



GASCOYNE PILBARA
RANGELANDS INITIATIVE



RANGELANDS MONITORING TOOL

A practical, producer-driven tool designed to track changes in rangeland condition over time. By combining photos, observations, and data, the tool helps land managers see trends in groundcover, plant species, and landscape function. It provides an evidence base to guide decisions, demonstrate stewardship, and support long-term resilience of pastoral businesses across the Gascoyne and Pilbara.



RANGELANDS
MONITORING TOOL



RANGELANDS MONITORING TOOL

The development of the Rangelands Monitoring Tool required significant dedication from volunteers and supporters of the concept. The Gascoyne Pilbara Rangelands Initiative Inc. extends its heartfelt appreciation to all those involved in making this initiative possible.

90% of the RMT is built on the science of the PMS; the GPRI has just enhanced it by developing the value-based model and then modernised it by creating an in-field app.

Keep In Touch

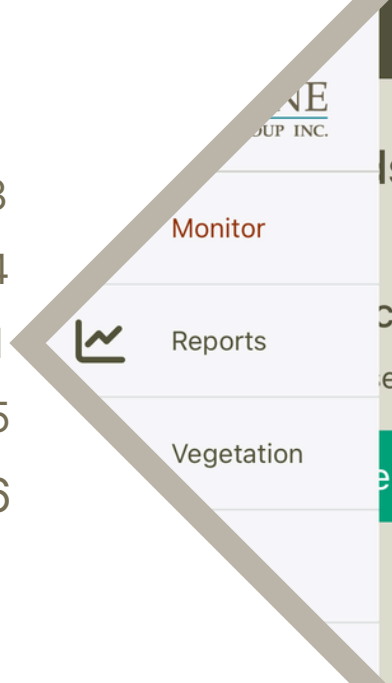
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INFORMATION

Starting in 2007, this industry-focused application has undergone significant development. Initially available only on Apple devices for use in the Gascoyne region, it later expanded to incorporate data from the Pilbara.

In recent years, substantial investment has enabled the development of new reporting functions, improved accessibility, and vegetation monitoring beyond initial site establishment, resulting in the comprehensive and operational tool available today.

Currently, the tool focuses on plant species listed within the app, providing tailored support for pastoralists across the Gascoyne and Pilbara regions.

The Rangelands Monitoring Tool© (RMT) enables pastoralists to conduct self-assessments of their rangelands and submit results to a central repository. It builds on the existing Excel-based self-assessment tool developed by Gascoyne Catchments Group (GCG), now Gascoyne Pilbara Rangelands Initiative Inc. (GPRI) and already widely used by stakeholders.

A key objective of the RMT is to reduce manual effort between survey completion and compulsory reporting to the government. All data submitted is securely stored on a backend server, with access restricted to the developer and GPRI administrators.

The RMT supports rangeland assessment by providing:

- Trends in perennial shrubs and grasses to track pasture composition
- Indicators for monitoring rangeland condition
- Measures of soil health, stability, infiltration, and nutrient cycling
- A method for recording and assessing erosion type and severity
- Improved day-to-day management decisions for pastoral leases

Evidence collected through the RMT can be used to communicate with regulators, industry, and conservation agencies. It also provides a credible basis for informing the public about the condition and management of rangeland resources. Most importantly, it equips pastoral managers with timely insights to adjust management practices in response to land and vegetation indicators.



HISTORY

The Gascoyne Pilbara Rangelands Initiative Inc. is committed to building an ecologically resilient, profitable, and respected pastoral industry that underpins an adaptive and vibrant community. Originating from a collaboration between the The Gascoyne-Wooramel, Lyndon, and Upper Gascoyne Land Conservation District Committees, working in partnership with the Department of Agriculture and Food, have focused on advancing innovative and critical projects for Western Australia's pastoral industry.

Today, GPRI represents a passionate network of 42 pastoral beef and sheep producers in the Gascoyne region who share a strong belief in the future viability of both the livestock industry and the remote and regional communities of WA.

In November 2007, working with the Ecologically Sustainable Rangeland Management program, the group identified the need for an industry-driven and endorsed rangeland self-assessment and reporting tool. The Rangelands Monitoring Tool© (RMT) was developed to build on the foundations of Pasture Monitoring Sites (PMS), established in the early 1980s by the Department of Agriculture and Food WA. The tool is designed to support future land use decisions, track the condition of pastoral leases, and demonstrate the outcomes of Rangelands NRM-funded projects. It also provides a regionally relevant self-evaluation model, offering strong evidence of environmental stewardship that can be integrated into broader environmental management systems.

For nearly forty years, the Gascoyne region has been recognised globally for its scientific and academic significance to rangeland ecology. Ecological surveys and studies conducted here have shaped international monitoring and assessment methodologies, contributing to global benchmarking in rangeland science.

Through the RMT, Gascoyne and Pilbara pastoralists now have a practical tool to demonstrate the outcomes of land management activities while establishing critical baseline data for future initiatives.



VALUE BASED APPROACH

The GPRI explored a range of alternative monitoring methods, including David Tongway's Landscape Function Analysis, Queensland's Department of Primary Industries' Stocktake® program, Grazing Land Management, and the Western Australian Rangeland Monitoring Systems.

Building on the principles of these systems and applying the Pasture Monitoring Sites approach to assessing and monitoring perennial species trends, GPRI developed the Rangelands Monitoring Tool (RMT) using a value-based approach. This method reduces subjectivity in interpreting rangeland trends and provides a consistent framework that landholders can apply.

The system evaluates three key components of rangeland health:

- 1. Plants** – Each plant species is assigned a value between 1 and 10, based on its environmental and commercial significance.
- 2. Soils** – Four soil attributes, adapted from LFA, are assigned values between 1 and 10, reflecting their contribution to stability, nutrient cycling, and infiltration.
- 3. Erosion** – The three main types of rangeland erosion are given negative values between 0 and -10, according to their adverse impacts on stability and infiltration.

These values were developed in consultation with the Department of Agriculture and Food WA, Department of Parks and Wildlife, the Pastoral Lands Board, CSIRO, the University of Western Australia, and Independent Lab Services.

The combined values generate a Site Stability Index (SSI), which serves as a benchmark for tracking changes at the site, land system, property, or catchment scale.



FUNCTIONALITY

The application has been upgraded for practical use in the field, with full functionality even when mobile reception is unavailable.

- 1. Field-Based** – The RMT includes plant species data with both scientific and common names, clear descriptions, and reference images, making it easy to use directly in the paddock.
- 2. Species Data** – The tool currently contains information on more than 95 plant species, with descriptions referenced from Arid Shrubland Plants. Both scientific and common names are provided, along with supporting images, to assist with accurate identification. This data can be viewed while entering site details in the field, providing real-time support for assessments.
- 3. Whole-of-Property Reporting** – The RMT generates evidence-based, self-assessment reports designed to support ecologically sustainable management. Using a value-based approach to assess and monitor perennial species trends, the tool removes subjectivity and provides consistent, reliable insights into rangeland condition.

The Rangelands Monitoring Tool (RMT) can be downloaded on both Apple and Android devices, and is also accessible via the tool’s website.



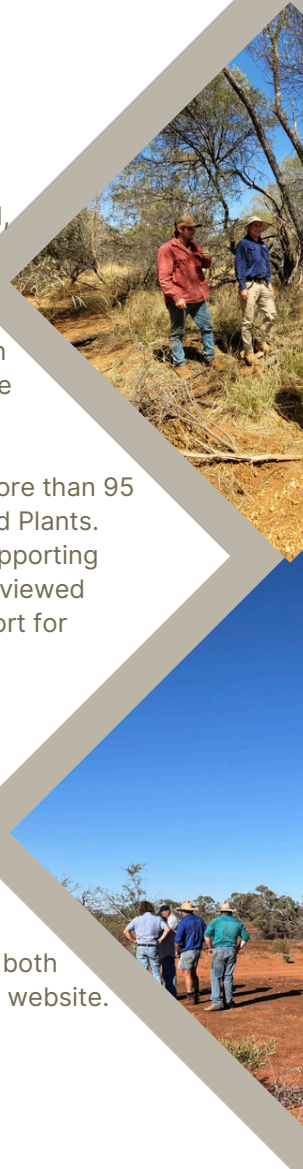
Web-Based Access
www.gpri.org.au/rmt

Android App

<https://tinyurl.com/GPRIGoogleRMT>



Apple App
<https://tinyurl.com/GPRIAppleRMT>



site set up

90% of the RMT is built on the science of Pasture Monitoring Sites (PMS), the GPRI has just enhanced it by developing the value based model and modernised it by creating an app. That is what makes the Rangelands Monitoring Tool so credible, is that we haven't actually changed any of the precise rangeland science that was developed by the grandfathers of the field way back in the 70s. Establishing a site has four steps.

1. Site Location

When selecting a site location within a paddock or management unit, consider whether existing monitoring sites are already in place. Many pastoral leases have networks of sites installed by, or on behalf of, the lessee for paddock-scale management. In many cases, these sites remain suitable for use as Pasture Monitoring Sites (PMSs), and lessees should consider incorporating some or all of them when planning their PMS network.

For monitoring the impact of grazing on rangeland condition, sites should be representative of the lease and sensitive to changes in management. For example:

- A site already in poor condition cannot decline further, but improvement at such a site can provide valuable information.
- Conversely, a site in good condition may not improve further, but a decline in its condition is highly significant.

Sites should not be located in:

- Pasture types of low or very low productivity (e.g. hard spinifex).
- Pasture types of insignificant area (e.g. a small patch of Mitchell grass within a black spear grass community).
- Transition zones between different pasture types.
- WARMS sites, where data is collected by DPIRD staff. These sites are designed for regional-scale monitoring and are not suitable for paddock-scale reporting.
- Areas likely to be disturbed by future developments such as new fences, tracks, or water points.

Wherever possible, PMSs should be located away from the influence of roads, fences, or other structures that might alter grazing pressure. Sites should also be easy to locate for future reassessment.



survey creation

The Rangelands Monitoring Tool (RMT) has been designed as a step-by-step process for entering site assessments directly in the field. Users can create or select a site, record vegetation data, assess soil attributes and erosion, and add comments on rainfall and overall site condition. This information forms the foundation for the app's reporting interface, enabling users to generate, extract, and share site-level or property-wide reports.

1. Log-in

Ensure that you have logged into the application, whilst in reception. This ensures that you are ready to go when in the field.

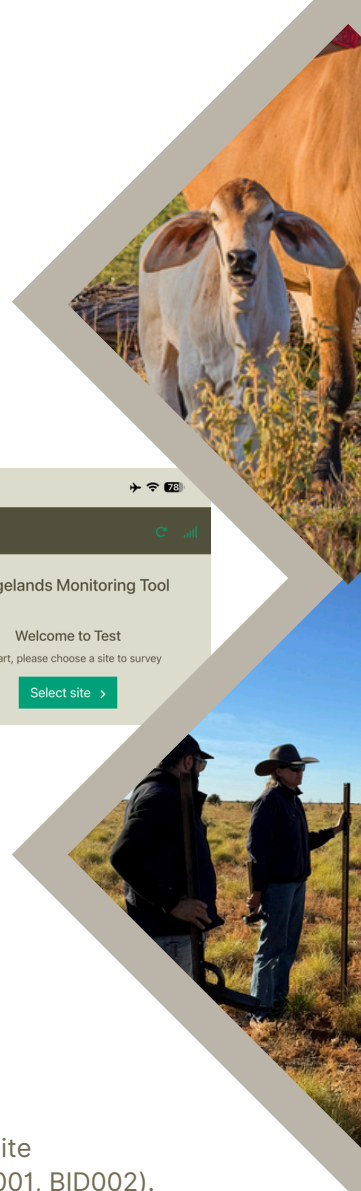
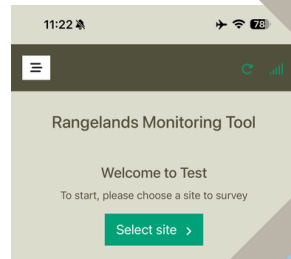
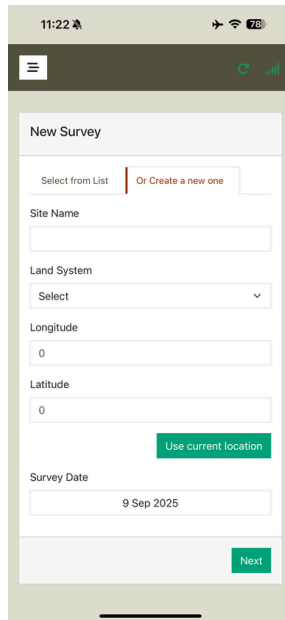
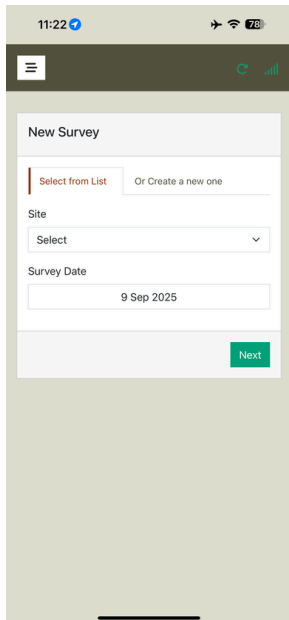


survey creation

2. Site Creation / Reassessment

Reassessing Existing Sites

Reassessing an existing site is straightforward. Simply select the site for reassessment, confirm that the date is correct, and upload a current photo of the site.



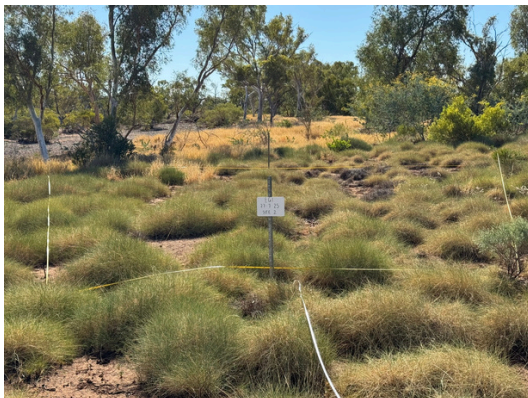
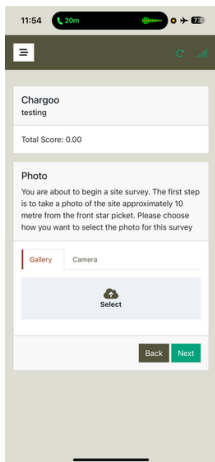
Creating New Sites

Creating a new site is just as simple. Begin by entering a site name, following a consistent naming convention (e.g. BID001, BID002). Next, select the land system. If you are unsure, choose Unknown and advise G once the correct information is available so it can be updated. Use the Current Location function to capture longitude and latitude. This information can be downloaded and plotted, making it easy to relocate sites for future reassessments.

site photos

3. Photo

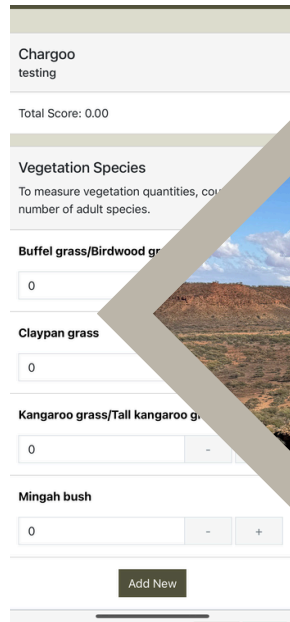
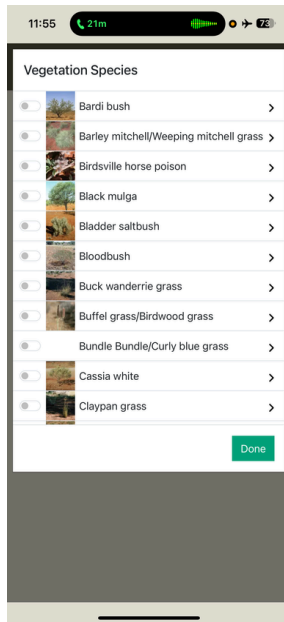
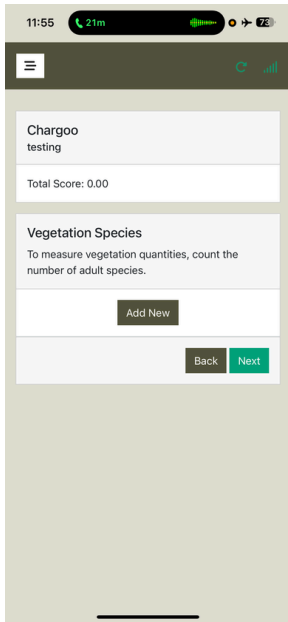
When taking site photos, ensure they are captured from the same height each time. Aim for an image composition of approximately two-thirds land and one-third sky. Always take the photos first and then upload them to the site record this helps ensure accuracy and consistency. Multiple images can be uploaded for each site if required.



vegetation species

4. Vegetation species

With your site established, species identification is carried out in a grid pattern, recording one species at a time. Each species is listed by common name within the app—you can either select all species present at once and enter their counts, or add them individually as you work through the site. Annual species are not included in the app. If you encounter a species not listed, record it in the comments section along with its count, and take a photo for later identification.



Tips for Species Identification

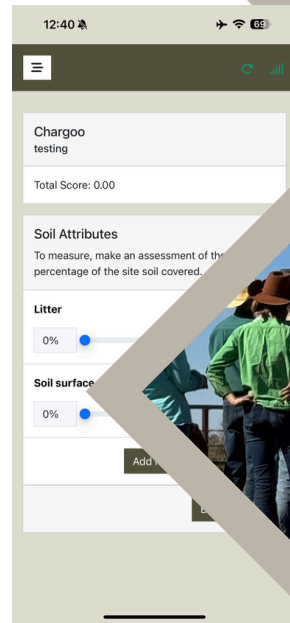
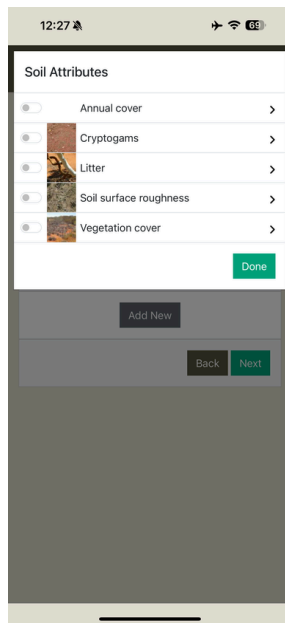
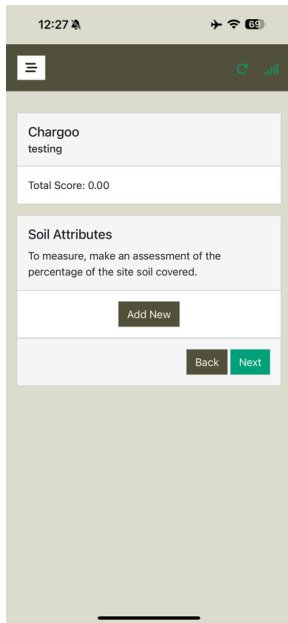
- Bring a printed report if this is a reassessment it will show which plants were recorded during the previous assessment.
- Keep field guides and plant reference books handy to assist with identification.
- Use the RMT app's built-in resources by clicking on each species to view larger images and detailed descriptions.



soil attributes

5. Soil Attributes

When assessing soil attributes, we are looking at the positive influence each attribute has on the health of the site and the broader landscape. There are five key attributes to consider, and the aim is to keep the process straightforward without overcomplicating the estimation of percentage cover for each.



Annual Cover

This refers to the percentage of the site covered by living annual plant species at the time of assessment. Annual cover provides a short-term indication of seasonal growth and ground protection, but as annuals complete their life cycle quickly, this measure can vary significantly between seasons and years.



soil attributes

Cryptogams

Cryptogams are living soil organisms that form a biological crust on the soil surface. They often appear as a black or dark crust when dry, and shift to shades of grey or green when wet. This living crust contains a mix of microorganisms such as algae, lichens, and mosses. Cryptogams are usually among the first colonisers in degraded areas, providing essential soil stability by holding topsoil in place, maintaining structure, and enhancing nutrient and water infiltration.



soil attributes

Litter

Litter refers to detached plant material and organic matter found on the soil surface, including grass fragments, leaves, stems, twigs, fruit, and dung. Litter plays a critical role in rangeland health by protecting the soil from erosion, reducing evaporation, and helping maintain soil moisture. As it breaks down, litter also contributes organic matter and nutrients back into the soil, supporting nutrient cycling and improving soil fertility. In addition, litter provides a protective cover that can buffer soil temperatures, creating a more favourable environment for seed germination and the activity of soil organisms.



soil attributes

Soil Roughness

Soil surface roughness refers to the natural irregularities, cracks, and small mounds or depressions on the soil surface that enhance its ability to capture and retain mobile resources such as water, topsoil, seeds, and organic matter. A rougher soil surface slows the flow of water, reducing runoff and erosion, while allowing more moisture to infiltrate into the ground. This, in turn, improves soil stability, supports plant establishment, and promotes nutrient cycling. By holding organic matter and seed in place, soil roughness also increases the likelihood of plant regeneration, making it a key attribute for maintaining rangeland resilience.

Class	% Score	Surface roughness
0	0	Loose sandy surface
1	20	<3 mm relief in soil surface - Smooth - no retention
2	40	Shallow depressions 3-8 mm relief - Low retention
3	60	Deeper depressions 8-25 mm - and/or extensive stony cover - Moderate retention
4	100	Deep self mulching soils dense tussock grasslands - Large retention



soil attributes

Soil Roughness - Guides

Minimal Soil Roughness



Medium Soil Roughness



High Soil Roughness



soil attributes

Vegetation Cover

Vegetation cover refers to the proportion of the soil surface that is protected by living plants, including shrubs, grasses, and groundcover species. Adequate vegetation cover is vital for reducing soil erosion, improving water infiltration, and maintaining overall landscape function. In the RMT, reference images are provided to help users interpret different levels of cover and set accurate percentage estimates for their site. These visual guides make it easier to standardise assessments and reduce subjectivity when estimating vegetation cover in the field.



5% Coverage



20% Coverage



25% Coverage



30% Coverage



soil attributes



75% Coverage



85% Coverage



90% Coverage



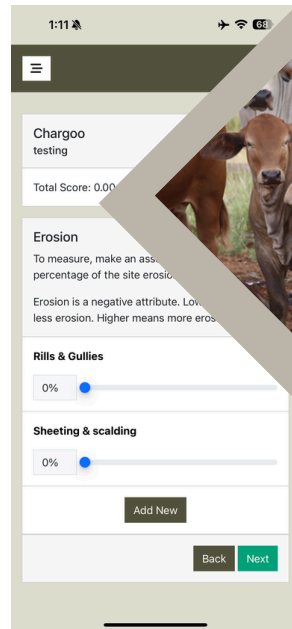
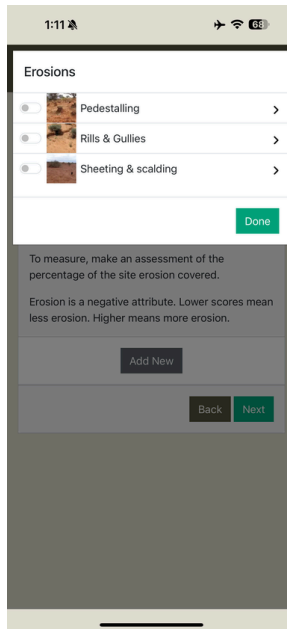
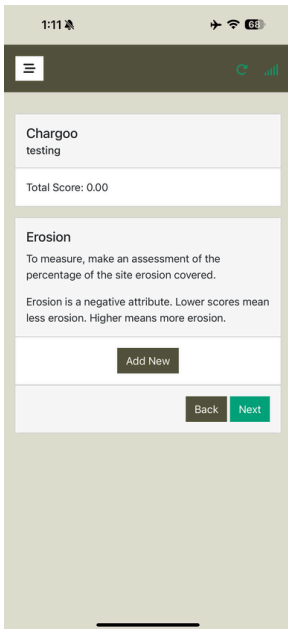
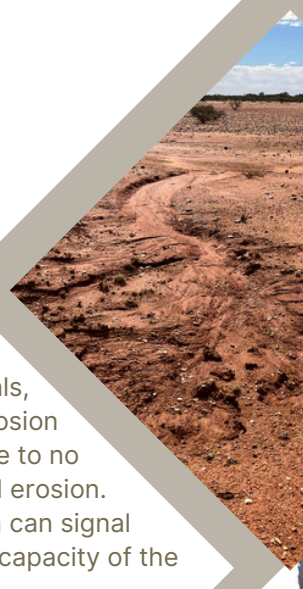
95% Coverage



erosion

6. Erosion

Erosion refers to the loss or displacement of soil caused by wind, water, or grazing pressures, and is considered a negative attribute in rangeland health assessment. To measure erosion at a site, estimate the percentage of the area affected by visible signs such as scalding, rills, gullies, pedestals, or wind-blown sand movement. In the RMT scoring system, erosion reduces the overall site health score: lower values indicate little to no erosion, while higher values reflect more severe or widespread erosion. Monitoring erosion over time is essential, as increasing erosion can signal declining land condition, reduced soil stability, and diminished capacity of the site to support vegetation and ecological function.



erosion

Pedestalling

Pedestalling occurs when erosion removes surrounding soil, leaving plants standing on small clumps or “pedestals” of soil above the general surface level. Exposed roots are a key indicator of this form of erosion. The presence of pedestalling shows that soil is being lost from around plants, reducing stability and making vegetation more vulnerable to stress.



erosion

Rills and Gullies

Rills and gullies are channels cut into the soil surface by flowing water. Rills are shallow channels less than 300 mm deep, while gullies are deeper channels greater than 300 mm. These features may begin along cattle or sheep tracks where water concentrates. Their presence is a clear sign of rapid water runoff from the landscape, often carrying litter and topsoil away, which accelerates land degradation and reduces the site's capacity to retain moisture and nutrients.

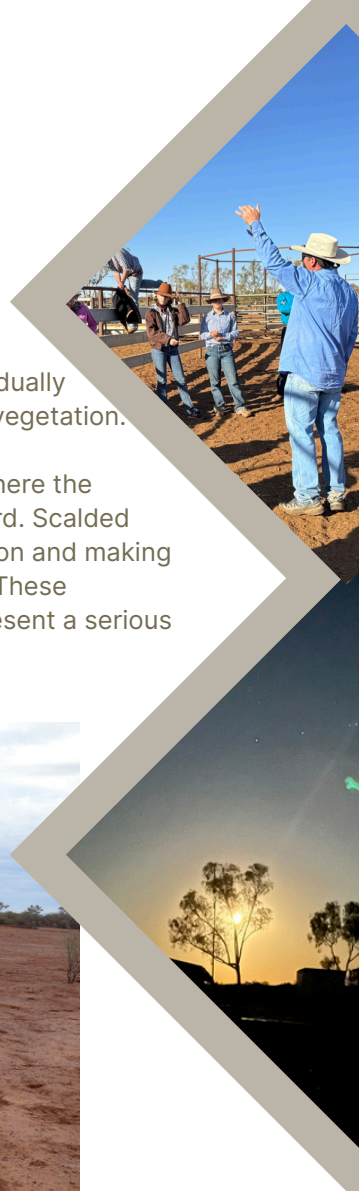


erosion

Scalding & Sheeting

Sheeting refers to the progressive removal of very thin layers of topsoil across broad areas, often leaving behind a surface covered with gravel, stone, or coarse particles after the finer material has been eroded. This process gradually reduces soil fertility and the ability of the land to support vegetation.

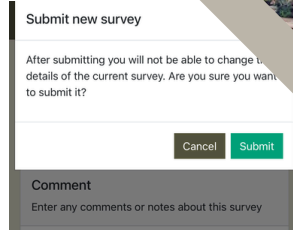
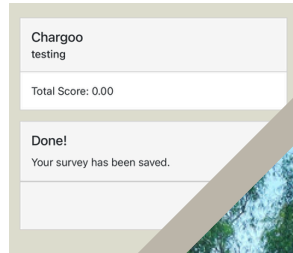
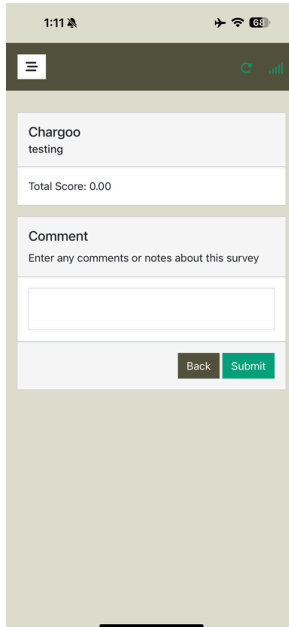
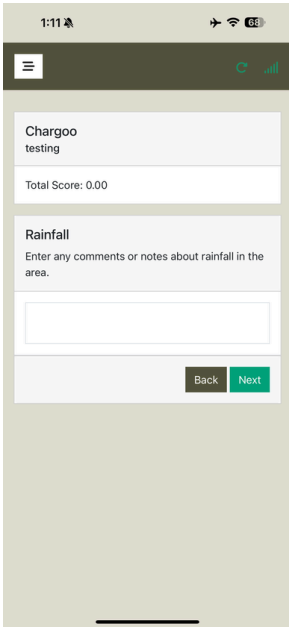
Scalding is a more advanced consequence of sheeting, where the exposed soil surface becomes compacted, baked, and hard. Scalded areas often have a sealed crust, preventing water infiltration and making it extremely difficult for plants to establish or regenerate. These surfaces are highly vulnerable to further erosion and represent a serious decline in rangeland condition.



site finalisation

7. Rainfall

Users now have the option to add rainfall and seasonal comments for each site. While not compulsory, these notes provide valuable context by recording recent rainfall totals, the timing of key events such as summer storms or winter rain, or broader seasonal conditions affecting the property. Including rainfall details can help explain changes observed in vegetation, soil, or erosion and strengthens the interpretation of long-term site data. Over time, these comments build a richer picture of how seasonal conditions influence rangeland health at both site and property scales.



8. Comments

The comments section is an important place to record additional site notes that may be useful in future assessments. This can include plants that could not be identified or are not listed in the app, as well as any other observations that add context to the site. It is also a good idea to record practical details such as the distance from a water point, track, or road anything that will make the site easier to locate and reassess in the future.

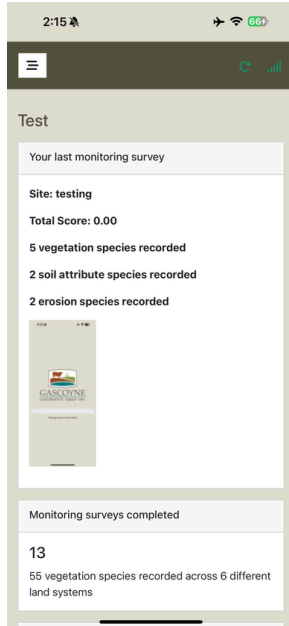
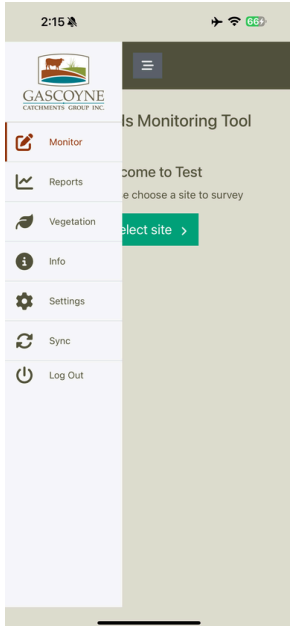
9. Submit your survey



REPORTING

The Rangelands Monitoring Tool provides flexible reporting options that allow users to explore and analyse their station data in detail. Station reports can be viewed year by year, giving access to all sites recorded in that period. From there, users can drill down into individual site records and view all details entered, including vegetation, soil attributes, erosion, photos, and comments.

Within the RMT, data can be explored in a variety of ways—by land system, site, plant species, or year—offering a highly adaptable platform for monitoring and decision-making. Each reporting option enables users to drill down into specific information, making it easy to compare results across time, sites, or property units. To illustrate this functionality, we have included screenshots showing examples of the different reporting views available.



REPORTING

Yearly Species Report

Species Scores

2024: 250, 2019: 50, 2025: 250

All Sites

Buffel grass/Birdwood grass

Generate

Species Count

Year	Count
2024	27
2019	2
2025	30

Yearly Site Report

Site Scores

2024: 1390.40

Plant May

Site Scores

2024: 1390.40

Survey	Total Score
Created on Wed May 15 2024 for Plant May	1390.40

Plant May

Buffel grass/Birdwood grass	Vegetation species	
Crinkled cassia		
Flannel bush	Vegetation species	
Gascoyne mulla mulla	Vegetation species	
Needle bush	Vegetation species	1.00
Pussy tail bluebush	Vegetation species	19.00
Windmill grass/Curly windmill grass	Vegetation species	2.00
Cryptogams	Soil attributes	80.00
Soil surface roughness	Soil attributes	40.00
Vegetation cover	Soil attributes	15.19
Pedestalling	Erosion	

Total Score
1390.4

Test

Survey Site Name: Kyrstie
 Survey Site Coordinates: -24.631649, 115.338284
 Survey Land System: Ashburton
 Survey Date: 2025-08-21T15:39:00-08:00
<https://app.gascoynerecords.com.au/surveys/kyrstie-2025-08-21>



Total Score: 3471.6



Test

Vegetation Species	
Name	Count
Buffel grass/Birdwood grass	30.00
Bundle Bundle/Curly blue grass	4.00
Creeping cassia	13.00
Flat leaved bluebush	24.00
Granite poverty bush	9.00
Limestone grass	10.00
Sago bush	9.00
Silky browntop	150.00

Soil attributes		Erosions	
Name	Percentage	Name	Percentage
Annual cover	15.19	Sheeting & scalding	100.00
Litter	41.14		
Vegetation cover	43.67		
Rainfall			
Description			
No record			





RANGELANDS MONITORING TOOL



Since its inception, Gascoyne Pilbara Rangelands Initiative Inc. has received considerable support beyond its own funds to develop, refine, and improve the Rangelands Monitoring Tool®. We would like to acknowledge and thank the organisations and partners who have contributed to this important work.

