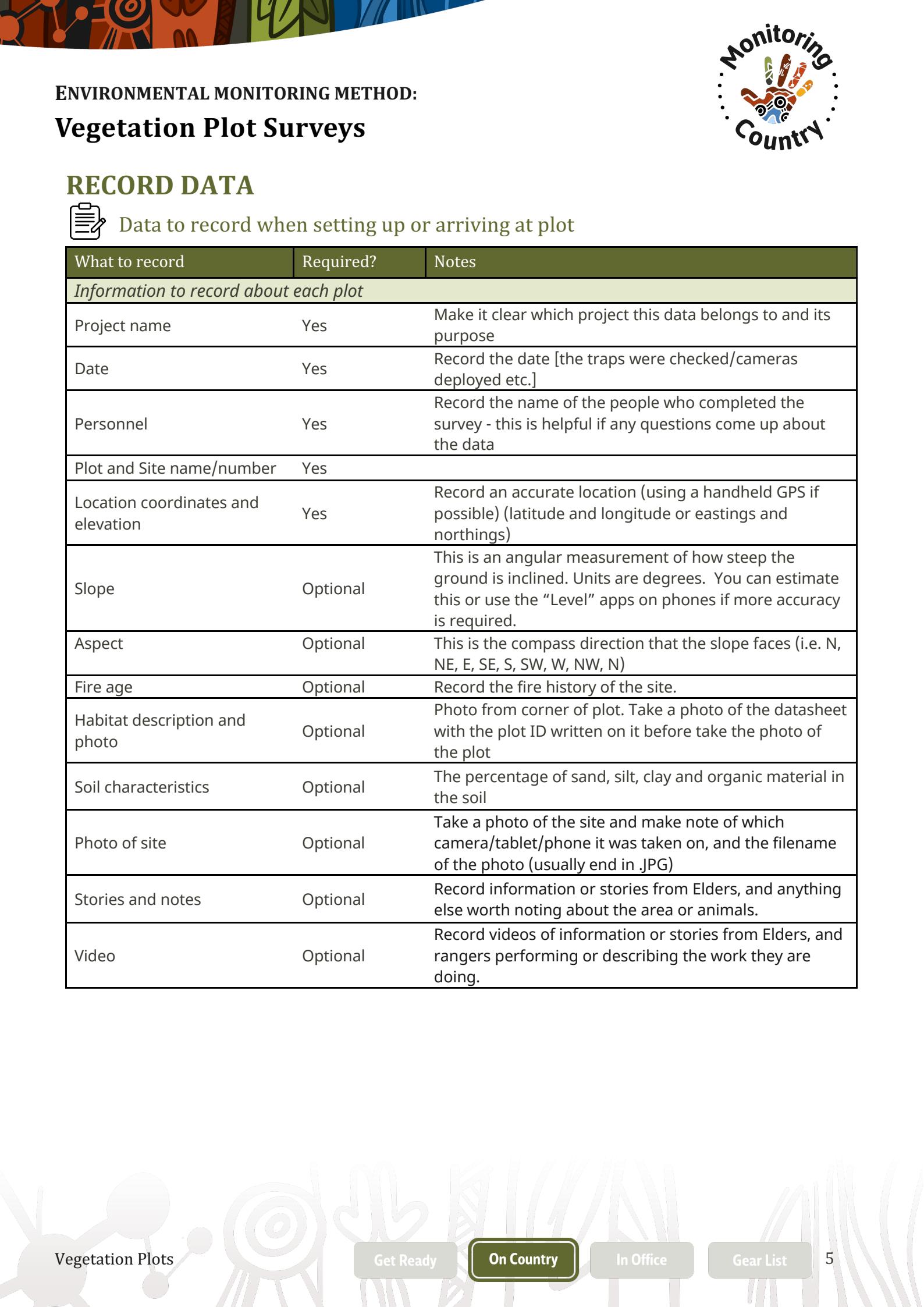
Vegetation Plot Surveys

RECORD DATA

Data to record when setting up or arriving at plot

What to record	Required?	Notes
Information to record about each plot		
Project name	Yes	Make it clear which project this data belongs to and its purpose
Date	Yes	Record the date [the traps were checked/cameras deployed etc.]
Personnel	Yes	Record the name of the people who completed the survey - this is helpful if any questions come up about the data
Plot and Site name/number	Yes	
Location coordinates and elevation	Yes	Record an accurate location (using a handheld GPS if possible) (latitude and longitude or eastings and northings)
Slope	Optional	This is an angular measurement of how steep the ground is inclined. Units are degrees. You can estimate this or use the "Level" apps on phones if more accuracy is required.
Aspect	Optional	This is the compass direction that the slope faces (i.e. N, NE, E, SE, S, SW, W, NW, N)
Fire age	Optional	Record the fire history of the site.
Habitat description and photo	Optional	Photo from corner of plot. Take a photo of the datasheet with the plot ID written on it before take the photo of the plot
Soil characteristics	Optional	The percentage of sand, silt, clay and organic material in the soil
Photo of site	Optional	Take a photo of the site and make note of which camera/tablet/phone it was taken on, and the filename of the photo (usually end in .JPG)
Stories and notes	Optional	Record information or stories from Elders, and anything else worth noting about the area or animals.
Video	Optional	Record videos of information or stories from Elders, and rangers performing or describing the work they are doing.

ENVIRONMENTAL MONITORING METHOD:
Vegetation Plot Surveys

Data to record when surveying the plot

What to record	Required?	Notes
Information to record about each plot		
Signs of introduced feral animals	Optional	Did you see, or see signs of introduced species like cow or camels e.g. tracks, scats or diggings?
Signs of disturbance	Optional	Types and causes of disturbance you can see at the site
Vegetation condition scale	Required	Keighery Condition Scale

Rating	Condition	Criteria / Description for Comments
1	Pristine	Pristine or nearly so, no obvious signs of disturbance.
2	Excellent	Vegetation structure intact; disturbance affecting individual species; weeds are non-aggressive.
3	Very Good	Structure altered; obvious signs of disturbance (e.g., repeated fires, aggressive weeds, dieback, or grazing).
4	Good	Structure significantly altered by multiple disturbances; retains basic structure or ability to regenerate.
5	Degraded	Basic structure severely impacted; regeneration requires intensive management (e.g., partial clearing, high weed density).
6	Completely Degraded	Structure not intact; almost entirely without native species ("parkland cleared").

For each vegetation layer	Required	growth form, cover class (2 – 10%, 10 – 30%, 30 – 70% or over 70%) and 3 most dominant species on order of dominance

	Trees (>30m)	Trees (10-30m)	Trees (<10m)	Mallees (>8m)	Mallees (<8m)
Growth Form					
Cover Class (%)					
Height & Crown Cover					
Dominant Species					

	Shrubs (>2m)	Shrubs (1m - 2m)	Shrubs (<1m)
Growth Form			
Cover Class (%)			
Height & Crown Cover			
Dominant Species			

	Grasses	Herbs	Sedges	Other (e.g. ferns)
Growth Form				
Cover Class (%)				
Height & Crown Cover				
Dominant Species				

Species present	Required	Label each plant species inside the plot with a species number and plant's name or a working name if the plant is unknown.
Collect samples for herbarium, if required	Optional	See Collecting Plant Samples for Identification on the website

Part 3: Back in the Office

GATHER YOUR GEAR

Equipment required for this part:

☐ Electronic device(s) that you used to record your data

☐ Data management system, e.g. cloud storage

☐ Laptop or computer with software for spreadsheets (e.g. Microsoft Excel) and mapping (e.g. QGIS, ArcGIS, Google Earth)

KEEP IN MIND

When?

Always try to complete this work as soon as you can after returning from your time on Country ensuring photos on SD cards don't get deleted and so that what you did and what you saw is fresh in your memory.

Who?

At least one person to manage the data

Training and skills

Staff managing data are trained and competent in:

☐ Mapping software (e.g. QGIS, ArcGIS, Google Earth)

☐ Spreadsheet software (e.g. Microsoft Excel)

☐ Data collection systems (e.g. Fulcrum, datasheets)

☐ Data management systems (e.g. databases, cloud storage, external hard drives)

Data entry, analysis and reporting

1. Record a summary of what you did and why, any observations (e.g. weather conditions, fire history, site condition), anything that went wrong or didn't work and things that worked well.
2. Upload the plot data to your data management system.
   - Recommended: get someone else to proof the data to check for mistakes.
3. Upload any photos or videos taken during the survey to your data management system.

4. Discuss with the ranger team or community the results of the monitoring, any reasons for the presence/absence of species plants and if there have been any changes to previous years.
   - Consider whether trends might be related to your management to check how well management is working, or if you need to make adjustments.
5. Share the data according to any data sharing or funding agreements you have made

Next section – Full Equipment List

Gather Your Gear – Complete List

The complete **GATHER YOUR GEAR** lists for Get Ready, Out on Country and Back in the Office.

Gear List	Required?	Get Ready	On Country	In Office
Electronic device(s): ☐ Charged ☐ Ability to take photos ☐ App for data collection (e.g. Fulcrum) ☐ App for navigation (e.g. Avenza) ☐ Plant ID apps such as iNaturalist.	✓	✓	✓	✓
Power bank ☐ Charged	**Recommended**		✓	
Laptop or computer with software for: ☐ Mapping (e.g. QGIS, ArcGIS, Google Earth) ☐ Spreadsheets (e.g. Microsoft Excel)	✓	✓		✓
GPS (e.g. Garmin handheld device) & spare batteries	**Recommended**	✓	✓	
Plant ID field guides	✓		✓	
4 x permanent ground markers such as small star pickets – to permanently mark corners of plots	**Recommended**		✓	
Flagging tape – to temporarily mark corners of plots	**Recommended**		✓	
Datasheets or data collection software, Pencils, erasers, pencil sharpeners	**Recommended**		✓	
10m tape measure or premeasured rope	✓		✓	
Data management system (e.g. cloud storage)	✓			✓