Fact sheet

Case Study – Yougawalla Pastoral Company

Who we are

Yougawalla Pastoral Company (YPCo) operates a large scale, extensive northern beef enterprise in the Kimberley region of Western Australia with its primary focus on beef cattle breeding. The business is structured around a predominantly self-replacing breeder herd, with supporting activities that include growing out weaners and feeder cattle through to sale on some properties, and limited backgrounding or finishing pathways where land capability and seasonal conditions allow.

Production is based on extensive rangeland grazing across approximately 4 million hectares. Multiple pastoral leases are managed as a single aggregation to improve operational efficiency and consistency of management. The aggregation comprises a number of stations including Yougawalla, Moola Bulla (incorporating Mt Amhurst), Bulka, Beefwood Park, Margaret River, Shamrock, Nita Downs and Yeeda (incorporating Mt Jowalenga). The stations span a wide range of Kimberley land types from spinifex and savannah country to alluvial flats and river frontage, which together support the scale and resilience of the breeding focused production system.

> "YPCo is deeply committed to caring for land, water, animals and people, recognising this as crucial to long term business success. Central to this is protecting and enhancing natural capital for the sustainability of both the rangelands and the business.
>
> The passion our station managers bring to this project is particularly inspiring. They understand landscape function and are committed to improving it through science."
> Catherine Marriott OAM – ESG Advisor

Soils and the environment

Soils across the Kimberley vary widely (Figure 1), from shallow, coarse-textured upland soils with low fertility and limited water-holding capacity, to heavier alluvial and black soils that can support higher production when managed well. This variation is reflected in pasture types, with native annual and perennial grasses dominating upland savannah country, and more productive grass communities occurring on alluvial and riverine areas. These more fertile areas are important for seasonal feed supply and play a key role in maintaining livestock performance.

The region operates under a highly variable monsoonal climate. Most rainfall falls in a short, intense wet season followed by a long dry period, and year-to-year differences in rainfall timing, amount and distribution have a major influence on pasture growth, water availability and safe stocking rates. Managing this variability is central to running a successful operation. Flexible grazing strategies are needed to match stocking rates to feed availability, maintain groundcover, and allow pastures time to recover in poorer seasons, while making the most of good years without putting long-term land condition and productivity at risk.

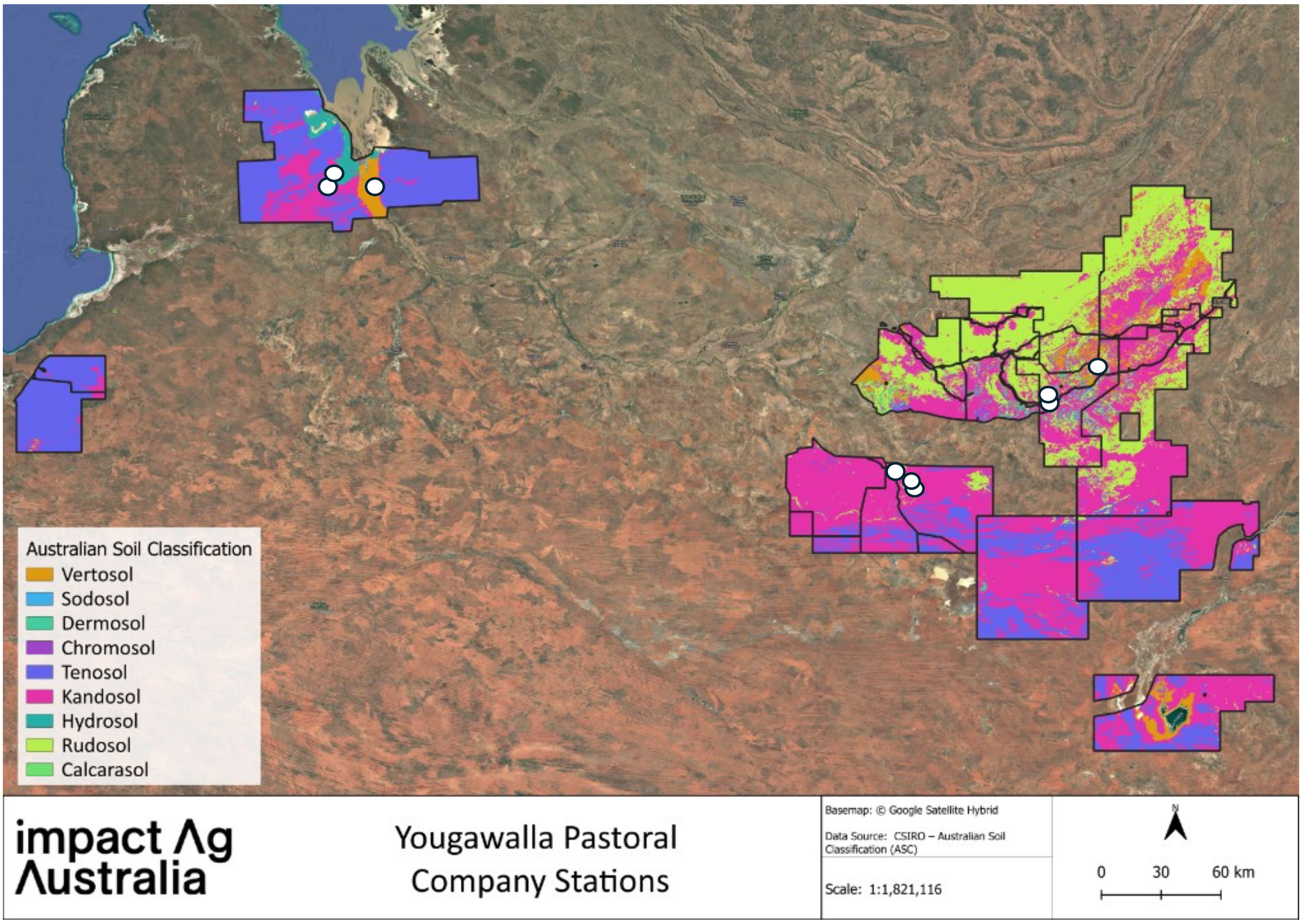

Figure 1. Yougawalla Pastoral Company Station footprint covering approximatly 4 million hectares of the Kimberley region of Western Australia. Australian Soil Classification (ASC) is overlaid to show the diversity of soil types present across the footprint. Sampling sites are indicated (white dots).

A practical approach to Natural Capital uplift

A clear understanding of how soils in the Kimberley capture, store and cycle water and nutrients is fundamental to running a productive and profitable pastoral business. These processes drive pasture growth, groundcover persistence and the overall capacity of the land to respond to rainfall, particularly in a highly variable and resource-limited environment.

Maintaining and lifting livestock production therefore depends on practical management that protects soil stability, improves rainfall capture and infiltration, keeps nutrients cycling, and maintains a base of perennial vegetation. When these functions are working well, more rain is converted into useful feed, pastures recover more quickly, and production becomes more reliable across seasons.

In this environment, the main management levers are controlling the intensity and duration of grazing pressure, along with practical rehydration techniques such as whoa boys, swales, rip lines and ponds. These approaches help slow and spread water across the landscape, increase infiltration, and improve the effective use of rainfall.

"By keeping more water and nutrients in the system, these practices support stronger pasture growth, increase groundcover, and improve feed availability. This not only protects the natural resource base but also strengthens business resilience by making production more reliable across variable seasons.

With the right data and monitoring, these management actions can also position producers to access emerging natural capital and environmental markets, providing opportunities to diversify income streams while improving land condition and long-term productivity." – Dr Susan Orgill, Impact Ag Australia.

Strengthening landscape function through better groundcover, patchiness, and biodiversity directly supports these outcomes by reducing runoff and erosion, retaining resources in the system, and improving resilience to dry periods. In this way, natural capital is not separate from productivity; it underpins it. Investing in soil condition, vegetation structure and ecological function is critical to avoiding degradation and sustaining long-term carrying capacity, profitability and climate resilience.

What we did

Natural capital for a Kimberley pastoral business is essentially the condition and function of the land: your soils, water, pasture and biodiversity, and how well they work together to grow and maintain feed.

The Impact Ag Australia team worked with YPCo Station Managers to select a range of sites across three stations where changes in grazing management and/or rehydration works had been put in place, to practically evaluate the potential and benefits of building natural capital. For grazing, this included areas where rest and recovery were being actively managed, as well as sites that represent “what good looks like” in terms of matching soil condition and pasture performance with the more productive parts of the landscape. The rehydration works included crescent-shaped ponds and swales designed to slow water flow and stabilise gullies (Figure 2a & b) and rip lines (Figure 2d) to help reverse claypan expansion and improve infiltration, and whoa boys (Figure 2c) used to manage runoff and rehabilitate station tracks. Tracks can be a major source of erosion, as water tends to concentrate along them. What starts as a small rill can quickly develop into larger erosion features, leading to soil loss, reduced water infiltration and localised declines in productivity.

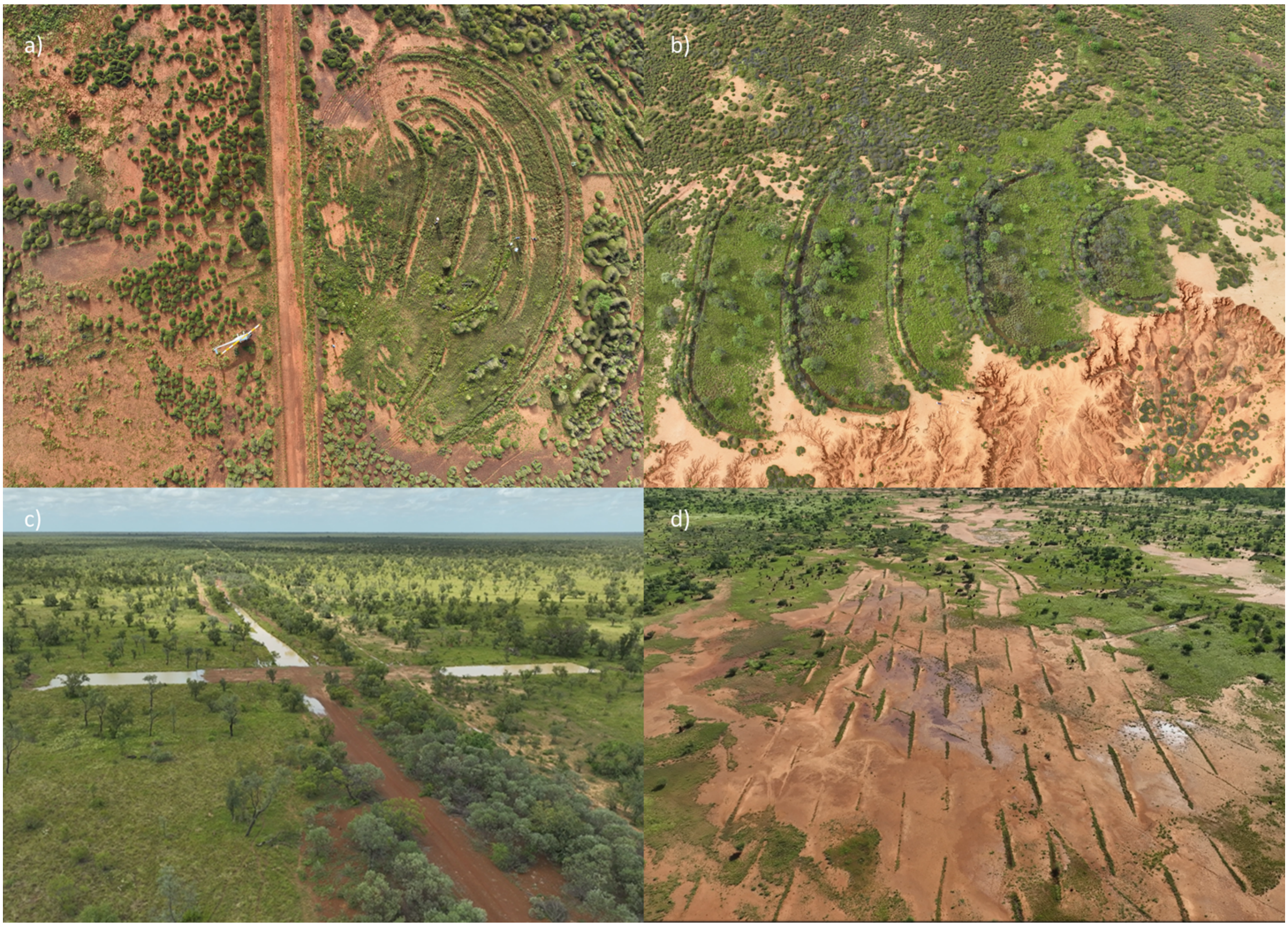

Figure 2. Aerial photographs of selected sampling sites across three YPCo stations including: **a)** on station road side swales established 2 years ago on Station A (samples = claypan vs swales) **b)** swales to arrest gully errosion established 8 years ago on Station A (samples = claypan vs swales) **c)** woah boys established 2 years ago on Station C (samples = rehydration vs control) and **d)** banks ripped with a blade on Station B (patch and interpatch samples). Other samping locations (not shown here but included in data below) included grazing treatments (Station B), representative examples of productive pasture (Station A and C) or spinefex pasture (Station A) and areas of runoff (fast feed-in zone for water or sheet erosion vs vegetation patch).

How we measured it

At each site, we collected soil samples and made practical soil and pasture observations using either transects or sampling quadrats (10 × 10 m). This allowed us to capture what was happening both on the ground and across the landscape pre- and post-intervention.

Soil samples were analysed for key indicators that drive production, including soil organic carbon (total, active and stable fractions), major nutrients, pH, electrical conductivity (salinity), texture and bulk density. We also used metagenomic analysis to better understand soil biological activity and overall soil function, and how these respond to different management approaches.

In the field, we measured important indicators of land condition such as water infiltration, groundcover, and surface soil condition (e.g. crusting, stability and erosion risk). Together, these measures provide a practical picture of how well the soil is functioning, how effectively rainfall is being used, and how management is influencing pasture growth and long-term productivity.

What we found

Soil pH

As expected, soil type and some soil properties varied between stations and were largely driven by landscape position rather than treatment. For example, soil pH ranged widely between sites and with depth (from pHCa 4.1 to 7.9 in soil layers to 30cm), reflecting underlying soil differences.

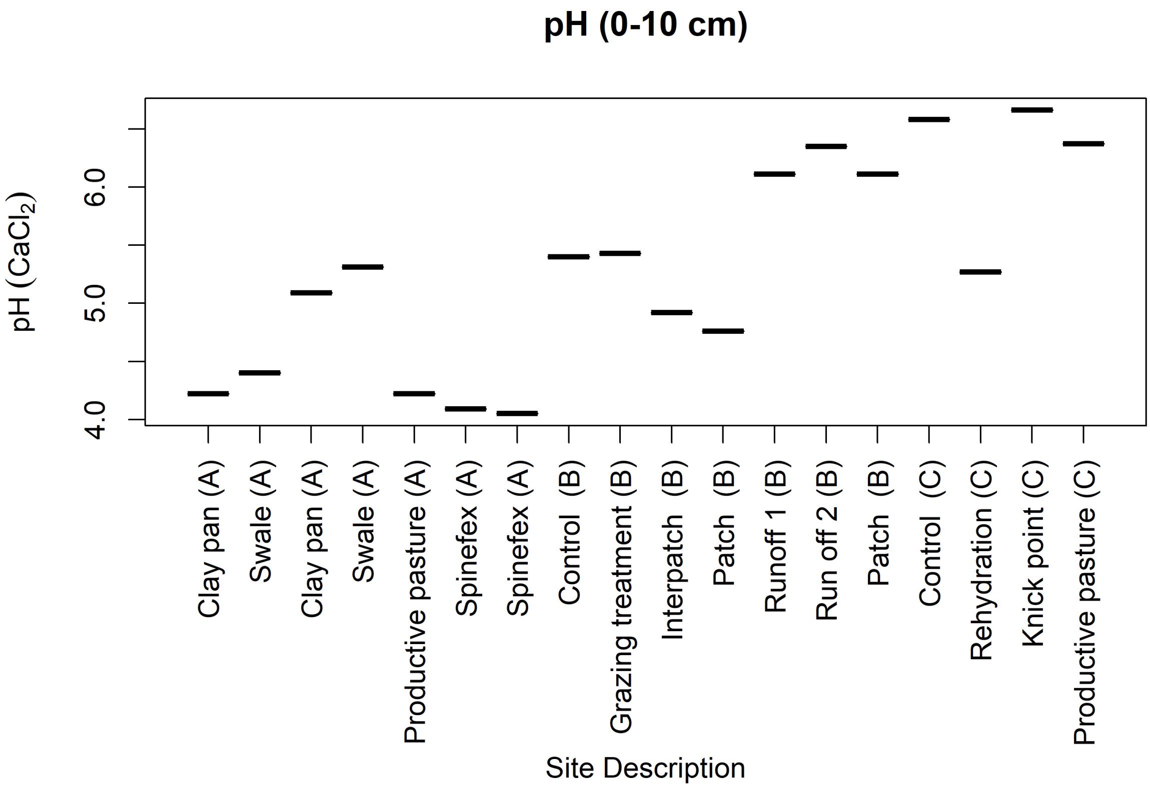

Figure 3. Soil pH across three stations (Station A, B and C) by sampling sites.

That said, there were some consistent trends linked to management. On Station A, soils in swales (where rehydration works had been applied) were slightly less acidic than adjacent bare claypans, suggesting improved retention of nutrients and bases. On Station C, the opposite trend was observed, highlighting that pH responses depend on soil type and where you are in the landscape. These differences make sense when you look at how water is moving. Slowing and spreading water can reduce leaching and help keep nutrients such as calcium and magnesium in the root zone, which can lift pH. In other situations, improved moisture and groundcover increase biological activity and soil organic matter, which can produce mild acidity and lower pH over time. In practice, both shifts can be positive if they reflect better soil function, so it's important to monitor trends over time rather than focus on a single number.

P

Available phosphorus (Colwell P) was very low across most sites (often below detection in the 0-10cm soil layer) which is typical for much of Northern Australia. The biology results support this, showing low levels of phosphorus-solubilising activity in the soil. These low phosphorus levels are a result of old, highly weathered soils that have lost or tightly bind nutrients over time. For pastoralists, this means pasture growth, feed quality and cattle performance can be limited, even in good seasons. In practice, this can be managed through phosphorus supplementation, maintaining good pasture condition and groundcover, and making the most of more fertile parts of the landscape.

SOC

As expected in a monsoonal environment, total soil organic carbon (TOC) levels were generally low in the topsoil (0–10 cm, 0.26-0.83% and an average of 0.52% across the three stations. TOC ranged from 0.41-0.68% and average of 0.59% for Station A, ranged from 0.26-0.58% with an average of 0.38% for Station B and ranged from 0.53-0.83% with an average of 0.65% for Station C). However, we saw clear trends linked to management. Areas with rehydration works and more productive grazing management had higher levels of both total carbon and labile (active) carbon compared to nearby control sites.

Labile carbon is the more easily broken-down, "active" portion of soil organic carbon. It comes from recent plant inputs such as roots, dung, litter and microbial activity. This is the fraction that fuels soil biology, helping drive nutrient cycling, aggregation and pasture growth. In contrast, total organic carbon includes both this active pool and more stable carbon, which is stored in the soil longer term and contributes to soil structure, water holding capacity and resilience. Put simply, labile carbon supports short-term productivity, while total carbon reflects both current function and longer-term soil health.

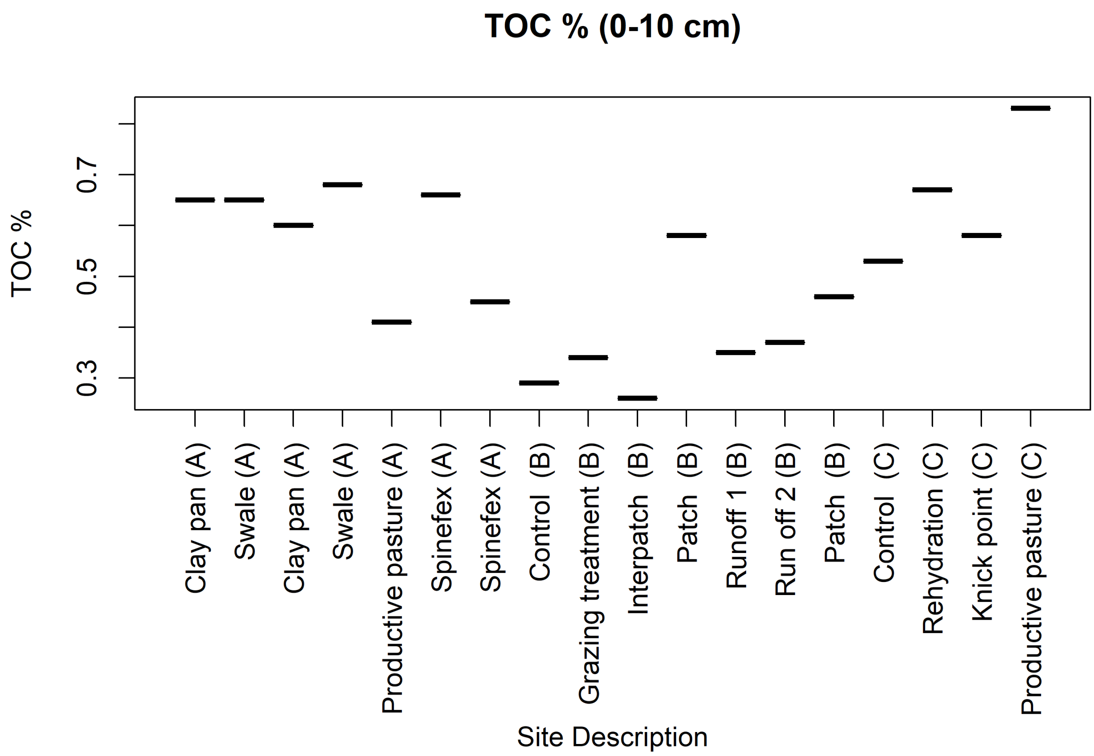

Figure 3. Total organic carbon (%) across three stations (Station A, B and C) by sampling sites.

The increases in these carbon pools lined up with what we observed in the paddock: better groundcover, more litter, higher pasture biomass and improved surface soil condition. This tells us the landscape is capturing more water and nutrients and cycling them more effectively. From a management perspective, these improvements are being driven by:

- Grazing management that maintains groundcover, allows rest and recovery, and promotes deeper-rooted perennial grasses, increasing organic inputs into the soil
- Rehydration techniques (e.g. swales, ponds, rip lines, whoa boys) that slow and spread water, improve infiltration, and support more consistent pasture growth and litter accumulation.

Together, these practices increase plant growth and groundcover, which feed more carbon into the soil and build both the active and stable carbon pools over time. For pastoralists this is important because building soil carbon improves how well the country responds to rain, supports more reliable pasture production, and increases resilience in dry periods, and an example of how building natural capital directly underpins long-term productivity and carrying capacity.

Soil biology

Metagenomic analysis (using DNA to understand the soil microbial community and what functions it can perform) showed clear differences between stations, sites and management approaches.

At a station level, different strengths in soil function were evident. For example, Station C showed higher levels of functional genes linked to soil aggregation, which is important for improving soil structure, infiltration and resistance to erosion. Station B showed higher abundance of genes associated with climate resilience, suggesting soils there may be better equipped to cope with seasonal stress such as dry periods.

Within stations, management also made a difference. At Station A, productive pasture areas consistently showed higher levels of functional genes linked to soil aggregation, indicating better soil structure where pasture condition was stronger. Functional genes related to organic matter formation and carbon fixation were highest in both productive pasture and in swales (rehydration areas), showing that these parts of the landscape are capturing and building more carbon.

In practical terms, these results highlight the need for further investment in research to understand more broadly natural capital and soil carbon uplift. The results back up what we saw in the field; productive pastures and rehydrated areas are supporting more active and functional soil biology. This is important because soil microbes drive nutrient cycling, support pasture growth, and help build soil structure, all of which underpin long-term landscape productivity and resilience.

> "The Kimberly represents a unique opportunity for the Australian beef industry to showcase a production system adapted to work within its natural capital, as opposed to the majority of global systems that modify nature to suit production. Placing a real value on natural capital is essential to ensure these unique landscapes can continue to economically support regional Australia whilst meeting our nature positive goals." Prof David Rowlings, QUT.

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