ENVIRONMENTAL MONITORING METHOD:

Feral Pig Damage & Signs Transect Monitoring

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
- ☐ Laptop or computer with software for mapping (e.g. QGIS, ArcGIS, Google Earth)
- ☐ Reference documents or field guides: Feral Pig sign guide to print and laminate

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)

Feral Pig Damage & Signs Transect Monitoring

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 and how long you will monitor.
   - Try to do the monitoring at the same time each year for sites where you have monitored before.
   - Time the monitoring to avoid weather conditions that are not good for monitoring, e.g. heavy rain and strong winds.
2. If this is the first year you are monitoring, gather feral pig records in your area and identify where potential feral pig habitat is. Such as from Traditional Custodians, Atlas of Living Australia (ALA) or government databases.
3. Select your sites.
   - If you are monitoring to see the effect of feral pig management actions, conduct monitoring in the same area you are managing. You can also choose a control site for comparison.
   - You will need at least one site in the area that you want to monitor, usually a waterbody (e.g. wetland, creek line, or dam) that feral pigs use.
4. Randomly select the locations of 1 km long transects within the site.
   - Ensure transects are at least 500 metres apart.
   - Give each transect a unique name e.g. TransectA, TransectB.
5. Give each site and transect a unique name, export and save the location data in your data management system.
6. Prepare maps of sites/load transect locations onto navigation devices.
7. Print out and laminate a guide for identifying Feral Pig signs (dung, tracks, other signs)
8. Plan how you will record information on Country e.g. Fulcrum electronic data forms.
9. Plan your data management system e.g. how you will store your site and count data.

10. Check **GATHER YOUR GEAR** lists for **Get Ready, Out on Country** and **Back in the Office** (complete list of equipment on last page) and get any equipment you don't have.
11. Be clear on how many people will be involved and what everyone needs to do the work.
12. 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 Feral Pig signs.

Next Section – Part 2: Out on Country

Part 2: Out on Country

GATHER YOUR GEAR

One set of this equipment for each transect setup:

- ☐ 21 pickets/pegs

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) and/or site maps
- ☐ Reference documents or field guides: printed/laminated signs guide of Feral Pig sings (dung, tracks, other signs)
- ☐ 50 m tape measure
- ☐ Hammer, mallet or picket driver (for transect setup only)
- ☐ 50 m piece of rope
- ☐ Rulers (to show scale in photographs)

KEEP IN MIND

When?

Monitoring is first done on the same day that the transects are set up. Monitoring is then repeated seasonally.

Where

Monitor the same transects every visit.

Who?

At least two rangers per site.

Training and skills

Make sure everyone knows the plan.

Field staff are trained and competent in:

- ☐ Navigation systems (e.g. Avenza, GPS)
- ☐ Data collection systems (e.g. Fulcrum, paper datasheets)
- ☐ Identifying Feral Pig signs (and other species you might come across)

Feral Pig Damage & Signs Transect Monitoring

ACTIONS

Set up transects

1. Make your transect easy to re-survey by marking sections along the transect. Hammer in a picket or peg every 50 m along the transect (including the start and end points).
   - Each transect is 1 km long.
   - Each transect section is 50 m long.
   - A transect will consist of 20 sections.

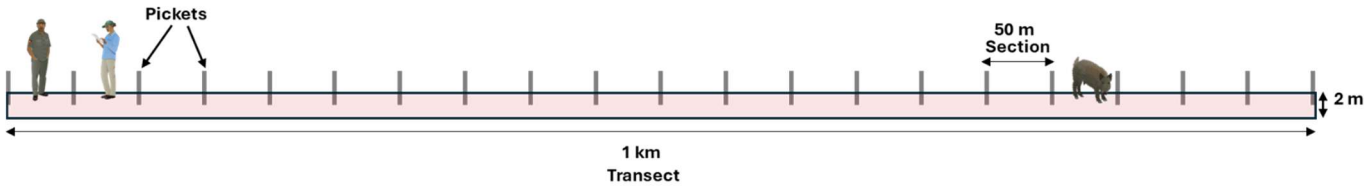


Diagram of transect setup (with 50m sections separated with pickets/pegs) for Feral Pig damage and signs monitoring. Red shaded area is the area to the be searched.

2. Give each section a name .
   - e.g. TransectA_01, TransectA_02, ... TransectA_20 etc.
3. Record the transect name on the start picket and the coordinates on your GPS.
4. Record **transect set up data**

Monitor Feral Pig damage and signs

This can be done as you set up the transect.

5. Mark the transect line between the pickets with the 50 m piece of rope.
6. Count and record the number of feral pig damage signs (rooting, wallow, tracks, dung, travel pad, plant damage, rubs and sightings) within 1 metre either side of the transect line. Do not record signs outside of this area.
7. If you are unsure about an identification, take a photo with the ruler next to it for scale to identify when you're back at the office.
8. Record **transect damage and signs data**
9. Repeat monitoring at the same transects every season until monitoring program is completed.

RECORD DATA

Data to record when setting up transects

What to record	Required?	Notes
Information to record about each transect		

Project name	Yes	Make it clear which project this data belongs to and its purpose
Date of set up	Yes	Record the date the transect was set up
Personnel	Yes	Record the name of the people who set up the transect - this is helpful if any questions come up about the data
Site name/number	Yes	This is site/area that contains your transects.
Transect name	Yes	This is the transect that contains your transect section.
Location coordinates of transect start and end	Yes	Record an accurate location of the transect start and end points (using a handheld GPS if possible) (latitude and longitude or eastings and northings)
Habitat description and/or photo	Yes	Describe or take a photo of the habitat type and landscape features at the site (e.g. open Eucalypt woodland, grassy understory next to seasonal creek)
Presence of absence of pig dung, tracks and/or other signs	Yes	Record whether you saw any pig signs when setting up the transect

Data to record when counting Feral Pig signs and damage

What to record	Required?	Notes
Information to record about each transect section when counting signs and damage		
Project name	Yes	Make it clear which project this data belongs to and its purpose
Site name/number	Yes	This is the area that contains your transects
Transect name	Yes	This is the transect that contains your transect sections
Transect section name	Yes	This is a 50 m section of the transect where you will count pig signs and damage
Location coordinates of transect section start	Yes	Record an accurate location of the transect section start points (using a handheld GPS - if possible) i.e. Latitude and longitude or eastings and northings
Date of count	Yes	Record the date you are counting pig signs and damage
Personnel	Yes	Record the name of the people who counted the pig signs and damage - this is helpful if any questions come up about the site or data
Presence or absence of pig signs and damage within section	Yes	Record whether pig signs and damage were present in the section
Count of pig signs and damage within section	Yes	Record how many pig signs and damage were counted inside the section
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.

Next section – Part 3: Back in the Office

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)

KEEP IN MIND

When?

Always tryp to complete this work as soon as you can after returning from your time on Country 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:

- ☐ Spreadsheet software (e.g. Microsoft Excel)
- ☐ Data collection systems (e.g. Fulcrum, datasheets)
- ☐ Data management systems (e.g. databases, cloud storage, external hard drives)

ACTIONS

Data entry

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. Check any photo that were taken of Feral Pig damage and signs that need to be identified.
3. Upload the **transect damage and signs data** to your data management system.
4. Upload any photos or videos taken during the survey to your data management system.

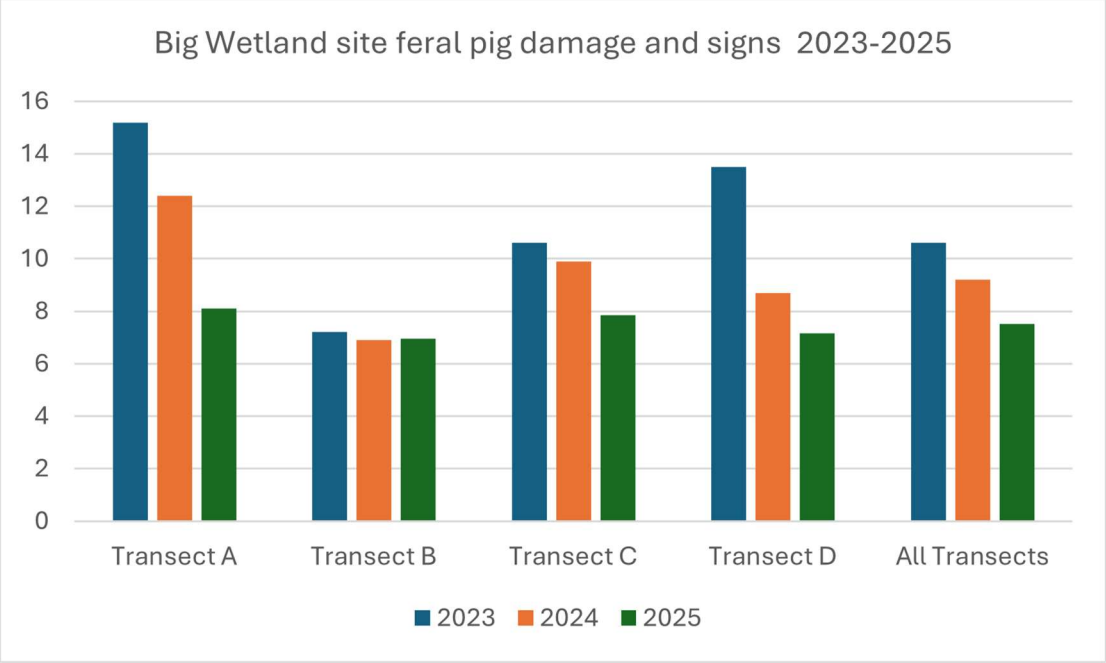
Feral Pig Damage & Signs Transect Monitoring

Data entry, analysis and reporting

5. Export the data into a spreadsheet
6. After each season's monitoring, add up the counts for each transect section.
   - E.g. Add all Transect A counts for each section = 162
7. Divide this by 20 (the number of sections per transect).
   - E.g. there were 20 sections in Transect A, so we divide 162 by 20 = 8.1
8. This will be the transect average number of feral pig damage and signs.
   - E.g. The average damage & signs for Transect A at Big Wetland Site is 8
9. Add all the transect average numbers for a site
   - E.g. Add Big Wetland Site's Transect A, B, C & D average damage & signs per transect = 8.1 + 6.95 + 7.85 + 7.15 = 30.05
10. Divide this number by the number of transects monitored at that site.
    - E.g. Big Wetland Site had Transect A, B, C, and D which is four transects = 30.05 ÷ 4 = 7.5
11. This will give you the site's average number of feral pig damage and signs per plot for that month's monitoring.
    - E.g. The average damage & signs for Big Wetland site in summer = 7.5.
12. Make a simple graph that shows the site's average number of damage and signs for each season you did monitoring.

Example: Big Wetland Site - Summer Feral Pig Transect				
Section	**Transect_A**	**Transect_B**	**Transect_C**	**Transect_D**
1	6	7	7	8
2	10	5	7	14
3	10	6	14	4
4	13	13	7	8
5	2	11	4	8
6	14	10	6	8
7	10	1	7	8
8	14	4	12	1
9	10	6	3	6
10	8	4	9	7
11	3	7	5	4
12	11	1	6	9
13	10	7	7	10
14	1	1	9	1
15	6	9	14	8
16	5	4	14	1
17	11	7	8	10
18	4	13	6	12
19	8	13	11	10
20	6	10	1	6
Total	**162**			
Average per transect	**8.1**	**6.95**	**7.85**	**7.15**
Average damage & signs for Big Wetland site across all transects:				**7.5**

Example of transect count data and calculations for a site called Big Wetland Site with 4 transects (A, B, C & D).



An example of how transect count data can be presented in a graph to track changes over time or show differences between transects.

Reporting

13. Discuss with the ranger team or community the results of the monitoring, any reasons for the Feral Pig damage and sign counts to have increased or decreased since the previous monitoring, why there were differences between sites (if you monitored more than one site), and if there have been any changes to previous years.
    - Consider whether trends might be related to your management (e.g. [relevant management to species/element of interest]) to check how well management is working, or if you need to make adjustments.
14. 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)	✓	✓	✓	✓
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**	✓	✓	
Feral Pig damage and signs reference documents and/or field guides	✓	✓	✓	
Star pickets/pegs • 21 per transect			✓	
Hammer, mallet or picket driver	**✓ (for setup only)**		✓	
50 m tape measure	**✓ (for setup only)**		✓	
50 m piece of rope	✓		✓	
Rulers	✓		✓	
Data management system (e.g. cloud storage)	✓			✓