Department of
Primary Industries and
Regional Development

GOVERNMENT OF
WESTERN AUSTRALIA

Australian Government
Department of Agriculture,
Fisheries and Forestry

Future
Drought
Fund

Southern Rangelands Revitalisation Program

Calum & Belinda Carruth at Murchison House Station

Managing rangeland goats to improve landscape condition

August 2025

Acknowledgments

This case study was co-prepared by the Department of Primary and Regional Development (DPIRD) and Soils for Life as part of the Southern Rangelands Revitalisation Program (SRRP), jointly funded through the Australian Government's Future Drought Fund and the WA State Government's Climate Resilience Fund.

The program started in 2021 and aims to support pastoralists to investigate and implement long-term solutions for on-station improvements in rangeland condition, land productivity and livestock management in WA's southern rangelands.

We acknowledge that the contents of this document do not necessarily reflect the views of contributors.

Cover image: A section of the linear trap yard at Murchison House

Source: Diana Blaschke

For further information, visit **dpird.wa.gov.au/southern-rangelands-revitalisation-program**

For more information on Soils for Life email **info@soilsforlife.org.au** or visit **soilsforlife.org.au**

SoilsforLife

Contents

About the case study series

This case study is part of a series that showcases 7 pastoralists in Western Australia who have participated in the Southern Rangelands Revitalisation Program (SRRP) run through the WA Department of Primary Industries and Regional Development (DPIRD), funded by the Australian Government's Future Drought Fund – Resilient Soils and Landscape program and the WA State Government's Climate Resilience Fund.

The Southern Rangelands Revitalisation Program aims to support pastoralists to investigate and implement long-term solutions for on-station improvements to land condition and livestock profitability in WA's southern rangelands. This program takes a systems approach to rangelands revitalisation involving:

- the regeneration of palatable, productive, perennial vegetation
- landscape function and hydration restoration
- total grazing pressure control
- livestock management.

The program provides support to pastoralists to learn as a community through organised group meetings with like-minded pastoralists, funding to access expertise and training, and grant funding for revitalisation projects.

The 7 pastoralists in the case study series received training and specialist support in the first phase of the program and were then successful in applying for funding for an on-ground revitalisation project.

Soils for Life has prepared each case study in collaboration with DPIRD and the pastoralists. Each pastoralist story provides an insight into their unique rangeland environment and context, challenges and motivations, and ways they are adapting and innovating to build resilience. The case study has a focus on practices implemented through the SRRP, but provides context about each pastoralist's broader management approach.

Station facts

Location
Nhanda Country, Kalbarri, WA

Climate
Hot summers, mild winters. Wet winters, low summer rainfall.

Average annual rainfall
319 mm[1]

Agro-ecological region
Semi-arid[2]

Property size
126,000 ha

Elevation
0–200 m+, ranging from sea level at the coast and tidal river to over 200 m in the high sandplains and cliffs

Social structure
Family owned and operated pastoral lease

Enterprise type
Commercial harvesting of feral 'rangeland goats'[3] and tourism

Landscape
Mixed scrub-heath with scattered tall shrubs[4]

Soils
Undulating sandplain on Silurian and Devonian sediments of the Gascoyne Sub-Basin (Carnarvon Basin), some Cretaceous sediments and moderately dissected in places with laterite remnants.[4]

Land systems[5]
Pillawarra, Bibra and Nanga

1 Sourced from pastoralist and **SILO**.
2 Agro-ecological region is determined according to **Outback Australia - the rangelands**. Extreme variability of rainfall is a defining feature of southern rangelands and has a significant impact on the challenges and solutions being explored in the SRRP.
3 'Rangeland goats' is the common name for the breed of feral goats that have naturalised in the Australian rangelands after domestic breeds escaped in the 1800s. Feral goats are a declared pest in WA. Under the pest management policy, commercial harvesting of feral goats is permitted in the WA rangelands under strict conditions.
4 Sourced from **Natural Resource Information, DPI**.
5 Land systems of the SRRP project area. Sourced from the Rangelands baseline surveys - Western Australia.

SRRP project highlights

Goals and approaches

- Managing ‘rangeland goats’ to improve rangeland condition
- Protecting the fragile and unique Pillawarra land system
- Using technology to support rangeland management

Practices implemented

- Installing exclusion fencing to keep ‘rangeland goats’ out of the Pillawarra land system
- Using the new exclusion fencing as well as water tanks and troughs to create a 9 km linear trap yard to deter goats from the Pillawarra land system
- Installing remote technology, including automatic gates and water monitoring, in the linear trap yard to improve mustering efficiency and safety and to reduce the cost and carbon footprint of mustering operations

Initial insights

- Goats have different grazing behaviours, diets, reproduction and home ranges compared to sheep and cattle, which influences management decisions
- Goats in managed numbers aren't necessarily more degrading or more detrimental than other livestock
- Goats represent special challenges in trap yards. The design of trap yards can be modified according to goat behaviour to improve effectiveness
- Internet connectivity has made management more efficient
- Regeneration can occur within a couple of years in exclusion fencing zones

> One of the most interesting things that we've noticed is that since we've been here, the rangeland conditions have generally improved. So, it shows that managing the numbers of goats and controlling that grazing pressure allows the landscape to recover.
>
> **Belinda Carruth**

Meet Calum and Belinda

Calum and Belinda took on the pastoral lease of Murchison House Station from Calum's stepfather in 2005, who had been there since 1997. The station is located 12 km east of Kalbarri on the banks of the Murchison River and is surrounded by national park. The station has 70 km of coastline and 35 km of Murchison River frontage, and Calum and Belinda operate a tourism venture with camping sites. Belinda explains, 'One of the things we've learned since we've been here is that diversification is essential, you must have multiple income streams. So we looked at tourism as an option because of our location, it made sense.'

The station had been unmanaged for about 10 years when Calum and Belinda took over the lease and it was entirely run down – none of the windmills were operational, there were no intact fences or swinging gates, the vehicles didn't start, and the vehicle tracks were heavily overgrown. Meanwhile, Belinda's background was in health and Calum's in mining. They describe the journey as being a 'massive learning curve, where they have had to learn on the run'.

Image 1 Calum and Belinda Carruth Source: Belinda Carruth

Learning to manage ‘rangeland goats’

When Calum and Belinda started managing the station, there were 5,000 sheep and 1,500 cattle, and they describe it as being overpopulated with ‘rangeland goats’. They sold most of the cattle in the first year and persisted with running sheep for 2 years before deciding not to continue because ‘the wool was worth nothing, because it was full of prickles from saffron thistle introduced to the property in the 1930s with a load of rams from South Australia’. After selling the sheep, Calum and Belinda reintroduced Brahman cattle. These cattle were on the station until 2011 when they sold them off after a live export suspension impacted the cattle market.

Calum and Belinda also planned to reduce the numbers of ‘rangeland goats’ after selling the sheep, however this plan hit a hurdle when they discovered that removing the migratory goats was going to be difficult or impossible without a fenced boundary on the station.

Image 2 Calum designed these ‘goat gates’ which he installed in the fence to allow goats through and prevent damage to fences Source: Belinda Carruth

Instead, Calum and Belinda have adapted and are now focused on managing the 'rangeland goats'. With goat prices improving and the market for goat meat becoming more consistent and reliable, Belinda explains, 'It made sense to manage the "rangeland goats" and muster them efficiently, so we've been concentrating on that. We're pretty good at catching goats these days.' The goats are mustered seasonally during the drier part of the year between November and March. They use helicopters, fixed winged aircraft, motorbikes and quad bikes to chase them into a keyhole trap that consists of a circle of mesh with a couple of wings forming a keyhole shape. The traps are placed where the goats congregate near permanent water in summer.

Calum and Belinda have learned a lot about 'rangeland goat' behaviour. They bring all the goats back to a holding paddock and draft them directly onto the road train. They found that if they drafted the goats out in the keyhole trap and brought the saleable goats back and left them in a paddock by themselves, they spent the entire time trying to get out and back to the others. When the whole mob is kept together, they settle down quickly and the Carruths no longer have the problem of them constantly trying to find their way out of the holding yard. The Carruths have also learned that they need to shift the traps and the direction they run every few years, otherwise the goats habituate and stop going in.

Approximately 3,000 migratory 'rangeland goats' were caught this year, which is down from 5,000–7,000 previously. Calum and Belinda feel that the 'rangeland goats' are making no more impact on the landscape than running 6,000 sheep. Calum and Belinda can see how they can wild harvest 'rangeland goats' in a way that is environmentally, ecologically and economically sustainable.

Through managing 'rangeland goat' numbers, they are seeing improvement in the landscape. Goats are browsers and can eat a much wider diversity of rangeland vegetation compared to sheep and cattle. 'Goats thrive in this landscape. We would never put sheep and cattle back into this landscape, it's so difficult trying to manage them. As soon as you have a bad season, you've got to move livestock somewhere else, and we haven't got anywhere else we can move sheep or cattle to,' says Belinda. 'Rangeland goats', however, can be readily caught and removed from the landscape for sale in a dry season.

Fencing that works for goats

When Calum and Belinda first came to the station, they built a massive ringlock fence as a mustering wing. This fence needed to be completely rebuilt the following season because the pigs, 'rangeland goats', emus and kangaroos had pushed through the fence to get to the water on the other side. Calum came up with the idea of building what he calls 'goat gates' at regular intervals along the fence. These gates are usually left open (folded up and wired to the top of the fence) to allow the goats and other animals access through the fence line at every major pad[6], preventing them from damaging the fence in an effort to reach water. When the fence needs to be used for mustering, Calum can easily close all the gates by riding along on the motorbike and dropping them, forcing the goats to run along the fence into the trap.

Calum and Belinda can see that the vegetation across the vast majority of the station has come back quite well since they have been reducing and managing the 'rangeland goats', with palatable species getting going again.

6 Pads are visible pathways made by regular animal movement through the landscape

Calum and Belinda are observing the groundcover improving and an increase in the diversity of plants, with chenopod shrubs, buffel grass (*Cenchrus ciliaris*), birdwood grass (*Cenchrus setiger*) and bullock bush (*Alectryon oleifolius*) showing up. Abalone fishermen who have been visiting the station for over 20 years also tell them the place looks much better than it used to.

Protecting the fragile Pillawarra land system

A small proportion of the station (~8%) comprises the unique and fragile Pillawarra land system, and these areas are quite degraded. The Pillawarra consists of steep bluffs that were a coral reef 150 million years ago, and is a world hotspot for cretaceous shark teeth. It is steep and rocky, covered by

Image 3 Revegetation in a 50 m x 50 m exclusion cell built as part of a previous project with the WA Soil Commissioner. Note that the top half of the cell is less vegetated due to reduced topsoil Source: Diana Blaschke

large calcrete boulders that make it difficult to muster. Historic overgrazing by domesticated and feral herbivores has reduced plant species composition and groundcover and contributed to the formation of erosion gullies. The fertile soils on the Pillawarra land system historically grow very palatable plants and the area is sufficiently watered by springs and soaks, so grazing impact from kangaroos and goats is constant.

Working with the Commissioner of Soil and Land Conservation[7] to mitigate significant erosion in the Pillawarra land system, Calum and Belinda have built four 50 m x 50 m exclusion cells on 4 different regoliths[8] in the Pillawarra including the rocky tops of hills, steep heavy limetic clay slopes, windblown sands and rocky red slopes. The 1.2 m high exclusion cells are constructed from ringlock, with rabbit proof fencing along the ground so that rabbits cannot dig underneath. These exclusion cells are being monitored and the results are encouraging, with native grasses and native chenopod shrubs appearing in the cells, including some species that they have never seen before (see Image 2 showing vegetation in the cell - note that the top of the cell is less vegetated due to reduced topsoil). They are excited to see that the seeds for these plants are still in the landscape, as it is hard to get native seed. Belinda says, 'What surprised us is how quickly that regeneration has occurred without any grazing pressure within a couple of years. That really was a big surprise.' Managing kangaroos and rabbits along with goat numbers is the biggest challenge for managing grazing pressure.

Using technology to improve efficiency

Calum and Belinda have been early adopters of technology designed to improve the efficiency of managing such vast areas of land. Prior to the SRRP project, they had built a system of wifi repeaters to cope with the rugged terrain and create a point-to-point wifi system that runs the length of the station. This has enabled them to monitor water remotely using flow-in and flow-out meters, so they know when the tanks are filling, when the goats are drinking or when there is a leak. They prefer water flow monitoring rather than using cameras, which are more expensive to run due to the data required.

7 The **Soil Commissioner** is a role within the Department of Primary Industries and Regional Development, Western Australia.
8 Regolith is the layer of loose material, including soil, dust and broken rocks, that covers the bedrock and is formed by weathering and biological processes.

> One of my favourite things
> is when people tell me
> something “can’t be done”.
> I ask, “how do I make that work?”
> and we just get out there and do it.
>
> **Calum Carruth**

Southern Rangelands Revitalisation Project on Murchison House Station

The Southern Rangelands Revitalisation Program (SRRP) aims to support pastoralists to investigate and implement long-term solutions for on-station improvements to land condition and livestock profitability in WA's southern rangelands.

Motivations and goals

Calum and Belinda's revitalisation vision is to: 'Develop management strategies that will restore rangeland condition, regenerate palatable, productive, perennial vegetation and improve livestock profitability to ultimately deliver an environmentally and economically sustainable rangelands pastoral enterprise. These outcomes will be achieved through total grazing pressure management, food on offer budgeting, water management and more efficient mustering and trapping, delivering a resilient, fast recovering and profitable extensive grazing business that will remain viable through all seasonal conditions without contributing to the degradation of the natural resource.'

The project came about due to Calum and Belinda's desire to protect the Pillawarra land system. This land system is unique to Murchison House, with 99% of the land system occurring on the station and nowhere else. The other 1% of the Pillawarra land system is within the neighbouring Kalbarri National Park. 'This particular section of the property is so unique and needs protecting. This project gave us the opportunity to begin to implement the change that was needed,' says Belinda. They are also motivated by a desire to create better fencing and other infrastructure to be able to control the movement of the 'rangeland goats' more efficiently and safely (the rugged terrain makes mustering dangerous) and to rest areas of the property.

The thinking behind their project has been inspired by Holistic Management training, which they attended as part of the SRRP program. This education has provided them with a more holistic view of the landscape and new perspectives on how managing the grazing impact of the 'rangeland goats' will contribute to improving landscape resilience.

Belinda can see that:

> ‘Goats in managed numbers aren’t necessarily more degrading or more detrimental. It’s only when you’ve got 5,000 sheep and 1,500 cattle, plus over 4,000 goats - that aren’t worth anything and therefore no one’s paying attention to them - that the overgrazing damage occurs. So, if you manage the total grazing pressure on the property better through removing either the sheep, or the cattle, or the goats, then that becomes more sustainable. What we’ve done is remove the cattle and the sheep because of the additional management they require, and the goats are of value.’

The SRRP project provided an opportunity to progress their use of technology to support rangeland management. Prior to the project, they had been using technology for remote monitoring of water points, and for the SRRP project they were looking to build on this approach by introducing some new technologies that would continue to improve efficiency and reduce costs. Cost efficiency has always been a motivating factor for Calum and Belinda, which has driven their early investments in digital connectivity technologies. As Calum puts it, ‘We didn’t have an established business to come into, so we had to do everything as cheaply and efficiently as possible.’

Image 4 A gully in the Pillawarra land system with spring water at the bottom on Murchison House Station Source: Diana Blaschke

Practices implemented

Exclusion fencing to create a linear trap yard

Exclusion fencing: As part of the SRRP project, Calum and Belinda constructed 2 exclusion fences that create a fenced laneway along the edge of the Pillawarra land system. This exclusion fencing is designed to intercept the migratory path of the 'rangeland goats' before they reach the Pillawarra, stopping them from passing through the fragile land system to access water.

The exclusion fences are built from 8/90/15 long life ringlock fencing wire and galvanised pickets. The exclusion fence incorporates 'jump ins', which are tin ramps filled with rocks and built adjacent to the fence to provide the goats an entry point over the fence instead of pushing through it to reach water in the laneway (see Image 5). Once in the laneway, the goats cannot enter the Pillawarra. Remote gates are installed to control access to the laneway for goats migrating through the Pillawarra.

> "I think that once you know what the country could look like – and we didn't know any different when we got here – but now that we know what it could look like, you can't really sit back and not do something."
>
> **Calum Carruth**

Image 5 'Jump in' built to allow goats entry into the laneway Source: Belinda Carruth

Image 6 Aerial image of the northern end of the exclusion fence with the linear trap yard in the background Source: Diana Blaschke

Image 7 Aerial view of exclusion fencing showing laneway and ruggedness of terrain
Source: Diana Blaschke

Image 8 Exclusion fencing at Murchison House Source: Belinda Carruth

Image 9 Goats on one side of the exclusion fence Source: Belinda Carruth

Linear trap yard: The two fences that form the 25 m wide laneway also create a 9 km long linear trap yard. Building on his previous success with 'goat gates', Calum has installed 10 of them along the external trap yard fence. These gates will remain open for most of the year allowing and training the 'rangeland goats' to enter the yard to access water.

The provision of good water attracts the goats into the trap. A series of tanks and troughs are installed every 2 km down the middle of the linear trap yard, fed by 10.5 km of poly pipe supplying water sourced from a well within the Pillawarra. The goats come through the open gates and get used to drinking at the tanks and troughs. With access to plenty of water along with access to shade and feed provided by a strip of scrub that has been left in the middle of the area, the goats stay there and don't put pressure on any other fences. Belinda explains, 'When we have the numbers and know they are all drinking, we shut the gates. We can then use two quad bikes, one on each fenceline up the length of the yard, to slowly push the goats into a traditional total grazing management (TGM) trap yard. We have found that the slow and steady pace of mustering the linear trap means that the goats are not stressed during the process, delivering tangible animal welfare benefits.'

There are TGM yards at each end and one in the middle, allowing 'rangeland goats' to be 'caught and loaded out depending on which tracks are better or easier to drive on,' explains Calum. 'Goats can be easier to work with than sheep, once you have run them through the drafting yards, they learn very quickly and can be easily drafted with minimal staff.' Typically, Calum and Belinda can work the mob themselves.

Initially they were considering building a 3 km linear trap yard to prove the concept. Seeing how far goats will walk around fences, Calum and Belinda realised the linear trap

yard needed to be longer to be effective. The linear trap yard was extended to become 9 km in length to prevent the goats from walking around the smaller length fence.

The linear trap yard has been specifically designed for goats, who can pose challenges in trap yards. ‘Goats are clever and they will learn quickly,’ according to Calum. Belinda explains how ‘they climb, jump and put more pressure on fences than sheep so you must have a taller, stronger fence’. Initially Calum and Belinda found that spear gates in trap yards designed for cattle weren’t catching the goats. They realised that the billy goats were standing up on their back legs, dropping down on the spears and popping them open to get out. The design of the TGM yards now includes ‘jump ins’, so the goats can climb up and jump into the trap and then can’t jump back out.

Using technology to improve the efficiency of mustering

Calum and Belinda have learned from and expanded upon their previous use of technology to make mustering ‘rangeland goats’ in the new linear trap yard much more efficient.

The 10 ‘goat gates’ that allow goats into the linear trap yard have been made into automatic gates that can be triggered shut from a mobile phone (see Image 11). This means Calum and Belinda no longer need to ride along the fence ahead of the muster. They decide when to trigger the gates to close based on data from remote water flow-in and flow-out meters installed on the tanks and troughs in the linear trap yard (see Image 12). Once Calum and Belinda can see that enough goats are drinking from the tanks, as indicated by monitoring the falling water level remotely, they shut the gates to lock them in the trap yard.

Image 10 Aerial image of the linear trap yard
Source: Diana Blaschke

Image 11 Automatic gate that can be triggered shut using a mobile phone Source: WA DPIRD

In addition to improved efficiency and reduced cost and carbon footprint, the technology also reduces the number of times they need to physically travel through the very rugged area for mustering, improving safety. Calum shares that ‘mustering is extremely challenging, so efficiency and safety is a huge thing. It will reduce our carbon footprint dramatically with less fuel being used, in particular choppers and planes are expensive on fuel.’

Initial insights

Project activities were initially delayed by drought, as Calum and Belinda didn’t want to disturb the ground while it was dry and fragile. This was followed by a long period of wet weather that washed away creek crossings and inundated roads, which meant that they couldn’t access the property for many months. Work was then needed to repair tracks before they could get to the project site.

The project is now complete and Calum and Belinda are happy to see that ‘goats are already wandering into the linear trap yard and drinking, doing what we expect them to do, coming in through the gates in the northern fence, wandering along until they find the trough and hanging out in the shade for a bit. They aren’t in a hurry to move on. We have run our initial trapping cycles and these have been very successful.’

Calum and Belinda are quietly confident that the linear trap yard will pay for itself within 5 years through reduced mustering costs and improved safety of mustering. Belinda can see that ‘the other thing that will be proof of the success is that the exclusion fences will not be damaged, so it will maintain its integrity because of the design of the trap yard system’.

Image 12 Remote water flow-in and flow-out meters are installed on the tanks and troughs in the linear trap yard Source: WA DPIRD

Next steps

Calum and Belinda hope to extend the linear trap yards to reach 12 km in length by the end of this summer (2025–26). They plan to continue to extend the fences and keep rolling the linear trap yard out, with the ultimate goal of building a 70 km fence that goes around the rugged terrain to enclose the Pillawarra system entirely, allowing it to regenerate. Excluding the 'rangeland goats' and reducing other grazing pressure would also create a 'haystack'[9] running the whole eastern side of the property, which they hope could regenerate enough for them to be able to reintroduce managed goats to occasionally intensively graze the area.

Belinda explains how 'this project has increased our knowledge base so intensively and we are still working on how we are going to do rotational grazing on the scale that we have'. Calum and Belinda are building a 2,000 ha exclusion paddock as part of a project with the Commissioner of Soil and Land Conservation and have also begun to build a second exclusion paddock of 2,500 ha adjacent to this. Goats will be excluded from these areas until the land has recovered enough for managed grazing. Kangaroo numbers may also need to be addressed.

They can see the potential for chenopods and grasses to establish in exclusion zones that can be opened, allowing managed goats or other stock to graze once the grasses recover, and more importantly closed when needed to be able to get the stock out again. Belinda explains, 'As we develop our local market and need to supply more regularly, it may be that we split the paddocks into smaller areas and practice more intensive rotational grazing.'

Calum can see that 'instead of having "rangeland goats" roaming everywhere, we can prevent overgrazing by catching them and running them according to carrying capacity in a big paddock for a month or three months, fatten them to sell them and then let the paddock rest for 18 months or 2 years'. Calum believes that 'if we can prove that it works, and we can get demonstrable results out of the first section, I think we might be able to find partners who would come in to help fund it'.

Calum and Belinda are excited by the response they are seeing in the exclusion cells so far and looking forward to seeing these results replicated in larger areas. They hope to show that exclusion fencing is worth investing in and to be able to apply it to other projects as well.

9 A '**haystack**' is where an area of pasture is intentionally left to grow and mature to provide a feed source for livestock in dry times.

Image 13 A section of the linear trap yard at Murchison House Source: Diana Blaschke

Seeing the response from those ‘tiny little patches’ put in, Calum and Belinda are now planning to build more exclusion cells at a larger size of 100 m x 100 m and will place them strategically around the property to act as seed banks. Calum hopes that ‘the seed will blow out of them and spread through the land system’.

Calum and Belinda are hoping the future brings improvements to technology that can further assist them in managing the station.

Given Murchison House Station does not have a fenced boundary, there is no way to control stock movement or the migration of goats. They would like to be able to tag and track ‘rangeland goats’ to monitor their migration and numbers, as well as target them more efficiently. They are also interested in the future potential of drones for moving stock through the landscape and for weed spraying in the rugged terrain.

Department of Primary Industries and Regional Development

+61 1300 374 731 | enquiries@dpird.wa.gov.au | dpird.wa.gov.au

ABN: 18 951 343 745

PR001-25-06 AUG 2025