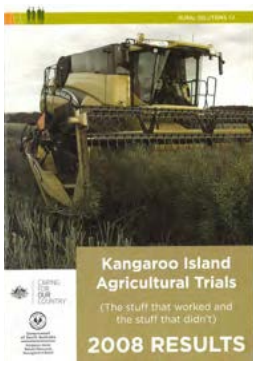

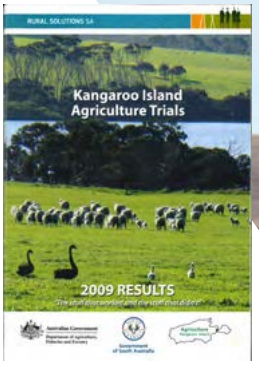

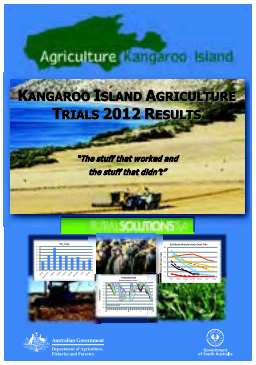

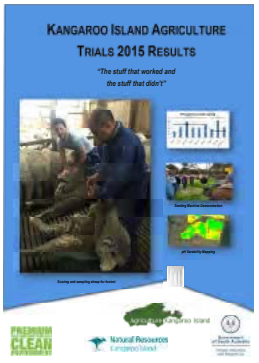

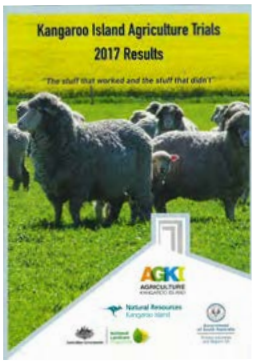

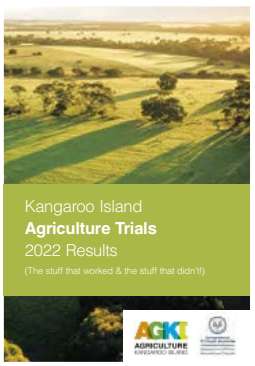

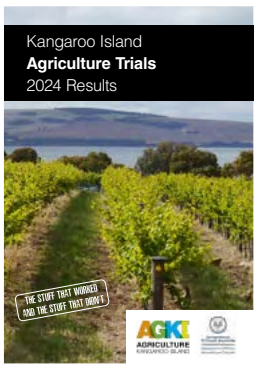

Kangaroo Island
Agriculture Trials
2025 Results

The stuff that worked
...and the stuff that didn't

Government of South Australia
Department of Primary Industries and Regions

AGKI
AGRICULTURE
KANGAROO ISLAND


Photo: Tim Prance

Proudly supporting Kangaroo Island's agricultural industries to prosper and grow

The Department of Primary Industries and Regions (PIRSA) team on Kangaroo Island continues to work with primary producers and the wider community to help strengthen our primary production sector, offering expert advice and support.

Landholders can access:

- technical advice, educational courses and workshops
- enhanced biosecurity programs through weed management, animal health, and resources protecting the island from pests and diseases
- soil and water testing and interpretation of results
- financial assistance, including help with applying for PIRSA grant programs.

General Enquiries: 8553 4949

PIRSA Office:
Shop 7, 56 Dauncey St, Kingscote

https://www.pir.sa.gov.au

Animal Health:
Kate Buck 0419 091 156

Fisheries:
Aaron Ledgard 0428 183 474

Soil and Land Management:
Lyn Dohle 0419 846 204

Biosecurity SA & Weed Control:
Bianca Jones 0427 981 410

Sheep Blow Fly Eradication:
Helen Brodie 0411 216 968

Feral Pig Eradication
David Jirman 0428 371 436

Government of South Australia
Department of Primary Industries and Regions

Forewords

The production of this publication has been supported by the Kangaroo Island Landscape Board and the Australian Government through funding from the Natural Heritage Trust under the Climate-Smart Agriculture Program.

Welcome to the 20th edition of the KI Ag Trial's book!

We have all pushed through one of the driest years on record for the 2024/25 summer and autumn seasons. Finally, we are starting to see some germination in the paddocks after receiving well overdue rain as we put together this year's Ag Trials booklet for 2025. Adversity is nothing new to KI farmers, with the last couple of seasons testing our resolve. However, with good planning and management the agriculture community on KI remains on track to produce some of the best meat, wool and produce in Australia.

Locally produced agricultural trials are pivotal in providing access to relevant, local data to help overcome any issues identified and inform strategic and day to day decision making for our farmers. This year's booklet includes trials that have been run by PIRSA's AgTech project along with other PIRSA funded projects, the KI Landscape Board, and Meat Livestock Australia for our five year Producer Demonstration Site project. AgKI's ongoing partnership with these agencies enables us to access funding to deliver ongoing ag trial projects and findings that are tailored for our soils and climate. Contact details are provided at the end of each article so that further information about the application and findings of each project can be sourced if required.

As with all previous years, the Ag Trial's booklet is coordinated by Lyn Dohle at PIRSA whose contribution to a thriving, sustainable agriculture sector on Kangaroo Island is well known and very much appreciated.

We look forward to continuing to work with our partners for all future projects with another new exciting ag trial project to be announced a bit later in 2025.

Peter Cooper

Chair, Agriculture Kangaroo Island Inc

Shit that works...

This ongoing publication has been put together by a few key PIRSA staff over the years – namely Gail Capon, Faye Stephenson, Jacquie Skinner, Zuzka Hucock, Emma Fulwood (and of course yours truly!).

Thanks to all the authors who have contributed papers and put up with me hounding them to get the papers to me on time... Special thanks to Alice Teasdale, who has perfected the layout, taken over much of the final proof reading and oversees the printing.

Some of you may wonder about the significance of the line on the front cover "The stuff that worked and the stuff that didn't". When I first had the idea of putting together an annual KI Trial, I discussed it with AgKI and said I wanted a title a bit more exciting than "Ag Trial Booklet". Neil Pontifex suggested I should call it "The shit that worked and the shit that didn't". I wasn't sure if I really should use those exact words so changed it to "The stuff that worked and the stuff that didn't" and those words have remained on the front cover ever since!

I hope you enjoy flicking through this latest edition.

Lyn Dohle

Principal Regional Advisor – Kangaroo Island, PIRSA

TELEPHONE/ONLINE SUPPORTS

In times of need, a simple call can connect you with **help and support** that could make all the difference or supporting a friend to make that **call.**

Police, Fire, Ambulance - 000
Kangaroo Island Hospital - 8553 4200
KI Medical Clinic - 8553 2037

Regional Access - 1300 032 186
3 free counselling sessions via phone or online chat for anyone over 15 years of age

Mental Health Crisis Service - 131 465
confidential clinical telephone support for people having a mental health emergency

Lifeline - 131 114 || Text - 0477 13 11 14
a confidential service where you remain anonymous - an online crisis chat option also exists

Kids Helpline - 1800 551 800
private and confidential phone and online counselling service for young people aged 5 to 25 years

Men's Line - 1300 789 978
phone, online or video counselling service for men with emotional health or relationship concerns

Suicide Call Back Service - 1300 659 467
phone, online or video counselling service for people affected by suicide

Beyond Blue - 1300 224 636
trained mental health professionals via phone or online chat to listen, provide information and advice

Family Drug Support - 1300 368 186
support to help families of alcohol and other drug users to gain coping skills and survive their journey intact

Stand By - Support After Suicide - 0438 728 644
contactable anytime to arrange free telephone or face-to-face support - for up to 12 months

SPAM Helpline - 08 8115 3950
CFS, SES, VMR Volunteers

Open Arms - Veterans & Families Counselling - 1800 011 046
free and confidential counselling and support service for members of the serving and ex-service community

1800 RESPECT - 1800 737 732
support for people experiencing or at risk of experience, sexual assault, domestic or family violence

Qlife (LGBTI Service) - 1800 184 527 (3pm-Midnight)
free telephone and webchat support - delivered by trained LGBTI community members

Contents

Disclaimer

1. If you rely on the information in this booklet you are responsible for ensuring by independent verification of its accuracy or completeness.
2. The information and data in this booklet is subject to change without notice.
3. Department of Primary Industries & Regions SA, Agriculture Kangaroo Island, Kangaroo Island Landscape Board and the State of South Australia, its agents, instrumentalities, officers and employees:
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   - Accept no liability for any use of the said information and data or reliance placed on it;
   - Make no representations, either expressed or implied, as to the suitability of the said information and data for any particular purpose;
   - Do not sponsor, endorse or necessarily approve of any businesses, consultants, products, books or groups listed or referred to in this booklet;
   - Do not make any warranties or representations regarding the quality, accuracy, merchantability or fitness for purpose of any material contained in the booklet.

Note on the use of QR codes

We are increasingly using QR codes in this publication to direct you to further information online, as lengthy addresses are unwieldy to follow from a print publication. Hover your phone camera over the QR code without taking a photo, and your phone should ask whether you wish to go to the website. If you'd prefer to read on your computer, enough information is given alongside each code for you to find the page via a search engine such as Google.

AgKI Partners

Platinum Partners

Primary Industries & Regions South Australia (PIRSA)
Kangaroo Island Landscape Board

Gold Partners

Nutrien Ag Solutions
FP Ag

Silver Partners

Elders
ANZ Bank

Bronze Partner

Rabobank
G. & J. East

Partner

Ella Matta

An Update from AgKI

Agriculture Kangaroo Island Inc is the peak body for agriculture and primary production on Kangaroo Island. With over 150 members, we represent members across the breadth of the island, including grain, wool and livestock producers, along with other farming and production activities.

In 2024/25, AgKI:

- continued lobbying and advocacy work to keep livestock freight charges in line with other commodity freight charges for the new ferry service.
- held workshops & information sessions throughout the year.
- Successfully applied to Meat and Livestock Australia for a Producer Demonstration Site on KI over the next 5 years with the 'Maximising Pasture Productivity in Acidic Soils' project.
- represented agricultural interests in forums on native vegetation management, harbour precinct planning, regional telecommunications, emissions profiling and natural capital assets assessments.
- represented agricultural interests at the Island Arks Symposium.
- contributed significantly to developing and launching the Adelaide Hills, Fleurieu & Kangaroo Island Regional Drought Resilience Plan.
- lobbied KI Council seeking re-introduction of differential rates from 2025/26.
- provided sponsorship for two KICE students to attend SA Sheep Expo and purchase eID equipment.
- represented agricultural issues to State Government, including the ongoing need for biosecurity checks at the ferry terminal and the need for a washdown facility.

To Contact AgKI:

Phone: 0428 716 330

Email: admin@agki.com.au

Website: www.agki.com.au

Join us!

Scan this code or email us to join. There are numerous member benefits!

We have continued to deliver on-island projects and research, as a result of grant funding, for the following projects:

- Filling the Feed Gaps
- MLA Producer Demo Site
- FRRR Future Drought Fund (weather station dashboard)
- SA Drought Hub – Improving Water Security for KI Farmers
- AgTech Demonstration Groups – Livestock & Wool
- Perennial Pastures Project with KI Landscape Board
- PIRSA eID Implementation Workshop Series

We continue to work with key partners to ensure that our members are well represented, recognising that agriculture/primary production is the largest industry sector on Kangaroo Island.

We have delivered a variety of workshops and information sessions over the last 12 months, including farm field days for graded catchments, strategies for a dry spring and summer workshop, feeding sheep in dry times workshop series, eID implementation workshop sessions, weather station dashboard community demonstration day and connecting communities workshop for rural women.

Our Board Members have continued to work hard representing the interests of our members. The current board members are:

Peter Cooper (Chairperson)

Tim Salmon (Deputy Chairperson)

Paul Bott (Deputy Chairperson)

Jamie Heinrich

Jenny Stanton

Simon Veitch

Sara Campbell

Grant Flanagan

Cr Sam Mumford (Council representative)

Lyn Dohle (PIRSA representative)

Jo Sullivan (KILB representative)

Anna Osman (Executive Officer)

We acknowledge our partners, whose valued assistance allows us to support and advocate for our members.

Kangaroo Island AgTech Demonstration Program

The Kangaroo Island AgTech Program demonstrated the potential for technology adoption to improve productivity and profitability within the Island's agricultural sector. The program was a part of the recovery initiative following the 2019/2020 bushfires and attracted the interest of 23 technology companies.

The Program connected 16 technology companies with 12 producers to trial various AgTech products on the island at no cost to the producers. The following table provides an overview of the technologies trialled and the producers who trialled them.

Technology Demonstration on KI Farms

Technology	Industry & Demo Site	Description
eBottli	**Viticulture** Islander Estate Vineyards	Bespoke traceability, data collecting and task tracking app for all viticultural needs.
Farmbot Monitoring Solutions	**Livestock** Teatree and Treville Own Farms	Tank level sensors and a rain gauge were trialled, with associated software providing an accurate snapshot into water levels remotely.
Sentek	**Viticulture /Potatoes** Bay of Shoals Wines, Cooper Farming	Soil probe technology that collects moisture, salinity, and temperature data at multiple depths, for precision irrigation management.
Shearwell	**Livestock** Lake Ada Pastoral	eID Weigh Crate designed to safely confine livestock and weigh them efficiently.
BeeSTAR	**Apiary** Island Beehive	An in-hive sensor installed between the centre frames of the hive. Collecting hive information to be analysed. Informs the beekeeper of inspection needs and abnormalities.
Hydrosmart	**Livestock** Bott KI Farming	Electronic water treatment.
Pairtree	**Livestock** Cooper Farming	An online service platform connecting all technologies on farm together in one spot.
SWAN Systems	**Livestock** Cooper Farming	SWAN Systems collects data from multiple sensors, enabling efficient crop irrigation and nutrient application.
AirborneLogic	**Livestock – Cooper Farming**	Hyperspectral imagery and precision mapping for assistance with crop analysis.

AgriWebb	**Livestock** Timber Creek	A digital livestock management software recording farm data including stock movements, husbandry, tasks, and inventory records in real time.
AxisTech	**Livestock** Bott KI Farming	Data management and reporting/analysis platform helping farmers make use of their data.
Espy Earth	**Livestock** Treville Own	On farm testing for the development of a device that monitors CO_2 and methane and biodiversity.
Deep Planet	**Viticulture** Islander Estate Vineyards	High resolution satellite imagery to monitor current vine health, past vine conditions, canopy levels and soils, and predict future yield.
Land Watch Australia	**Livestock** Glencorrie	Camera systems that allow farmers to remotely monitor their properties
Mobishear	**Livestock** Glencorrie	Cordless foot paring device.
Woven Optics	**Livestock** I & VM Green Family & Veitch Farming	Handheld fleece micron tester in real-time.

Above: Paul Green trials Woven Optics.

Program outcomes

Participating producers indicated an average 80% increase in knowledge for each technology trialled.

80% of producers expressed interest in retaining the technologies trialled.

This project also enabled direct feedback from end-users to technology providers, allowing enhancements of their products and services to be implemented along the way. It highlights the benefits of on-farm trial work. Case studies and video content documenting the experience and outcomes will soon be accessible on the PIRSA website.

Precision livestock management

Producers involved in this project gained practical skills in connecting devices to read eID tags, collecting and analysing livestock data, and using that data to inform profitable decision making. Their confidence in using data-driven approaches grew, all without needing to invest in new equipment.

Kangaroo Island scale and carbon stock level quantification

Carbon stock levels were generated for all primary production paddocks, areas of forestry and the island using technologies from FarmLab and FLINTpro. These Carbon predictions were made estimating the capture and storage of carbon dioxide (CO^2) from the atmosphere over 25 years to help offset GHG emissions in the region. This demonstrated how land management practices, such as planting diverse vegetation and implementing soil carbon strategies like managed livestock grazing, can improve pasture growth and enhance carbon storage.

The project demonstrated that, on average, improved tree and soil carbon storage over the 25 years could result in a 40% reduction in estimated greenhouse gas emission value for the farms involved.

Fourteen farms participated in the project. Ten received detailed soil and tree carbon reports, while four compared management practices to improve or maintain carbon levels. These insights will guide land and production management choices and enable farmers to better realise their highest carbon storing potential on-farm and at a larger Island scale.

PIRSA: Visit an AgTech demonstration farm or site

Kangaroo Island regional emissions and natural capital profiles

This project is part of a broader effort to demonstrate the current and future environmental stewardship at a regional level, as well as establishing a baseline emissions report across the island. It aims to support Kangaroo Island in capitalizing on emerging carbon and nature repair market opportunities. Led by PIRSA and Ricardo Group, it focuses on opportunities to reduce emissions from agriculture, improve sustainability and carbon sequestration, enhance soil health, and manage and enhance the natural capital of the island.

Additionally, this project will communicate agricultural environmental stewardship on the island and increase awareness of opportunities related to environmental markets. Input was received from FarmLab, AgKI, KI Landscape Board, KI Land, KI Pure Grain, Elders and other stakeholders.

Further opportunities created through the KI AgTech program:

Producers participating in the demonstration program have been offered technology grants through the program to support the adoption of trialled technologies that proved beneficial to their operations.

BeeSTAR's in-hive monitoring system proved highly effective during the demonstration trial, enabling Island Beehive to accelerate hive recovery and detect issues in real time. Building on this success beekeepers representing an estimate of more than 85% of the islands apiary sector, including 100% of the commercial beekeeping businesses, are now accessing 65 BeeSTAR-equipped hives to broaden industry recovery and growth on the island.

We also supported the South Australian Research and Development Institute's (SARDI) virtual fencing project on the island. This project evaluates the benefits of virtual fencing from a KI producer view. We were excited to provide additional virtual fencing collars to cover a full breeding herd, enabling detailed monitoring and data collection.

Funding/Sponsors

The KI AgTech Demonstration Program is being implemented by the Department of Primary Industries and Regions with funding by the Commonwealth Government Regional Recovery Partnerships Program.

HELP FOR LAND MANAGERS



CROPPING, LIVESTOCK and VITICULTURE

The Kangaroo Island Landscape Board is here to support and work with KI farmers to increase the sustainability, resilience and adaptability of our primary production industries.

KEY ROLES IN THE SUSTAINABLE LANDSCAPES PROGRAM INCLUDE:

SUSTAINABLE AGRICULTURE FACILITATOR: Connects farmers with the information they need to increase sustainable agriculture practices and address land management issues.

AGRICULTURE EXTENSION OFFICER: Supports farmers and farming groups to undertake property management planning and improve soil, plant and animal health by providing technical advice and information.

CARBON OUTREACH OFFICER: Supports farmers and land managers to make decisions to reduce emissions, store carbon and improve on-farm productivity and resilience.

WATER OFFICER: Offers advice on Water Affecting Activity permits, construction of dams, erosion control, construction of crossings, water security plans and the management of the Board's water resources monitoring program.

ANIMAL AND PLANT CONTROL OFFICERS: Supports pest plants and pest animal management on Kangaroo Island through prevention activities and provides identification and control advice.

LANDSCAPE SOUTH AUSTRALIA KANGAROO ISLAND

For more information scan the QR code or contact the Ki Landscape Board on 8553 2476.

Carbon Farming Outreach Program

Carbon Farming can benefit your farm and future-proof your business.

Background

The Kangaroo Island Landscape Board are rolling out a series of free Carbon Farming Outreach workshops to support local land managers in the uptake of carbon farming and low-emissions technologies and practices.

Navigating this rapidly evolving space can be difficult and these workshops provide clear, consistent and locally relevant information on carbon farming and Australia's new mandatory climate-related financial disclosures. These requirements impact banks, insurance companies, big business and all their suppliers – including our farmers!

Beyond reporting requirements, reducing on-farm greenhouse gas (GHG) emissions and/or sequestering carbon has a number of co-benefits. A low-emission or carbon-neutral farm reaps productivity, environmental co-benefits, and potentially increased profit.

What's being done?

Workshop series 1: A Beginner's Guide to Carbon Farming

These workshops will increase land managers' knowledge of:

- What is carbon farming? Understand the concept and its application.
- Reporting requirements as Australia and our export markets transition to climate neutrality.
- How carbon farming practices can improve productivity, efficiency and profit on farm.
- Greenhouse gas emission footprint and management.
- Carbon neutral and carbon credit schemes – what are the risks and opportunities?

Workshop series: 2: A Deeper Dive into Carbon Farming by Industry

Carbon farming is not a one-size-fits-all program. Location, climate, production type, and business goals are all factors to consider when determining the best approach for land managers to take.

These workshops will cover:

- Tailored GHG emissions-reduction and carbon storage practices for different industries.
- Tools to calculate your emissions number.
- How to incorporate carbon farming practices and reporting requirements in your property management plan.

Carbon farming activities include:	
Carbon storage (sequestration):	**Emissions reduction:**
• Soil, pasture and grazing management to increase soil carbon • Agroforestry • Revegetation • Protecting and improving native vegetation	• Livestock and grazing management • Livestock feed additives • Improved livestock genetics • Fertiliser selection and use • Improved production and energy efficiencies

Visit the KI Landscape Board website for more information about carbon farming for primary producers.

Take home messages:

- Carbon farming and low-emissions technologies and practices reduce your total GHG emissions 'number'. They also provide opportunities to improve production and efficiency on-farm.
- Co-benefits include improved biodiversity and environmental conditions, healthier soils and waterways.
- Australia's mandatory climate-related reporting begins this year. Our free workshops will cover what you need to know and information you may need to provide.
- While focusing on opportunities to achieve on-farm carbon neutrality, workshops will also explore carbon markets and the generation of Australian Carbon Credit Units (ACCUs or carbon credits).

Funding/Sponsors

This project is funded by the Commonwealth of Australia through the Department of Climate Change, Energy, the Environment and Water under the Carbon Farming Outreach Program.

Further Information

Alex Comino, Carbon Outreach Officer, Kangaroo Island Landscape Board

P 08 8553 2476

E alexandra.comino@sa.gov.au or KI.LandscapeBoard@sa.gov.au

KI Carbon Stock Quantification

Background

In 2024, Australia passed mandatory climate-related financial disclosures for applicable companies. Businesses within the supply chain will need to know and understand their carbon footprint and explore actions to reduce their emissions or sequester carbon to mitigate greenhouse gas emissions into the future.

To support this change, PIRSA partnered with with FarmLab and FLINTpro to quantify and model future scenarios across Kangaroo Island. The project assessed carbon above and below ground in trees and soils across 14 individual farms. This data was then scaled up to provide a picture of carbon storage across the entire Island's agricultural soils.

This is the first time carbon has been measured and modelled across an entire region in South Australia. The scenario modelling demonstrated anticipated change in carbon stock over time which will help make decisions based on changes to soil and planted vegetation.

Above: Project partner FarmLab works to simplify data collection and analysis for emissions reduction, agronomy, and natural capital projects.

What's being done?

PIRSA teamed up with FarmLab and FLINTpro to quantify carbon on Kangaroo Island both above and below ground. The goal was to give farmers a baseline for their carbon stock and provide modelled scenarios to help understand future carbon sequestration. The information was extended to cover the agricultural area to help understand the carbon stocks at an Island scale, changes to carbon stock following modelled scenarios over 25 years and anticipated sequestration rates to offset/inset their greenhouse gas emissions.

A localised Kangaroo Island scale soil carbon stock (0-30cm) map at 10m x 10m resolution was created using an innovative mix of physical soil sampling, remote sensing and machine learning.

- A tree carbon stock map was generated at the farm and Island scale.
- Scenarios were modelled for tree and soil carbon from 2022 to 2047 (25 years)
- Fourteen farms distributed across different soil types, rainfall zones and farming systems were used to create the localised carbon maps.
    - o Ten farms had soil and tree carbon quantified following the Emissions Reduction Fund Compliant Methodologies.
    - o Four farms compared management practices of two areas where soil carbon stock was measured.

The project utilised new technology (including remote sensing) to better locate soil samples with the aim of minimising the number of samples required for a reliable soil carbon baseline to 30cm. It was the perfect opportunity to not only provide farmers with average soil carbon concentration and stock on their farm but to try to model existing soil carbon for the whole of Kangaroo Island using the detailed information from the sampled farms.

Carbon sequestration also includes above ground carbon tree or forest carbon. FLINTPro created forest carbon maps and expected sequestration rates for the farms. They also modelled potential sequestration rates for the Island after 25 years with different scenarios of planting new environmental plantings (e.g. along creek lines, shelter belts etc.) to provide ballpark figures of sequestration.

What happened and who was involved

The ten detailed farms had tree carbon stock assessed and were modelled 25 years into the future by FLINTpro. The scenarios used for modelling were:

- all identified forest plantations removed over the 10 year period to 2032.
- a percentage of the area converted to mixed species environmental planting at Low (0%), Medium (25%) and High (100%) cover rates.

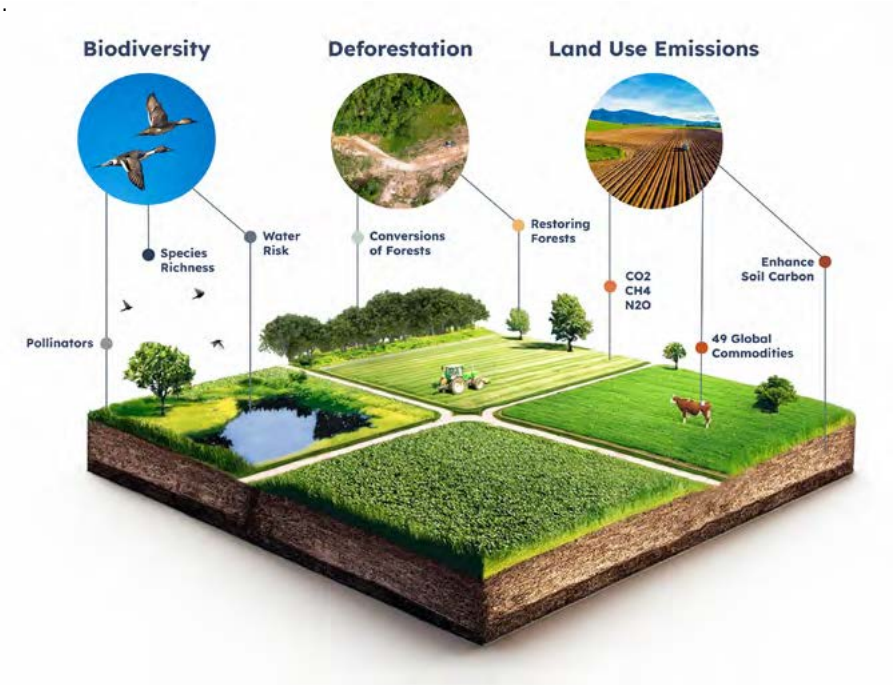
While specific farm emission data wasn't available, FarmLab estimated average emission at about 2 tonnes of CO_2 equivalent per hectare per year ($tCO_2e/ha/yr$), loosely based on other mixed farm carbon footprints.

In one scenario, adding 5% more land to environmental planting as shelter belts and the resultant improvement to plant productivity led to an average increase in carbon sequestration carbon stock of 0.28 $tCO_2e/ha/yr$ in soil (range 0.05 to 0.6) and 10.9 $tCO_2e/ha/yr$ in trees (range 9.2 to 17.1). Using the estimated carbon footprint information as a guide, this level of tree and soil carbon sequestration could reduce average farm emissions by about 40% over a 25-year period.

Outcomes of the project

The information gathered in this project:

- helps us to understand the distribution of carbon stocks from the farm to regional to Island scale.
- identifies areas where soil carbon and crop or pasture productivity could be improved, and where tree planting could store more carbon.
- helps farmers and state government understand the magnitude of future modelled soil and tree carbon stock change over a 25 year time frame (to 2047).
- provides information to farmers to help them get ahead of future climate reporting and regulations.
- highlights the lack of clear, available information for making carbon-related decisions.
- has provided information that we don't have for any other region.



Right: FLINTpro offers an intelligent data platform that quantifies risk and provides a clear path toward measurable action.

Funding/Sponsors

This project is funded by the Australian Government Regional Recovery Partnerships program.

Further Information

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Fact Sheet

Options for Water Security: Graded Catchments

Key Messages

- Graded catchments are a highly effective and long-term solution to enable landholders to more reliably capture run-off into dams.
- Correct design and construction are critical.
- Permits are required before starting construction.
- Ongoing maintenance of the site is essential.

Contact

Need help or more information?

Contact Lyn Dohle at the Kingscote PIRSA Office:

Ph. 0419 846 204
lyn.dohle@sa.gov.au

Introduction

A late break, a dry winter or a poor spring can all lead to a lack of water flowing into dams. Graded catchments may be one solution to enable landholders to reliably capture run-off into dams.

Graded catchments are designed to reduce soakage of rainfall into the soil and promote rapid runoff without causing erosion. Reshaping the soil surface by removing the topsoil and compacting the sub soil will improve the runoff dramatically.

On a pastured site, run-off equates to about 10% of a rainfall event. A graded catchment can increase run-off by 50-60%.

A monitored graded catchment site in Haines resulted in 1.6ML/ha/yr run-off into the dam below a graded catchment, (total rainfall in the year the site was monitored was 412mm).

Suitable locations

The site should:

- have sufficient slope to run water, but not be steep enough to create an erosion risk.
- have good 'dam sinking' clay, ideally within 20cm of surface to reduce earthmoving costs. Check the depth to clay at the proposed site (checking depth across both the length and width of the site).
- be close to an existing dam. Otherwise, there must be space to construct a new dam, ensuring size/capacity of the dam is suitable for the catchment.
- ideally be in a location to gravity feed to other sites on the farm.

Check carefully and avoid:

- sand/gravel seams as they will reduce the effectiveness of the system.
- cracking clays.

If there is no suitable site a **plastic sheeted catchment** is another option. Refer to *Case Study: Options for Water Security: Plastic Sheeted Catchments* for further information.

Construction

Effective construction is critical to ensure the system maximises run-off potential without causing any negative impacts:

- locate the catchment and drains as close to the existing/new dam as possible.
- remove topsoil and cut drainage lines into the clay.
- slope of drainage lines can be up to 2-3% (greater than this can result in erosion) and can be run down the slope, into a collector drain and into the dam (refer to Figure 1).
- if the slope is greater than 3%, the drainage lines can be run across the slope before being collected into the collector drain (refer to Figure 2 and 3).
- compact drainage lines to enhance run-off (you are aiming for a hard, smooth, impermeable surface once the site is completed).
- fence the site to exclude stock as they will damage the surface, and their manure will pollute the dam.
- use a grader or equivalent to form the drains, then a roller to re-seal and compact the surface. Not using a roller leaves small depressions in the drains resulting in less run-off.
- use a sediment trap or grass filter strip 8-10 m between the drainage lines and the dam to reduce sediment run-off into the dam.
- consider access around the site for vehicles and machinery.

Design Options

Figures 1, 2 & 3 show options for design and lay out of your graded catchment. Design will depend on the site topography. Prevent erosion by ensuring your drainage lines do not exceed a slope of 3%. The sediment trap is desirable to ensure your dam does not silt up.

Key

- Constructed drainage lines
- Collector drains
- Grass filter or sediment trap

Figure 1: For sites with a 2-3% slope.

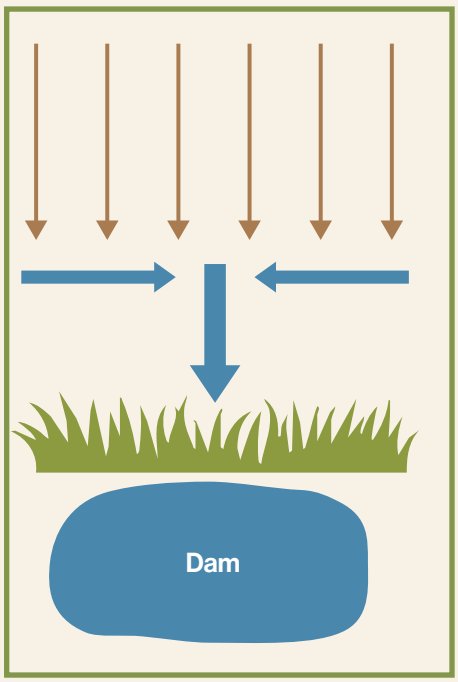


Figure 2: For sites with a greater than 3% slope.

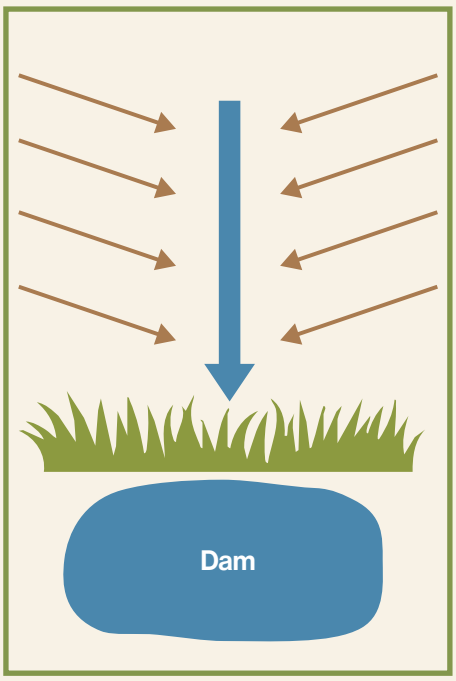
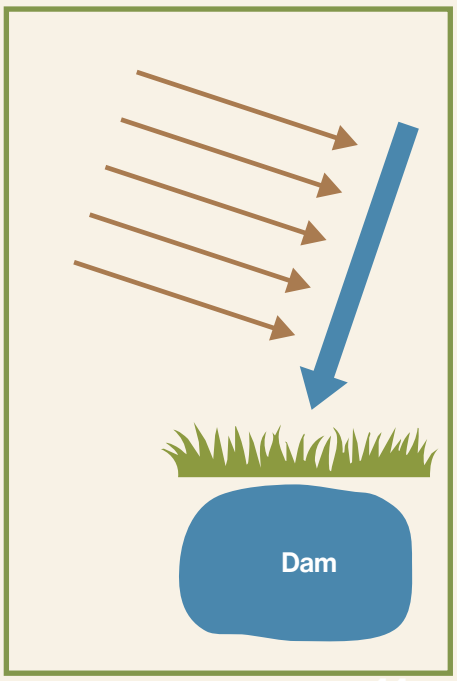


Figure 3: For sites with a greater than 3% slope.



Maintenance

Annual weed control

Regrade every 5-10 years

Maintenance is essential as run off can decrease to minimal levels within 3 years if the site is not kept weed free. Remember, we tend to generate the most run-off into dams in early winter, so undertake annual weed control early in the season i.e. a knockdown soon after germination in Autumn.

Maintenance or regrading of the graded drains may be required every 5-10 years to keep drainage lines clear.

Ideally keep stock off the site, but if they do have access the annual weed control and regrading of the site will become even more imperative.

Approvals

The construction and enlargement of all dams, no matter the size, require a from the Kangaroo Island Landscape Board.

Graded catchments are deemed a Water Affecting Activity and require a permit, as installing a graded catchment increases the volume of water allowed to be captured in farm dams.

Before any construction begins on either the dam or graded catchment, contact the Kangaroo Island Landscape Board to seek approval for the works.

Contact KI Landscape Board:

Ph. +61 08 8553 2476
ki.landscapeboard@sa.gov.au

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Case Study

Options for Water Security: Graded Catchments

Key Messages

- Implementing new practices has improved the farm's water security, with water quality now suitable for direct consuption by livestock.
- The farm can efficiently capture the water and store it in dams, totalling 15 ML last year, which means the Wheaton farm now has a far greater capacity to survive a drought.

landscape.sa.gov.au/ki/water

Contacts

Need help or more information?

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Background

The Wheaton family have been farming in MacGillivray for over 100 years – so they know a thing or two about dry seasons!

Not only is the Hundred of MacGillivray amongst the driest on KI, but saline ground water also prevents most landholders from digging deep dams. After a few dry spells, the Wheaton family came close to running out of stock water. This motivated them to think seriously about longer term water management options.

When Derek returned home to the farm in 2016, he began to focus on the water quality of the farm as well as looking to drought proof the operation.

A visit to Peter and Katrina Lovering's graded catchment gave them the solution they were looking for to attain water security.

Exploring options

DESALINATION

Around 2017, Derek looked at desalination options. With plenty of salty water on the property, there was no lack of supply. But several issues arose:

- what to do with the hyper saline wastewater.
- the cost to purchase a desalinator plus ongoing running costs, including a power source.
- the saline water supply was near the lowest point of the farm, meaning all desalinated water would need to be pumped (an extra cost) to all other reaches of the farm.

BUY IN WATER

The nearest standpipe is approximately 20 km away, again a considerable cost. Negotiations were undertaken with SA Water to access the mains desalinated water, but the system is currently over allocated.

DIG MORE, OR DEEPEN EXISTING DAMS

The saline underground water in this area means there is a significant risk of intercepting this layer if deeper dams are dug. Shallow dams tend to only hold just over a year's supply of water, which is not a good drought proofing farm exercise!

ACCESS UNDERGROUND WATER

An existing well on the property is plentiful and always available. However, no matter how much or how little rain fell, the well was becoming increasingly saline.

Solution – Graded Catchment

All the options above were clearly unviable. The option to destock in dry times was also unviable for purely economic reasons.

Having heard about the graded catchments that had been constructed on the Island after the dry run of 2005-07, the Wheaton family's solution was to construct a graded catchment.

Graded catchments are designed to reduce rainfall soaking into the soil by promoting rapid run-off without causing erosion.

By removing the topsoil and compacting the clay subsoil, the rain can more easily run off into the dam.

Work on KI has shown that graded catchments can increase runoff by over 50% compared to 10 -15% for pastured areas.

Farm details

- **Size - (arable and scrub): 1292 Ha; in total 720 Ha arable.**
- **Rainfall: 480 mm.**
- **Soil type: terra rosa, heavy cracking clay, sandy loam over clay and deep sandy loam.**
- **Livestock / crop mix: 2600 cross bred self-replacing flock.**
- **Pasture mix: lucerne, chicory, fescue, phalaris medic clover mix. Wet country consists of tall wheat grass, phalaris and medic.**

Construction process for graded dam

1. Site selection.

The site was selected for several reasons:

- it's the highest point of the property, meaning water can be reticulated across the whole farm via gravity feed from two tanks to all farm troughs.
- the site was appropriate for the construction of graded catchments and dams i.e. suitable soil and slope.

2. Design

The design was discussed and developed with Ron Watkins, who resides in Western Australia, and is a supporter of Keyline Farming Techniques designed by PA Yeomans.

Ron provided the contour design with dam placement/construction already in existence. Refer to the Graded Catchment Fact Sheet for more information about design options.

3. Construction

The site was surveyed to enable a design of interconnected drains and graded catchments to fill three dams.

Three dams were constructed as the underlying saline ground water did not allow for a single (deeper) large dam to be built.

Drainage lines were designed with a <1% fall. The topsoil was then stripped off and stockpiled by the existing dams (giving Derek the option to on-sell the soil if he chooses), the runs were then cut down to the clay layer and the surface compacted.

Above: Jessie and her offsider Derek Wheaton inspecting the dams.

Below: Catchments and drains at the MacGillivray site.

Results

Dams filled to 90% capacity

Improved stock health

Within the first-year post construction, the dams in the graded catchment were filled to over 90% capacity. The water quality was excellent at 300 ppm (a massive improvement on the 10,000 ppm they had been accessing from the well).

An additional benefit of the improved water quality was better stock health. When stock were watering from the well or small dams, they were prone to significant pink eye problems due to the dust in the summer months. With the previous water quality, the sheep used to congregate around the water points, as their thirst was not satisfied with the salty water. Now the stock travel in single file to have a drink and leave.

Left: The top dam on 10th July 2025, showing high water levels even early in the season after a dry summer.

Below left: Three dams and graded catchments on the Wheatons' family farm.

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Case Study

Options for Water Security: Plastic Sheeted Catchment

Contacts

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Background

Tim needed to find a water source for his livestock on his property near Western Cove. The flat salty land combined with low rainfall added to the challenge as he was unable to dig a deep dam due to saltwater table interception.

He also needed to capture rainfall, as opposed to run off, as the runoff would flow across saline land. Hence the traditional graded catchment was not an option due to the salinity levels in the clay. The solution was a plastic sheeted catchment.

Plastic sheeted catchments are a good option where there is no clay, or where the clay is not suitable (e.g. salty or cracking clay). In addition, it enables immediate run off from minimal falls compared to a graded catchment that needs the clay base to wet up before run-off occurs. This results in a smaller area being required to generate the same run-off a larger graded catchment would provide.

Materials options

Several options for plastic sources are available, each with their own pros and cons. All options will need fencing to keep stock off the plastic and will require some system (tyres or weights) to secure the edges and help create the middle drainage line.

If the site is designed properly, then the plastic can be easily replaced if required, which justifies the choice to use the cheaper/free silo plastic.

	Cost (2024)	Lifespan	Pros/Cons
Silo Plastic	$1.60/m^2	15 years+ However, if it comes loose it can easily be damaged by wind.	**Pro:** Cost effective. **Con:** Susceptible to stock or wildlife damage.
Second hand silo plastic	Free from KI Pure Grain.	15 years+ As above – can be damaged by wind.	**Pro:** No cost for plastic. **Cons:** Susceptible to stock or wildlife damage. May have damage from silo handling.
Heavy durable plastic	$4.25/m^2 + welding cost. In this case study, the quote was approx. $4000 to come to KI and weld 2 x 100m runs.	Almost indestructible as long as cattle are kept out – hooves could puncture plastic.	**Pro:** Extreme durability. **Con:** High cost.

Construction process for plastic sheeted catchment

1. Plastic choice

Due to the high cost of welding the durable plastic, the decision was made to utilise the cheaper (& non-weldable) plastic and lay it out in separate runs.

2. Site selection

The site was selected as it was poor/waste ground with minimal slope. The thinking at the time was to not waste good land to harvest water.

In hindsight, it would have been better to pick a sloping site above a dam, in a location that enabled gravity feed of water to the rest of the farm.

Note the faster the water runs, the less loss there will be with any minor holes in the light plastic.

3. Designing & grading runs

The overall design became 3 runs x 100m long. Each run is an 8m width of plastic with approx. 50cm each side buried – leaving a 7m wide strip of effective catchment.

A 5-6 m gap between runs allows for bobcat or grader access to form the runs and cover the edges of the plastic.

A grader was used to form each V shaped run with a side slope of 10%.

Heavy grazing or burning during preconstruction allows for a more even soil surface to be prepared by the grader.

4. Plastic placement

The plastic was then placed down the runs. This can be done by hand with the silo plastic but if using the heavy plastic, it will require a tractor (or a lot of manpower!) to pull the plastic into alignment. Each run then flows into a plastic lined collector drain and is then pumped into a dam.

The plastic must lie flat. Any ripples in the plastic will reduce run-off, especially in low rainfall events on hot days.

5. Securing the plastic

On both sides of each run a drench of approx. 250mm deep by 350mm wide was dug. The plastic edge was laid into the drench and then backfilled to effectively secure the edges.

If using silo/light plastic, place tyres in the centre of the V to hold the plastic down.

The plastic lined runs resulted in an almost perfect 100% run-off.

Farm details

- **Size: 525 ha (270 ha arable + 255 ha of saltmarsh/tidal inundation).**
- **Rainfall: 450mm**
- **Soil type: light sand over clay.**
- **Livestock mix: crossbred and Suffolk ewes.**
- **Pasture Mix: Ryegrass, volunteer annual grasses and clover.**

Above: Tim Chirgwin.

Below left: One of the runs with the drench visible, showing the depth to which the plastic was buried to secure it. All work should be inspected by a kelpie.

Results

- **Plan for the driest years or be prepared to cart in water.**
- Best results are gainedby **ensuring that all grass cover is removed** (burn or graze heavily) during preconstruction for a more even surface.
- If you can, **choose a site which enables gravity feed of water to the rest of the farm**. A sloping site above an existing dam is ideal.
- **Leave a gap between runs** to enable access for machinery during construction.
- **Fence the site** leaving room to plant trees to act as windbreak to help protect the plastic.
- As the major cost can be the plastic itself, **an effective, low-cost option is the free second hand silo plastic.** The significant run-off from the small area of earthworks easily justifies the cost of replacing recycled plastic sheeting.
- Even in the very low rainfall years, the **plastic yields close to 100% run-off** compared to a graded clay catchment that needs to fully wet up before generating any run-off.

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Update: Sheep Blow Fly Eradication on KI

Background:

South Australia Research and Development Institute (SARDI) researchers are continuing to develop the Sterile Insect Technique (SIT) for sheep blowfly *Lucilia cuprina*, the primary instigator of flystrike, on Kangaroo Island. This approach aims to improve animal welfare and reduce management costs by eradicating sheep blowfly populations over the coming years.

The rearing facility at the corner of North Coast and Ten Tree Lagoon Roads is now fully operational, with the first sterile blowflies successfully released last year. More than 13 million sterile blowfly pupae were aerially deployed across the Dudley Peninsula in Spring 2024. This coming spring will see over 85 million released as the rearing facility increases production capacity.

What's being done

In order to determine the best time of year to begin the annual sterile releases, we ran an experiment to find out when the flies re-appear in spring after spending winter in the soil. In 2023, we placed open-bottom cages of blowfly larvae across KI at different times in autumn and winter. The cages were checked to see when adult flies emerged, and those times were compared with soil moisture and temperature.

Most flies emerged in late September to October. This tells us that the blowflies don't all appear at once, but instead emerge over several weeks once the soil warms. We also saw that soil temperatures below 17°C supressed their development and increased mortality. These findings will help us time the release of sterile blowflies more accurately, making sure we target all of the emerging wild flies. The better we match this timing, the more effective the eradication will be.

We also wanted to know exactly where the wild sheep blowflies were present on the island. Over the 2023-2024 summer, we conducted a trapping survey across KI using 81 blowfly traps (Figure 1). The survey categorised sites into four habitats: urban, sheep farms, conservation, and cropping. As expected, the highest numbers of flies were caught on sheep farms, but interestingly, we also detected flies in Flinders Chase and Cape Gantheaume. Knowing where the flies are will help ensure sterile flies are released in the right places to outnumber the wild population and eradicate the species.

During the 2024 releases, sterile blowflies in their pupal stage were dropped by air across a 10x10km area on Dudley Peninsula. A network of traps within this drop zone successfully trapped both wild flies and the emerged sterile flies (marked with dye, Figure 2). We also determined that released flies were active in the environment for up to 5 weeks. This is encouraging for the survival of flies released as pupae. We were able to

Figure 1: One of the blowfly traps used for monitoring the sterile and wild sheep blowfly populations.

demonstrate some outnumbering of the wild population, but this was not sustained beyond the end of the release period. Refining our timing in 2025 should improve the effectiveness of the sterile flies.

Releases in 2025 will focus on the whole of Dudley Peninsula and a 10km wide band running from North to South in approximately the mid-point of the island. This should allow for good comparison between treated and untreated areas.

Since spring 2022, we have been receiving samples of flystrike maggots from KI farmers for species identification. Approximately 80% of the samples have included the sheep blowfly. Other species identified from the samples have been what we consider secondary strike species, those that generally appear after *L. cuprina* has caused the initial damage.

As the program progresses, these flystrike samples will be increasingly important for monitoring the impact of our sterile blowfly releases. We have portable collection kits available for farmers willing to collect maggots from live struck sheep (Figure 3). The kits contain vials capable of keeping maggots (or next lifestage – pupae) alive for a week or so between collection and drop-off, and a few short questions about the strike. Kits and additional collection vials can be grabbed from any of the following pick-up/drop-off points:

- Nutrien Ag, Kingscote
- Elders, Kingscote
- PIRSA office, Kingscote
- Keilem CRT, Parndana
- Post Office, Penneshaw

Figure 2: Sterile dyed fly pupae ready for release.

Take home messages

- Production capacity at the sheep blowfly rearing facility is gearing up over the next few months in preparation for the 2025 release season.
- Over 13 million sterile blowflies were released in 2024, with another 85 million planned for 2025.
- Farmer involvement through maggot sample submissions is vital for the monitoring of the wild fly population and impact of the program.

Figure 3: Maggot sampling kit showing some of the vials stocked in the kit.

Funding/Sponsors

This 5.7 million dollar project is funded by Meat and Livestock Australia, Australian Wool Innovation, Animal Health Australia, the SA Sheep Industry Fund, SARDI and the University of Adelaide.

Acknowledgments

Thank you to all those farmers and/or landowners who have hosted traps, collected maggot samples or given feedback on this project. You are invaluable and precious to this project!

Further Information

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Livestock Michael 0407 947 637 www.fpag.com.au

Moving sheep and farmed goats tagged with eID

A South Australian producer's guide to who is responsible for recording individual animal movements on the National Livestock Identification System (NLIS) database.

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All sheep and goat movements onto a new property identification code (PIC) must be recorded on the NLIS database.

Buying at an online auction

- When buying through an online trading platform (e.g. AuctionsPlus, Farm Gate), the buyer is responsible for recording the movement - not the selling or buying agent.
- Animals with eID tags must be scanned or manually read and individual movements must be recorded within 2 days of arriving on your property, or before leaving your property, whichever occurs first.
- You can arrange for your agent to complete the transfer on the NLIS database on your behalf, but the responsibility remains with you as the buyer.

Buying at an on-farm public auction

- When buying at an on-farm public auction (e.g. ram, breeder or clearing sale), the selling agent is responsible for recording the movement.
- The selling agent must scan animals with eID tags and record individual movements on the NLIS database within 2 days of the sale.
- You must advise the selling agent of the PIC the animals are to be transferred to on the day of the sale (if known).

Moving to or from an agricultural show (AgShow) or event

- When moving stock with eID tags to and from an AgShow or event, the event organiser is responsible for recording the individual movements on the NLIS database.
- This includes sheep and goats attending for purposes of display, competition, show, fair, farmyard nursery, sheep dog trial and shearing competitions.

Moving for agistment

- When moving animals to and from a property for agistment purposes, the stock owner or stock manager is responsible for recording the movement.
- Animals with eID tags must be scanned or manually read and individual movements recorded on the NLIS database within 2 days of arriving on the property, or before leaving the property, whichever occurs first.
- You must ensure the agistment property has a current PIC and is registered for the species you are moving.

Moving to and from a saleyard

- When **selling** your animals through a saleyard, the saleyard operator is responsible for scanning stock with eID tags and recording individual movements on the NLIS database.
- When **buying** animals through a saleyard, the saleyard operator will scan stock with eID tags and complete the transfer onto your PIC on the NLIS database.
- You must advise the saleyard operator or selling agent of the PIC the animals are to be transferred to on the day of the sale (if known).

Moving to a processor

- When moving stock to a processor (abattoir or slaughterhouse) the abattoir operator is responsible for scanning animals with eID tags and recording movements on the NLIS database.

Receiving from a property with a different PIC (P2P movement)

- When buying or receiving stock directly from a property with a different PIC, the receiver is responsible for recording movements on the NLIS database (this is a requirment even if you own both properties).
- Animals with eID tags must be scanned or manually read and individual movements must be recorded within 2 days of arriving on your property, or before leaving your property, whichever occurs first.
- You can arrange for your agent to complete the transfer on the NLIS database on your behalf, but the responsibility remains with you as the receiver.

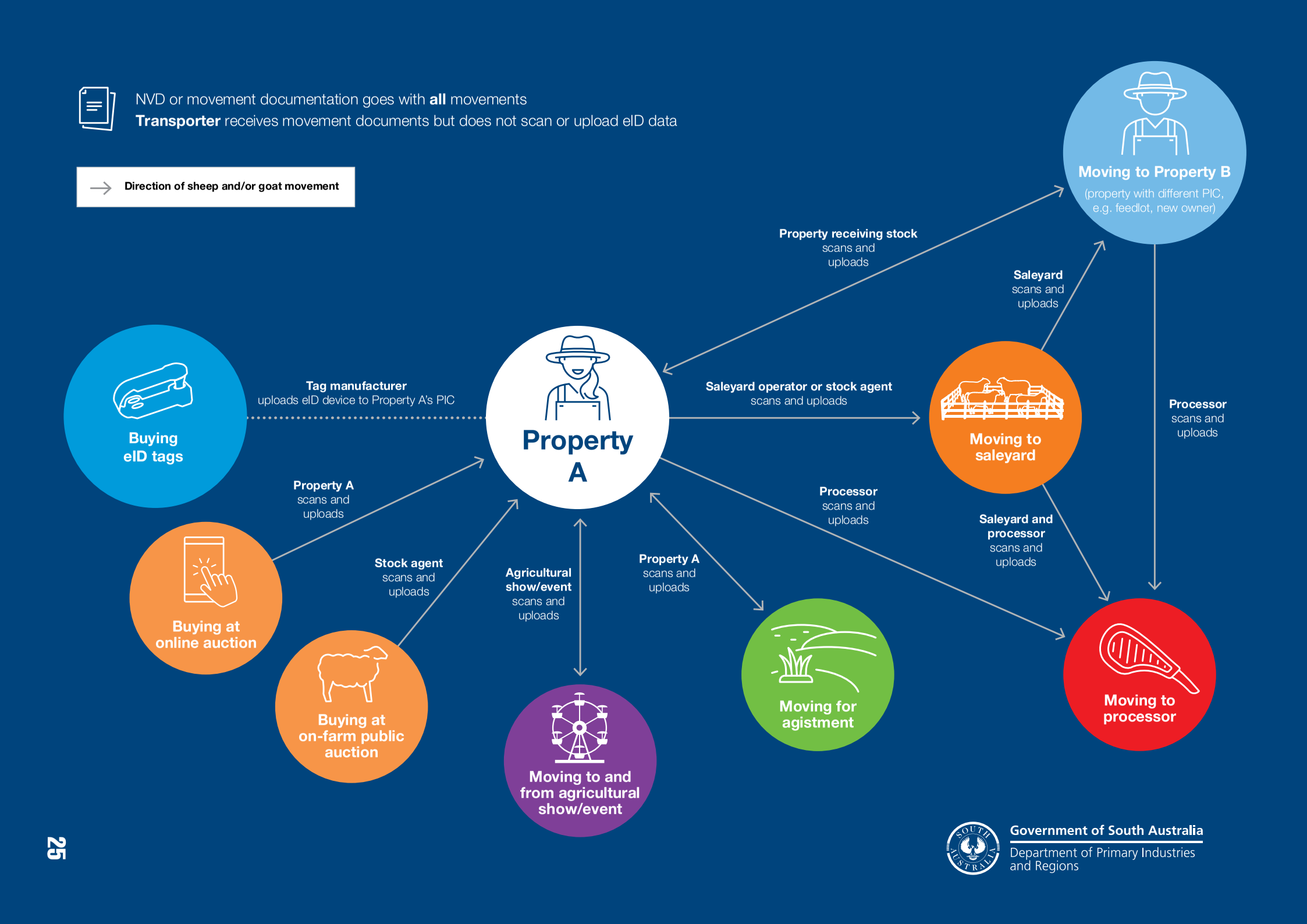
Movement documentation

- A movement document, such as the National Vendor Declaration (NVD) must accompany the animals, and a National Sheep Health Declaration (NSHD) is required for all sheep movements.

Find out more

Search "how to guides" for tips on using the NLIS database: **integritysystems.com.au**

To learn more about eID requirements for sheep and goats scan the QR code or visit: **pir.sa.au/eid**



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eID for sheep and farmed goat traceability

Information for South Australian producers

Individual electronic identification (eID) tags are replacing the mob-based visual tag system for the identification and traceability of sheep and farmed goats.

For many producers, the only change will be switching from visual tags to eID tags.

Key dates for South Australian producers to transition to eID are:

1 January 2025 - Sheep and farmed goats born on or after 1 January 2025 must be identified with a National Livestock Identification System (NLIS) accredited eID tag before leaving their property of birth.

1 January 2025 - Producers who conduct property to property (P2P) movements must record individual movements of sheep and farmed goats identified with eID on the NLIS database within two days of arrival.

1 January 2027 - All other sheep and farmed goats leaving a property must be identified with an NLIS-accredited eID tag.

Sheep and farmed goats born before 1 January 2025 do not need an eID tag if sold or processed before 1 January 2027 - an NLIS visual tag will satisfy NLIS requirements for these animals.

Requirements for producers

- eID tags must be NLIS-accredited. For a list of accredited tags visit pir.sa.gov.au/eid
- Use a compatible applicator when applying eID tags and follow tag manufacturer instructions - see applicators listed for NLIS-accredited tags and link to application guides at pir.sa.gov.au/eid
- Sheep and goats must only be identified with one eID device. Once applied, the tag must remain with the animal for life. eID tags cannot be reused.
- The year-of-birth colour system is used by most producers for management purposes and remains voluntary in South Australia.
- It is the receiver's responsibility to scan eID tags and record individual movements. If you move animals directly to a saleyard or processor, as a producer, you do not have to scan eID tags.
- Producers are responsible for recording individual movements of sheep and goats with eID tags on the NLIS database within two days of arrival on their property if they:
    - have multiple property identification codes (PICs) and move stock between them
    - buy stock privately (with or without an agent)
    - agist stock on their property.
- If transferring animals to another business owner's PIC, it is the receiver's responsibility to scan.

Email: eIDsheepandgoat@sa.gov.au
pir.sa.gov.au/eID

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Implementation funding support

Point-of-sale eID tag discount scheme (2025-2027)

Discounted eID tags are available to SA producers with an active PIC registered with PIRSA.

An agreement is in place with tag manufacturers to provide a 47.5 cent discount per tag. The discount applies to NLIS-accredited eID tags aligned to the year-of-birth colour system:

- white eID tags for 2025 (discount available from 1 July 2025 to 31 December 2025)
- orange eID tags for 2026 (discount available from 1 January 2026 to 31 December 2026)
- light green eID tags for 2027 (discount available from 1 January 202 to 30 June 2027).

eID tags range in price, depending on the type and manufacturer. The discount will be applied at the point of sale. You should not need to complete an application form or any additional paperwork.

Expanded eID device rebate – applications close 30 June 2027

A rebate is available for sheep and goat eID tags purchased between 1 July 2025 and 30 June 2027 that are not aligned to the NLIS year-of-birth colour system.

SA producers can apply for a 25% rebate up to a cap of 47.5 cents (GST exclusive) on the purchase price on NLIS-accredited eID tags not designated to the current year.

Read the Guidelines and apply: sa.gov.au/eidexpandedrebate

Essential equipment rebate - applications close 30 June 2026

The Sheep and Goat eID Implementation Essential Equipment Rebate (Producers) is open to assist with costs for equipment needed to conduct property to property (P2P) movements and meet NLIS reporting obligations for sheep and farmed goats.

SA Producers can apply for a 75% rebate on the cost of purchasing essential equipment. The maximum rebate amount depends on the number of animals moved onto your property each year for the past three consecutive years (between 2021 and 2026):

- up to $500 for movements of 100 or less head of animals annually
- up to $2,000 for movements of between 101 and 5,000 head of animals annually
- up to $20,000 for movements of more than 5,000 head of animals annually.

Read the Guidelines and apply: sa.gov.au/eidequipmentrebateproducers

What is eID?

eID devices (tags) allow animals to be individually identified and traced through the NLIS database. They do not store data. They use a radio frequency identifier (RFID) microchip to store a unique serial number that can be read by a handheld wand or panel reader. This unique number can be used in management software, spreadsheets or databases to record production data for each animal.

Accredited eID devices are registered to the NLIS database and linked to your PIC at the time of purchase. eID breeder tags are used to permanently identify animals born on your property. Post-breeder eID tags (pink) are used to identify animals missing a tag and no longer on their property of birth.

How can I find out more?

Learn more about the NLIS: integritysystems.com.au/nlis | 1800 683 111
Find out how to register for a PIC: pir.sa.gov.au/pic
Learn more about SA's transition to eID and subscribe for updates: pir.sa.gov.au/eid

Updated: 1 July 2025

Fact Sheet

Footrot Program changes in South Australia

Restrictions around the management of footrot have been eased in South Australia following extensive consultation with the state's sheep industry.

Footrot remains a notifiable disease under the South Australian *Livestock Act 1997;* however legislation has been changed to make it easier for sheep with suspected or confirmed footrot to be moved and traded.

Key changes in place from 1 January 2025

As of 1 January 2025, footrot changed from a notifiable disease to a notifiable (report only) disease in South Australia. This means all forms of footrot or suspicion of footrot will remain notifiable under the *Livestock Act 1997* and must be reported to PIRSA.

Movement restrictions adjusted:

Movement of sheep from infected or suspect flocks is now permitted directly to another property, provided that **prior notification** of footrot status is provided to the purchaser. The footrot status will remain with the purchased sheep.

Mandatory notification of footrot status:

Sellers must disclose the footrot status of sheep using one of the following methods:

- National Sheep Health Declaration, in section B Question 3 and 4 (suspect properties must declare virulent footrot)
- Private sales agreement between vendor and purchaser
- Declaration on an online livestock selling platform

The following legislative requirements under the *Livestock Act 1997*, remain:

- if a person knows or has reason to suspect that livestock owned by or under his or her control are affected with footrot, the person must take all reasonable measures to control or eradicate the footrot
- a person must not do an act intending that, or being recklessly indifferent as to whether, livestock become affected or further affected with footrot
- a person must not, without the approval of the Chief Inspector of Stock, bring footrot into the state or cause footrot to be brought into the state.

Saleyards Weekly Markets:

The Naracoorte Regional Livestock Exchange and Mount Gambier & District Saleyards are approved by the Chief Inspector of Stock to receive sheep from properties with known footrot infected or suspected flocks, provided they erect warning signage and stamp all National Sheep Health Declarations with a warning statement alerting purchasers to the potential presence of sheep infected with footrot at the saleyard. All other saleyards within South Australia **do not** have approval to receive sheep from suspect or infected flocks.

All sheep transported still need to meet 'fit to load' guidelines. An accurately completed National

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Government of South Australia
Department of Primary Industries and Regions

Sheep Health Declaration must disclose the flocks footrot status and accompany all movements of sheep within and into SA.

Surveillance and investigation will continue at all saleyards.

At Naracoorte Regional Livestock Exchange and Mount Gambier District Sale Yards:

- There will no longer be placarding of suspect footrot infected sheep
- Consignments from known infected or suspect properties with accurate National Sheep Health Declaration declarations will not be investigated unless there is an associated welfare issue.
- For new Footrot detections, samples will be taken and owners will be notified of the detection.

Restrictions of movement:

Sheep from infected and suspect properties are not permitted to move through a saleyard, transit or spelling facility, or any other interim property, except those approved by the Chief Inspector of Stock to receive sheep from infected or suspect properties.

How to limit the spread of disease

- Do your homework before purchasing stock: contact the agent or vendor for more information on flock footrot history and treatments, check National Sheep Health Declarations and organise an independent inspection.
- Keep strays or new purchases separate from other sheep until you confirm their status.
- When moving sheep, avoid crossing paths of known infected flocks or mobs.
- Spell yards and paddocks for 14 days between mobs.
- Inspect rams for footrot prior to joining.
- Secure fencing to prevent straying and identify strays to PIRSA for inspection.

Continued support for producers

Ongoing support is available for producers to identify, manage and eradicate the disease. Please contact an Animal Health Officer in your area or speak to your private livestock veterinarian for assistance.

Why have these changes been put in place?

The changes follow Livestock SA's review of the Footrot Management Program and extensive consultation through an industry-led steering committee.

The new program aims to reduce the economic and animal welfare impacts of footrot across the South Australian sheep industry, by enhancing the understanding, diagnosis, prevention, and management of footrot using a collaborative industry approach.

The Footrot Management Program is funded by the Sheep Industry Fund, administered by Livestock SA and delivered by the Department of Primary Industries and Regions (PIRSA).

A copy of the current legislative requirements can be found at the South Australian Government Gazette.

For more information contact PIRSA Footrot Program Manager Kate Buck on 0419 091 156.

Fact sheet

Filling the Feed Gaps

Best practice hay and silage production for Kangaroo Island

Key Messages

- If cut and baled correctly, legumes usually make better hay than silage, and good hay will be cheaper than good silage.
- More fermentation with lactic acid = good silage.
- Two livestock feed quality testing systems are used in Australia, both of which use NIR (Near Infra-Red spectroscopy). It is not recommended to compare results from different laboratories, as the measuring systems used vary.
- Samples for fodder analysis must be collected using a corer, not a grab sample from the bale or from the feed out trail.

Introduction

Preparing for dry times through best practice feed conservation and storage is critical for Kangaroo Island livestock producers. This fact sheet has been developed as a tool to improve primary producer decision making around cost effective and sustainable production of hay and silage.

Silage vs Hay

Silage is a fermented product, much like beer but with less (or no) alcohol. The fermentation process is anaerobic so it must proceed with no air (oxygen). If air is present, compost is produced, not silage. During anaerobic fermentation, lactic acid is produced which preserves the crop or pasture.

Keys to successful silage production:

Good silage must be baled (or chopped) within 1-2 days of cutting and wrapped (or sealed) immediately following baling or carted to a pit/ bunker.

Air is excluded by baling (or chopping and rolling) whilst the forage is still wet, but not too wet. Aim for 60-70% water for chopped silage and 40-50% water for baled silage. Silage must be wrapped quickly and tightly or sealed in a pit/bunker to prevent air entering. Air is the enemy of silage!

The more sugar in the cereal or pasture, the better the fermentation and therefore better silage quality.

Cereals and annual/Italian ryegrasses make the best silage. Lucerne, clover and capeweed/mustards/ turnips are difficult to turn into silage as they have very low sugar content.

Good silage will have a low pH (4.0 to 5.0) compared to the freshly cut crop/ pasture with a pH around 6.5 to 7 and will be mostly lactic acid with only a small amount (or nil) acetic and no butyric acid.

Lactic acid does not smell. If your silage smells, this means you have an "off" fermentation such as butyric acid. This will be a result of baling (or chopping) too wet, insufficient sugar for fermentation, air getting into the stack/ bale or crop/pasture being left for too long between cutting and chopping/ baling.

Although difficult to turn into silage, legume dominant pastures make very good hay if wilted quickly.

Legumes usually make better hay than silage and good hay will be cheaper than good silage.

Sampling kits:

Sampling kits can be sourced from:

foragelabaustralia.com.au

feedtest.com.au

References & resources:

Downloadable "Successful Silage" manual

Purchase a "Successful Silage" manual (print copy)

High Quality Silage in 5 Easy Steps

Dairy Australia: Winter Crops

Collecting hay/silage samples

Samples for fodder analysis must be collected using a corer, not a grab sample from the bale or from the feed out trail. On average, 7-10 bales per lot should be sampled with samples collected from the sides (round bales) or ends (square bales).

Corer holes in silage bales must be sealed with silage tape to prevent air entering.

Silage samples should be refrigerated as soon as collected, then sent by express courier post early in the week. Do not attempt to dry samples in a microwave or oven.

Fodder quality testing – know your labs!

There are two livestock feed quality testing systems used in Australia, both of which measure using NIR (Near Infra-Red spectroscopy).

The two systems are quite different, so do not attempt to compare results using different laboratories. The results from different testing labs will vary, but no lab is better than the other. Each lab regularly (several times/year) ground truths their NIR equation against wet chemistry, so there is good confidence in the validity of the results.

There will also be a +/- 5 to 10% variance in test readings using the laboratory NIR regression equation, so even if you supplied an identical sample to the same lab at different times there could be a +/- 5 to 10% variance.

For these reasons, it is recommended you stay with the same lab when testing your hay or silage.

Forage Lab provides more than 30 different nutrient analyses for a standard NIR fodder analysis compared to about 10 for a standard test from the Feed Test Lab.

The **Feed Test Lab** results follow the Feeding Standards for Australian Livestock: Ruminants and are reasonably easy to follow, whereas the **Forage Lab** results are more difficult to interpret, being based on American feeding standards, although they do provide an explanation sheet covering most of the results.

Forage Lab provides a particularly good NIR silage analysis which includes pH, total VFA (volatile fatty acids), ammonia as % of crude protein and VFA components (lactic acid, acetic acid and butyric acid).

Feed Test Lab don't include silage pH, ammonia as % of crude protein or VFA components in their standard NIR feed test, but they can be requested for an additional charge.

Keys to achieving high quality conserved fodder (silage or hay)

Cut early

Wilt Quickly

Hay cut early will still deteriorate if on the ground for more than 14 days, especially if rain occurs, as resulting bacterial decay causes significant leaf loss (see Figure 1).

Silage must be baled or chopped within one to two days of cutting, which is one reason why silage can have higher quality than hay, but hay can be high quality if baled soon after cutting.

Tedding a cereal or ryegrass crop significantly reduces curing time by throwing the crop into the air and spreading it out immediately following cutting (Figure 2). Mowing with a conditioner reduces curing time even further.

To be effective the tedder rake must follow immediately behind the mower before leaf stomates close.

Use a tedder if you are not confident of curing hay within 14 days.

Figure 1: ME vs Days on ground

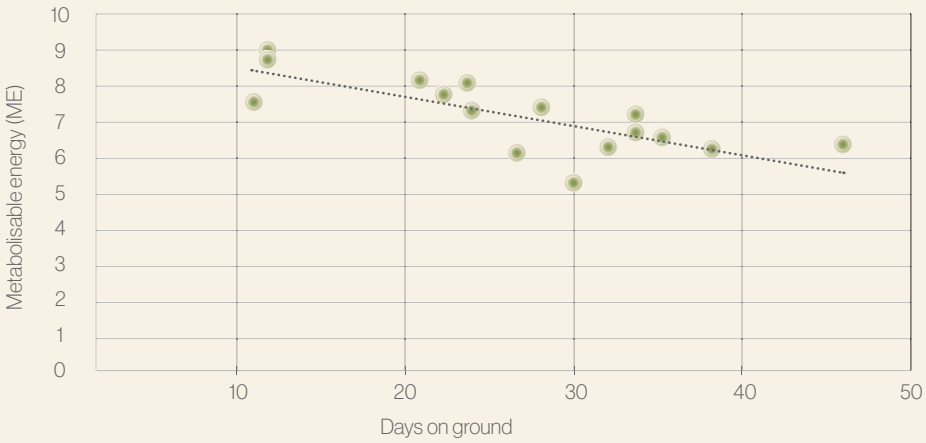

Figure 1: Results from 9 Kangaroo Island annual ryegrass hay samples, cut mid-October 2022 at early head emergence, plus 7 Fleurieu Peninsula hay samples cut early November to early December 2022. All received between 25mm and 50mm rain after cutting.

Figure 2: Tedding a cereal or ryegrass crop significanlty reduces curing time by spreading it out.

Figure 3: A Tetila annual ryegrass crop at Macgillivray cut at canopy closure yielded about 4t/ha dm and was made into hay in early October 2023 which tested 11.9 ME, 43% NDF and 19% CP (Feed Test Lab). This shows that good quality hay can be made if cut early and wilted quickly.

Inoculant vs no inoculant for silage

In 2023 three paired round bale wrapped silage samples were compared (three with no inculant and three with Pioneer 1174 inculant containing lactic acid bacteria).

There were no differences in their feed tests and fermenation quality as all silages were cut early, wilted quickly to and wrapped promptly at about 50% water (50% dry matter).

Silage inoculants are a valuable insurance if you must bale very wet silage and/or it is mostly capeweed/clover (low sugar levels). Silage inoculants are more important for pit/bunker silage where there is less wilting and therefore higher water content.

Silage vs hay comparison

	Silage	Hay
Cost	Pit/bunker silage cost ($/t dm) is comparable to hay but requires economy of scale e.g. 500 t dm (1,500 wet tonnes). Good quality pit/bunker silage is well suited to fully feeding or maintenance feeding ewes in confinement but requires specialised equipment, therefore economy of scale is important.	Good quality baled hay can test the same as good silage and is much cheaper than baled silage, if costed in either $/t dm or c/MJ ME.
Rain	Less likely to be rain affected as only 1-2 days between cutting and baling. Silage can be cut earlier than hay which can allow clover pastures to set seed, and also remove annual grasses (especially barley grass) before they produce seed.	Consider baling slightly wetter if it means earlier baling (not recommended with large square bales or high sugar cereals) or use a hay preservative (HayGuard) or hay inoculant (HayKing) which will enable baling at up to 24% moisture. Also consider using a conditioner and tedder to significantly reduce wilting time.
Quality	Silage fermentation will improve fodder ME as volatile fatty acids can be turned into energy in the rumen, but early cutting and quick wilting are still paramount for high quality silage. If fermentation is poor, silage is worthless or even detrimental to livestock due to mould and/or toxins and lack of palatability, and poor silage (ME less than 9.5) is very expensive.	
Weeds	Silage will "pickle" grass and weed seeds, reducing subsequent germination, but resulting silage may only have a low ME.	Effective way to spread weeds.
Wastage	Less wastage than hay (e.g. 10% compared to 15-50% for hay depending on hay quality) but silage can require specialised equipment to feed out.	Hay is easier to feed out, albeit with more wastage than silage. Wastage with good quality hay (ME 10) is very low (maybe less than 15%) compared to poor quality hay (ME 8 upto 50% wastage if fed as the sole ration).
Storage	Silage does not catch fire and there are no mice problems if stored correctly (not in long grass) and not under trees (birds). Pit/bunker silage will last 10-20 years if well sealed, but baled silage will last only as long as the plastic (about one winter).	
Transport	Silage is difficult to transport once wrapped, or in a bunker or pit.	Net wrapped hay is easy to transport and well protected from rain.

Economics of Silage

All costs (and returns) vary considerably, for example:

- Tube wrapped or in line silage wrapping is cheaper than individual stretch wrapped bales.
- Heavier bales and drier bales reduce silage cost significantly.
- Self-unloading forage wagons such as Strautmann, Taarup or Krone can be purchased second hand and are suited to a smaller scale operation than a self-propelled silage chopper and semi tippers. Self-unloading forage wagons for making silage can also be used to feed out silage.
- If feeding silage to lambs for maximum growth a short chop length is important and may also require grain to added to the silage.
- Silage chop length will be long for baled silage and can also be long with self-unloading forage wagons, compared to self-propelled silage choppers, and therefore may not be suited to production feeding lambs.

Silage round bale (wet weight 600 kg)

Contains 45% water or 55% dry matter = 600 x 0.55 = 330 kg dry matter

Cost $45/roll (baling & wrapping) = $45/330 x 1000 = $136/t dry matter

Hay round bale (weight 330 kg)

Contains 15% wter and 85% dry matter = 330 x 0.85 = 280 kg dry matter

Cost $25/roll (baling) = $25/280 x 1000 = $89/t dry matter

Pit/bunker silage costs

Includes chopping, cartage to pit/bunker using a semi-tipper, rolling & plastic; = approx. $120/t dry matter (about $42/wet tonne)

Figure 4: Digestibility vs NDF/ADF

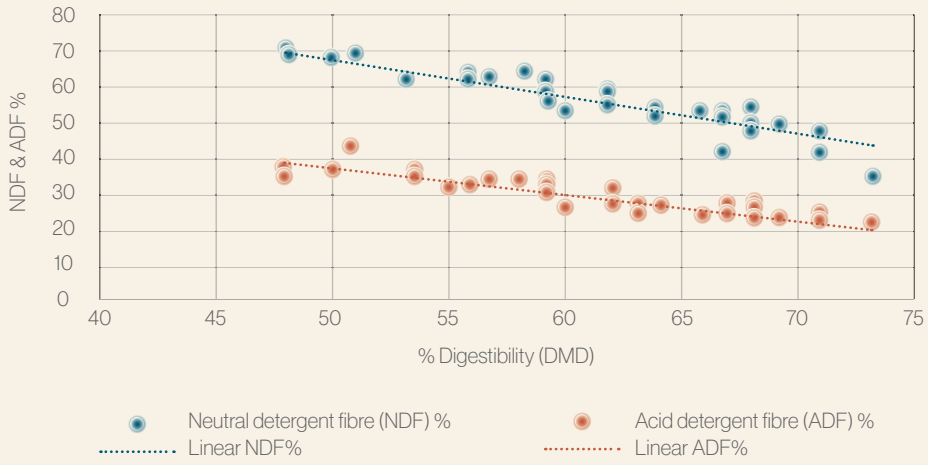

Figure 4: The graph above clearly shows the relationship between ADF and NDF and ME/digestibility for the 35 hay and silage samples collected from Eyre Peninsula in December 2023.

Figure 5 (left): Forage wagon unloading silage into a bunker. The forage wagon can also be used to feed out silage. Check carefully for rust and wear/tear if purchasing second hand.

Fodder analysis terminology

Moisture (water) and Dry Matter (DM)

Dry matter plus water always = 100%. For example, 85% dry matter = 15% water and 65% dry matter = 35% water. All fodder contains water of varying amounts ranging from 10-15% for hay and up to 40-65% for silage and 80-90% for green pasture, but the nutrients are only in the dry matter (after water is removed), therefore fodder analysis results are calculated on a dry matter basis. However, when calculating how much fodder to feed to livestock, you must include water by calculating the "as fed" weight.

Crude Protein (CP)

Nitrogen (N%) x 6.25. Low protein cereal/ryegrass hay is a reliable indication of insufficient nitrogen fertilizer applied during the growing season.

Dry Matter Digestibility (DMD)

The percentage of the dry matter of a feed that can be digested by animals. High digestibility feeds have a DMD over 65-70% which means 65-70% of the feed is used by the ruminant animal and only 30 -35% is expelled as dung. Feeds below 50% to 55% DMD are of poor quality as 45 to 50% is expelled as dung.

Metabolizable Energy (ME)

The energy content of the feed expressed as megajoules per kilogram of dry matter (MJ ME/kg dm) and is calculated directly from the digestibility.

Acid Detergent Fibre (ADF)

The cellulose and lignin content of a feed. Cellulose is the least digestible form of fibre in a feed whilst lignin is completely indigestible. The lower the ADF, the higher the DMD (and ME). ADF is similar to crude fibre.

Neutral Detergent Fibre (NDF)

Total fibre content of a feed, which includes the cellulose and lignin (ADF) along with digestible fibre such as hemicellulose and pectin. The lower the NDF, the higher the DMD (and ME) and the lower the NDF, the more a ruminant animal can eat. Hay/silage cut too late will have a NDF above 65% (mostly stems). Hay/silage left on ground for too long (or raked too dry) will have a high NDF (and low ME) as most of the leaf has disappeared.

Water Soluble Carbohydrates (WSC)

The total soluble sugars (glucose, fructose, sucrose & fructans) present in fodder. Very high WSC can cause hay to catch fire even if moisture levels are low

NOTE: A general rule of thumb, **Daily dry matter (DM) intake (% liveweight) = 120/NDF.**

For example, a poor hay with an NDF of 60, daily DM intake = 2% liveweight, whereas a high quality hay with an NDF of 40, daily DM intake will be 3% liveweight.

Acknowledgements

This project is supported by the South Australian Drought Resilience Adoption and Innovation Hub, which is one of eight Hubs established across Australia through the Australian Government's Future Drought Fund. The SA Drought Hub brings together a dynamic network of primary producers, industry groups, researchers, government agencies, universities, agribusinesses, traditional owners and others to work towards a common vision to strengthen the drought resilience and preparedness of farms and regional communities in South Australia. This project received funding from the Australian Government's Future Drought Fund.

Many thanks to to Daniel Schuppan, Nutrien Ag Solutions and Deb Scammell, Talking Livestock for their valuable comments included in this publication.

Contact

This fact sheet was prepared by Tim Prance, T Prance Rural Consulting, May 2025.

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Soil Health Report 2024/2025

Background

With the ever increasing cost of fertilizers it's never been more important to test your soils. Soil testing allows you to more accurately determine what type and how much fertiliser you should be applying or if you need to lime.

PIRSA provides a soil testing service for all producers. We provide the soil testing kit and can even assist with the soil sampling. All results come with a detailed interpretation of the test results. Call into the PIRSA office in Kingscote to find out more. In 2024/25 17 KI farmers submitted 73 soil samples for testing.

Results

Soil pH

Soil pH is important for optimal production of crops and pastures. As the soil pH falls below pH $5.5_{(CaCl2)}$ nutrients such as phosphorus, magnesium, calcium and molybdenum become less available; microbial activity starts to decline (including Rhizobia) and toxic amounts of aluminium can be released into the soil solution. All of these processes impact nutrient availability and crop/pasture productivity. The problem worsens if our sub soils acidify, due to the cost to get lime to depth. An acid subsoil impacts on plant roots ability to access soil moisture at depth. The aim is to keep pH_{cacl2} in the top soil (ideally) in the range 5.8-6 and at a minimum at 5.5.

The majority of soil samples taken during the 2024/25 seasons were below critical pH levels. Figure 1 shows that the average pH in all Hundreds was below 5.5 pH_{CaCl2} except for Menzies. Six of the eight Hundreds had an average pH of 5.2 or below. At these levels, pH will be limiting farm productivity and profitability and therefore liming should be a high priority.

Salinity

Saline soils are defined as soils that contain a high enough level of soluble salts in the root zone that it can adversely affect plant growth. Ideally, soils should have a salinity level of less than 2 dS/m (for salt sensitive plant species). Of the soil samples taken, all were below 2 dS/m.

Organic Carbon

The organic carbon test is a useful indicator of organic matter status and therefore of overall soil fertility, microbial activity, and the structural stability of the soil. The ideal target level of organic carbon varies with soil type. In sandy soils greater than 1% is desired, through to greater than 2% in clay soils. Of the soils tested, all except 1 site were well above critical values.

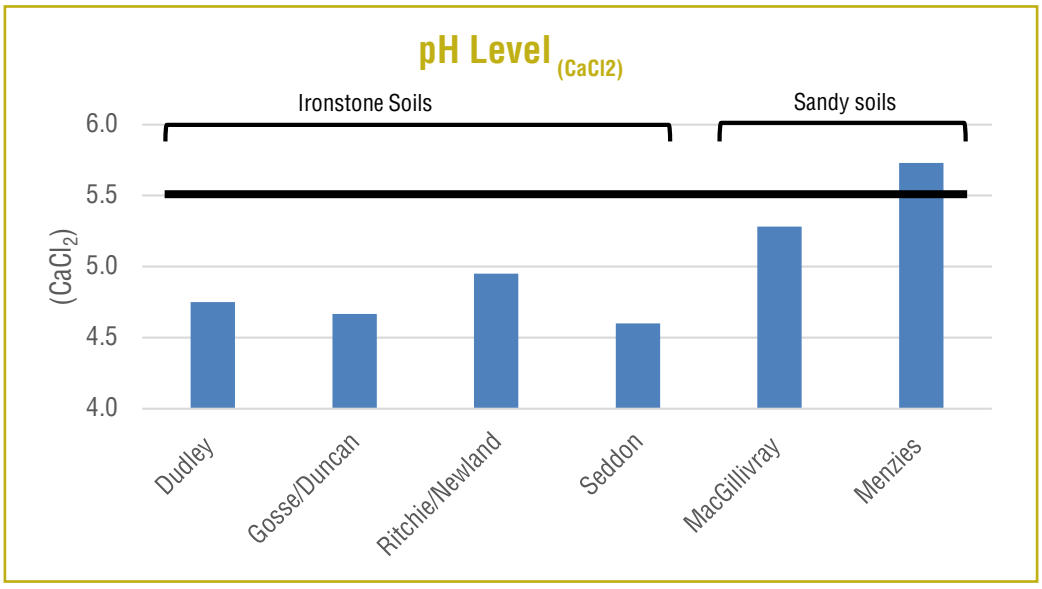

Figure 1: Average soil pH $_{(CaCl2)}$ results for each Hundred during the 2024/25 seasons. The black line shows critical value.

Soil Nutrients

Maintaining an adequate nutrient status in the soil is paramount to determining the productivity of the soil. Phosphorus, potassium and sulphur are essential nutrients for plant growth and yield (see Table 1 for target levels).

Maintaining an adequate nutrient status in the soil is paramount to determining the productivity of the soil. Phosphorus, potassium and sulphur are essential nutrients for plant growth and yield (see Table 1 for target levels).

SOIL NUTRIENTS	TARGET LEVELS	
	IRONSTONE SOILS	SANDY SOILS
Phosphorus	35	25
Potassium (Colwell)	>120 mg/kg	>120 mg/kg
Sulphur	6-8 mg/kg	>10 mg/kg

Table 1: Target levels for phosphorus, potassium and sulphur.

Phosphorus and PBI

For greater accuracy in determining your soil's exact phosphorus requirement we now use the PBI (phosphorus buffering index) test to determine the amount of P required (Table 2). Soils with a low PBI (i.e. sandy soils) require less P than those with a high PBI (i.e. ironstone or clay soils) to maximise productivity.

The majority of ironstone soils have a PBI in the range 100-200 which has a critical soil phosphorus level of 31-40. Sands, with a PBI of around 15-35, have a critical soil phosphorus level of 27-31.

During 2024/45, almost all samples collected from the Hundreds with predominantly sandy soils had phosphorus levels greater than 25 mg/kg. Of the Hundreds with predominantly ironstone soils, about half had phosphorus levels higher than the recommended level of 31-40 mg/kg (Figure 2).

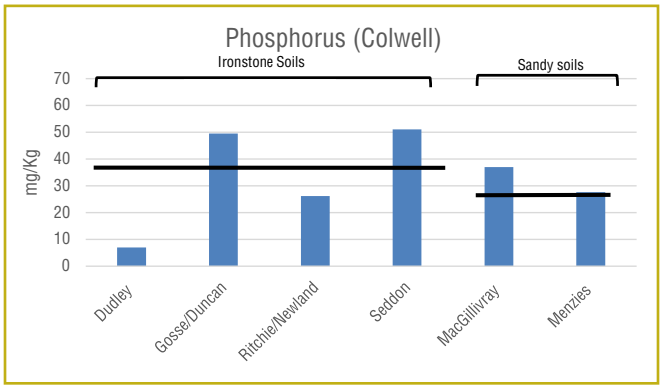

Figure 2: Average soil phosphorus levels for each Hundred during the 2024/25 season. The black line shows critical value.

Potassium

All hundreds had average potassium levels above the critical values of 120 mg/kg (Figure 3).

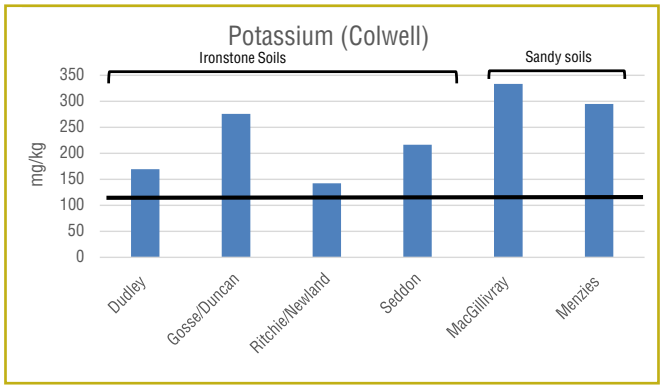

Figure 3: Average soil potassium levels for each Hundred during the 2024/25 season. The black line shows critical value.

Sulphur

Of the Hundreds with predominantly ironstone soils, all Hundreds except Dudley had average levels above the recommended rate of 6-8 mg/kg (Figure 4). The majority of sandy soil samples, except the Hundred of Menzies, had samples above the critical value of 10 mg/kg.

These results reinforce the value of soil testing to ensure the right rate and right product is applied i.e. if sulphur levels are low, farmers need to consider selecting a fertiliser that contains sulphur as well as phosphorus.

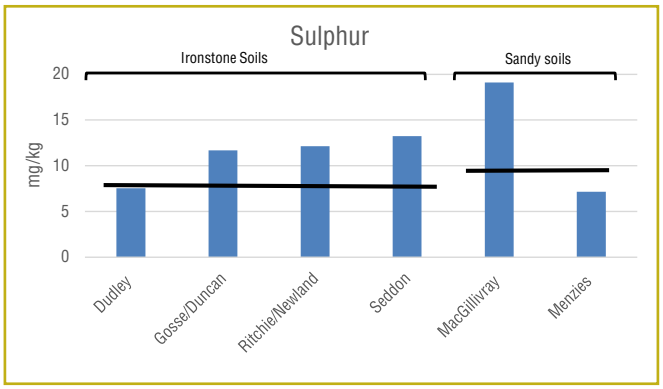

Figure 4: Average soil sulphur levels for each Hundred during the 2024/25 season. The black line shows critical value.

Summary

The 2024/25 soil tests carried out by Kangaroo Island farmers indicate that overall, soils are on target or above for organic carbon and potassium.

The average soil phosphorus and sulphur levels were variable across all Hundreds. Across the Island, soil $pH_{(CaCl2)}$ levels were predominately below critical values. Areas where low pH is occurring will reduce the availability of essential nutrients such as phosphorus to the plant and will be potentially limiting overall farm productivity.

The most cost effective and practical way to address low pH is through the application of lime. Low nutrient levels can be addressed through the application of fertilisers. Always seek advice from your local agronomist or consultant to ensure you are applying the right fertiliser or lime at the correct rate.

Soil types vary within each Hundred, so care must be taken in the broader interpretation. In addition, the data only reflects the number of samples taken in each Hundred, which may represent only a few properties. The data and resultant graphs can only be interpreted to the point of identifying trends over time.

Take home messages

- Soil testing is essential for monitoring soil fertility levels.
- PIRSA provides a soil testing service for all farmers – from provision of kits, to taking the soil samples, to interpretation of results.
- Of all the soil samples taken the majority were below critical levels for pH. Lime to maintain PH_{CaCl} above 5.5.
- Phosphorus, potassium and sulphur levels were low on some properties.

Hundred	Organic Carbon %	Conductivity dS/M	$pH_{(CaCl2)}$	Phosphorous mg/kg	Potassium mg/kg	Sulphur mg/kg
Critical Values	**>1**	**<2**	**>5.5**	**25**	**>120**	**>10**
MacGillivray	3	0.23	5.3	37	333	19
Menzies	2	0.17	5.7	28	295	7

Table 3: Summary of results for sandy soils. Note mg/kg is the same as ppm.

Hundred	Organic Carbon %	Conductivity dS/M	$pH_{(CaCl2)}$	Phosphorous mg/kg	Potassium mg/kg	Sulphur mg/kg
Critical Values	**>2**	**<2**	**>5.5**	**35**	**>120**	**6-8**
Gosse/Duncan	5	0.17	4.7	50	276	12
Dudley	2	0.08	4.8	7	170	8
Newland/Ritchie	4	0.16	5.0	26	142	12
Seddon	5	0.28	4.6	51	217	13

Table 3: Summary of results for ironstone soils.

Funding/Sponsors

PIRSA.

Note: The information used was sourced from individual Kangaroo Island farmer soil tests and analysed using CSBP Analytical Laboratory.

Further Information

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Lime Induced Trace Element Deficiencies

Background

Have you limed a paddock and noticed the clover turned yellow?? If you did, you're not alone.

Our coarse sandy ironstone soils are often low in manganese and liming can exacerbate that deficiency. Now the solution is to not to cease liming but to overcome that deficit! Mapping shows that up to 70,000 ha on Kangaroo Island are naturally low in Manganese (Mn), so it's a potentially significant issue resulting in poor pasture growth and loss of overall productivity.

The presence of low Mn levels can impact on pasture growth for many years. Whilst the solution to apply Mn is obvious, the question remains whether the best option is granular or foliar treatment and how long the treatments last. In recent years a few producers have applied demo strips of manganese sulphate to limed pastures and have noticed a significant visual response of >20% improvement in growth and pasture colour.

What was/will be done

We know adding Mn is the solution. However, trial work is needed to ascertain

- the most cost effective rates of application
- the best Mn formulations (i.e. granular or foliar sprays).

Funding has been received through MLA's Producer Demonstration Site (PDS) program to conduct some trials on Kangaroo Island to (hopefully) answer these questions on what to apply and how often. Project funding will cover the cost of establishing and monitoring a key trial site (to be located on Simon and Marissa Veitch's property Haines) and several smaller demo sites.

In 2024 some preliminary demonstration sites were set up:

- Spring (19th Aug) foliar application of Manganese sulphate (Mn at 2kg/ha) were set up on L Florance's (2 sites) and S Childs'.
- Spring foliar application of Manganese sulphate (Mn at 0.5, 1 and 2 kg/ha) were set up on S & M Veitch's. Treatments were applied across a limed (2.5t/ha) and an un-limed strip.
- Summer bare earth spray at 15kg Mn/ha plus Spring (19th Aug) foliar application at 2kg/ha on K & E Bolto's.

Results

No visual differences were noted at the Bolto site. However feed tests taken in late spring showed an increase in crude protein, digestibility and ME (metabolisable energy) for both the spring and bare earth foliar applications compared to the control (refer to Table 1).

At the Veitch site, leaf tissue samples were taken on 7 Sept 2024 from both the limed and unlimed strips and tested for Mn levels in the pasture. Refer to Table 2.

The limed plots had induced a Mn deficiency for all treatments except the higher rate of 2kg/ha Mn.

The unlimed plots also responded to the higher rates of applied Mn.

There were no visual differences noted at Florance and Childs site.

Feed Test	Spring Foliar 2kg Mn/Ha	Bare earth foliar spray 15kg Mn/ha	Control
Crude Protein	12.7	11	9.6
Acid det. Fibre	29.5	30.4	31.2
Neutral det. Fibre	54.2	55.7	54.4
Digestability (DMD)	61	58.2	57.6
Digestability (DOMD)	58.5	56.1	55.6
Est. ME	8.9	8.4	8.3

Table 1: Feed test values at Bolto site.

Treatment - foliar spray	Limed	No lime
Control	18	23
0.5 kg/Ha Mn	20	23
1 kg/ha Mn	15	26
2 kg/Ha Mn	28	26

Mn <20: Deficient
Mn 20-25: Marginal
Mn >25: Normal

Table 2: Leaf tissue test results for Mn (mg/kg) levels.

Take home messages

- Lime can induce a manganese (Mn) deficiency on some soil types, but the overall benefits of liming will outweigh this issue.
- Application of Mn can overcome the deficiency.
- Preliminary trial data are showing promising results.
- More work is required to ascertain the most cost-effective rates to apply Mn and formulations (i.e. granular or foliar sprays) to use.

MEAT & LIVESTOCK AUSTRALIA

Producer Demonstration Site

Funding/Sponsors/ Acknowledgements

- MLA – Producer Demonstration Site
- Simon and Marissa Veitch, Keith and Erica Bolto, Lachlan Florance, Steven Childs

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The Impact of Phosphorus on Pasture Growth

Background

Phosphorus (P) is frequently cited as the primary limiting nutrient in our grazing systems and Kangaroo Island soils are naturally low in P.

Whilst many of our native grasses have adapted mechanisms to manage low P levels such as low growth rates, soil organism associations and a focus on internal nutrient cycling, this results in efficient but less productive systems.

Applying phosphorus to clover based pastures has been consistently shown to increase pasture production, increase stocking capacity and thus improve overall farming returns.

Building our soil's fertility base requires the addition of nutrients to ensure the soil has sufficient reserves to promote growth. This becomes especially important in farming. Everytime we 'harvest' we are removing nutrients be it in hay, grain, wool or meat and those nutrients need to be replaced or improvements made to the soil to improve nutrient availability if we wish to maintain productivity.

What was done

In 2023 a demonstration site was set up on a property that had not been fertilised for 15 years. In April 2023, fertilser was applied across the farm. A small area was tarped and thus received no fertiliser. The same process was repeated in 2024, ensuring the same area received no fertiliser each year. Refer to Table 1 below for applied fertilser rates.

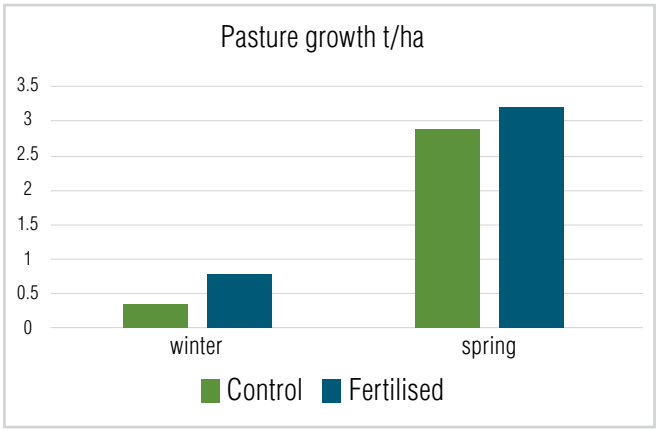
Year	Fertilser applied	Phos-orus kg/ha	Sulphur kg/ha
2023	240kg/ha of DAP/ Single Super 50:50	34.7	15.6
2024	300kg/ha Single Super	26.7	39

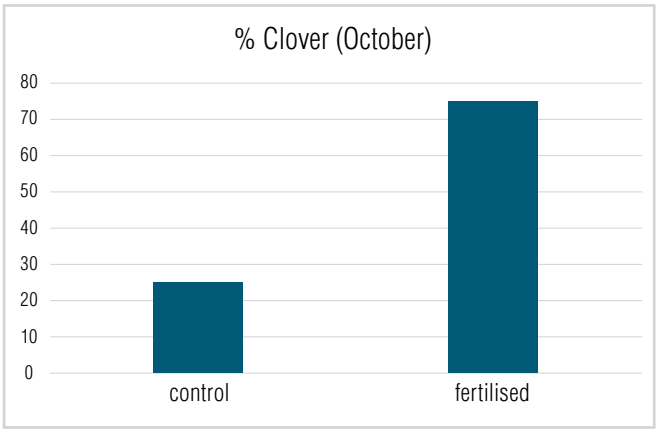
Table 1: Fertiliser rates applied each year and the nutrient value of each application.

The fertilised vs non fertilsed area were again monitored in 2024 for pasture growth rates (using pasture cages) and species variation.

Results

In 2024, two pasture cuts were taken in July and October and the site was also monitored for species composition, specifically any changes in clover percent between the control and fertilised site in October.





With two consecutive years of heavy applications of phosphorus and sulphur to the paddock, soil fertility is increasing and the improvements in pasture growth (both quality and quantity) are becoming even more evident.

In 2023 the fertilised site, over the growing season, produced (dry matter t/ha) 12% more feed. In 2024 the fertilised site grew 19% more feed. More importantly, the fertilised site (compared to the control) produced significantly more feed in winter, which is often a critical period for pasture growth.

Of even greater difference was the change in species composition. In 2023 the fertilised site grew about 40% more clover. In 2024 the fertilised site grew almost 150% more clover! Clover is key to pasture growth as it makes the nitrogen that drives overall pasture productivity.

The pasture cuts (quantity and productivity) would lead to an approximate 20% increase in carrying capacity.

Take home messages:

- If you want to grow good pastures, which in turn drives productivity, then you need to 'feed' the soil to maintain its productivity.
- This demo site reinforces the importance of ensuring soil phosphorus levels are at least at maintenance levels as capital applications of fertilizer are expensive. Plus the loss of pasture production incurred with low soil P levels is a double whammy.
- The extra pasture grown in both quality and quantity would lead to an approximate 20% increase in carrying capacity compared to the control.

Further Information

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Soil Organic Carbon Guidelines by Rainfall

Understanding the carbon capacity of your soil

Soil organic carbon (SOC) concentration benchmarks were determined for the South Australian agricultural zone from soil test data for the period 1990-2007 (Schapel et al 2021). Benchmarks by soil texture and land use were determined for the State and individual agricultural districts and are reported in separate information sheets. Climatic parameters including rainfall and aridity index were later added to the dataset. Using the benchmarks for common topsoil textures by annual rainfall, the values were smoothed to create the following tables and graphs.

While the values are the best data currently available for South Australia, they are guidelines only. They have been provided to help farmers and advisors assess if topsoils have the capacity to build additional soil organic carbon.

The SOC guidelines are for the 0-10cm depth and use the Walkley Black (OCWB) laboratory analysis method. The lower limit is based on the 25th percentile, the mid point is the median or 50th percentile, the practical target is the 75th percentile and stretch target is the 90th percentile. The average range is between the lower limit and practical target.

Soils that already have moderate to high SOC values for their given rainfall and soil texture (above practical target) have lower potential to further increase the SOC value. Soils that have low to average SOC values for their given rainfall and soil texture (between lower limit and mid point) have a greater potential to increase the SOC value. To change the SOC value may require identifying and overcoming one or more of the issues outlined in Table 2. For more detailed management options read the the information sheet *The effect of management actions on soil function*.

	SANDS				SANDY LOAM			
Annual Rainfall	Lower limit	Mid point	Practical target	Stretch target	Lower limit	Mid point	Practical target	Stretch target
<300	0.35	0.40	0.50	0.75	0.40	0.60	0.80	1.00
300 -350	0.50	0.60	0.75	1.00	0.65	1.00	1.25	1.45
350 - 400	0.60	0.75	0.95	1.20	0.75	1.20	1.40	1.65
400 - 450	0.70	0.90	1.20	1.40	0.85	1.30	1.50	1.80
450 - 500	0.85	1.10	1.45	1.80	1.00	1.50	1.80	2.10
500 - 550	1.00	1.30	1.70	2.20	1.20	1.70	2.10	2.50
550 - 650	1.20	1.65	2.20	2.90	1.40	2.10	2.80	3.40
650 - 750	1.30	1.90	2.60	3.40	1.90	2.60	3.60	4.30
> 750	1.40	2.10	2.80	3.60	2.10	2.80	3.80	4.50

	LOAM				CLAY LOAM			
Annual Rainfall	Lower limit	Mid point	Practical target	Stretch target	Lower limit	Mid point	Practical target	Stretch target
<300	0.50	0.65	0.90	1.20	0.50	0.80	1.20	1.50
300 -350	0.80	1.00	1.30	1.60	0.80	1.20	1.50	1.80
350 - 400	0.90	1.20	1.50	1.80	1.10	1.40	1.70	2.00
400 - 450	1.00	1.30	1.60	2.00	1.20	1.50	1.80	2.20
450 - 500	1.10	1.50	2.00	2.50	1.25	1.70	2.00	2.50
500 - 550	1.20	1.80	2.40	3.00	1.30	1.80	2.20	2.80
550 - 650	1.50	2.20	3.10	4.00	1.50	2.00	2.60	3.50
650 - 750	2.10	2.80	3.80	4.70	1.90	2.90	3.90	4.80
> 750	2.30	3.00	4.00	5.00	2.20	3.20	4.20	5.00

Table 1: Soil organic carbon guidelines for the 0-10cm depth based on annual rainfall zones. The guides are based on the analysis and interpretation of over 35,000 soil samples measured by the Walkley Black laboratory method and presented for key topsoil textures.

SOC values are more likely to be in the lower part of the average range (below the lower limit) if the soil:

- is shallow
- has low inherent fertility
- has suffered from soil erosion
- has poor management history
- has one or more soil constraints (such as acidity, sodicity, compacted layer, water repellence, boron toxicity, high subsoil chloride, high subsoil pH).

SOC values are more likely to be in the upper part of the average range (above the practical target) if the soil:

- is deep and fertile
- has good management history
- is calcareous
- contains ironstone
- has few soil constraints (such as acidity, sodicity, compacted layer, boron toxicity, high subsoil chloride)
- is under pasture.

Note that some soils with saline conditions or low pH may have above average SOC values due to low biological activity in the soil.

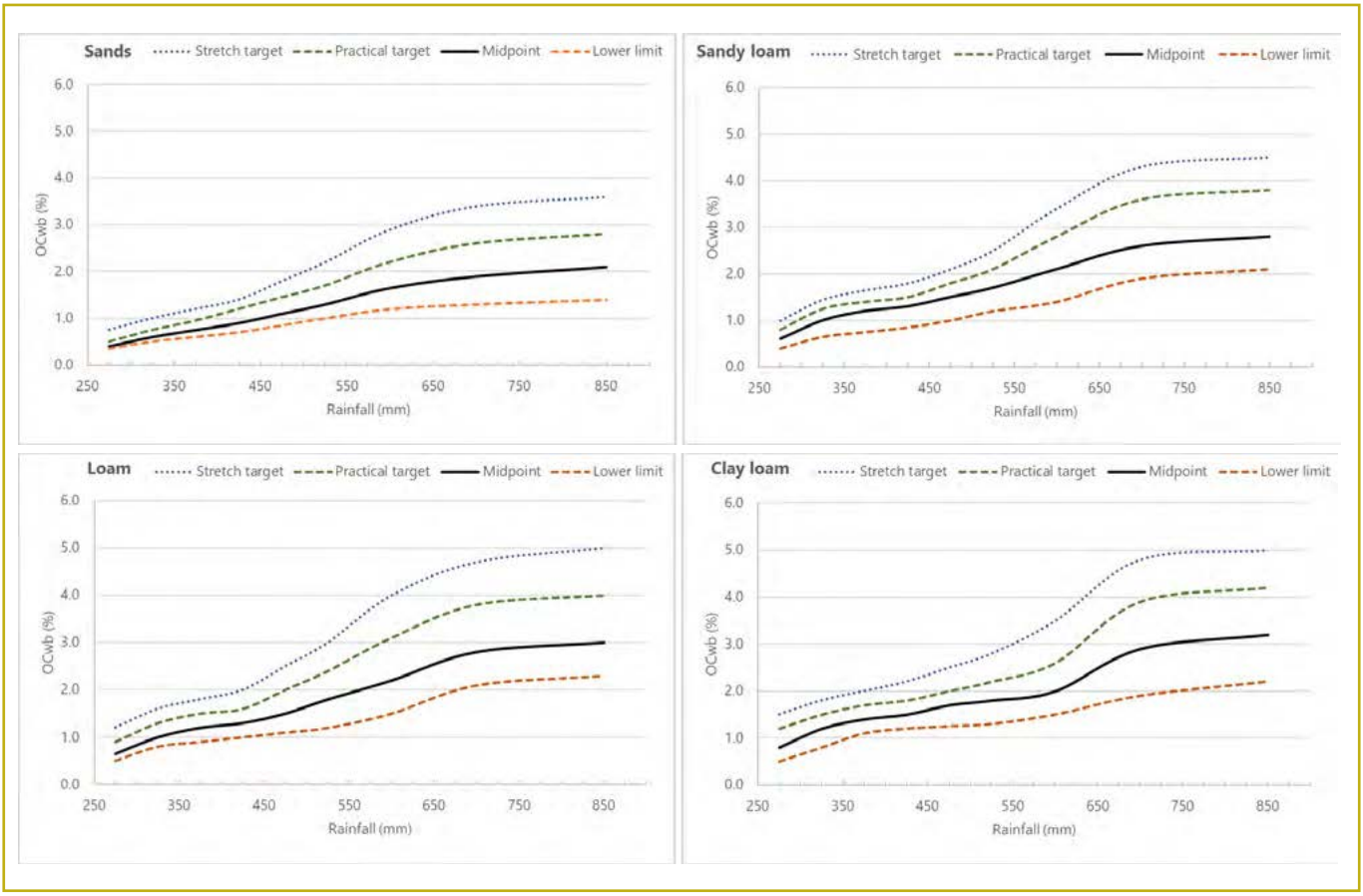

Figure 1: Soil organic carbon guidelines showing the lower limit, mid point, practical target and stretch target for topsoil textures sands (sand and loamy sand), sandy loam, loam and clay loam.

References

Schapel A, Herrmann T, Sweeney S and Liddicoat C (2021). ***Soil Carbon in South Australia: Volume 4 - Benchmarks and Data analysis for the Agricultural Zone 1990-2007.*** Soil and Land Hub, Adelaide.

Further Information

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SOUTH AUSTRALIA

Government of South Australia
Department for Environment and Water

KI Biosecurity Checks Program

Biosecurity is everyone's responsibility

Background

The Kangaroo Island Biosecurity Checks Program has conducted random biosecurity checks of travellers to the Island since 2015. Ferry Services to KI are recognised as a major pathway for biosecurity incursions and one of the major aims of the project is to minimise this risk for our agricultural industries.

Project Aims

- To intercept restricted items such as honey, used beekeeping equipment, unwashed potatoes and potatoes for planting.
- To seize fruit fly risk products. This occurred regularly, particularly with interstate travellers and over the summer months.
- To check compliance with livestock documentation requirements including National Vendor Declarations and Sheep Health Declarations. Pigs and Goats coming to the island are also inspected for their Landscape Board Permit.
- To inspect consignments of plants to ensure declared weeds are not present and remind gardeners of risks of weeds and plant disease being transported in soil.
- To inspect machinery including construction, earthmoving, agricultural and vegetation clearing machines to stress the importance of arriving clean on KI.
- To ensure recreational boats and equipment arriving are free of marine pests, and visitors are aware of the sanctuary zones and have been cleaned to meet the Abalone Viral Ganglioneuritis guidelines.
- To carry out biosecurity checks of cruise vessel passengers visiting Kangaroo Island.

What has been done

The 2024/2025 financial year checks have seen an increase in biosecurity officer presence at Cape Jervis as well as a number of checks on the larger cruise boat vessels.

- A total of 146,476 passengers and 52,558 vehicles were interacted with.
- 168 machines were assessed for cleanliness – we are seeing much cleaner machines, thank you KI!
- 169 livestock interactions occurred with over 28,300 animals.
- We saw a decrease in honey intercepted with 691 lots to a weight of 197.45 kilograms. 9 other bee products were also seized.
- 33 consignments of non-compliant potatoes were intercepted.
- Fruit fly risk fruit and vegetables remained steady with 280 seized.
- 770 plants were inspected to ensure they were in potting mix and not disease carrying soil.

Comparing this data to previous years, there is a general trend towards increased awareness on the biosecurity restrictions for Kangaroo Island. Scores for machine cleanliness also improved.

We appreciate everyone's cooperation in continuing to meet the biosecurity requirements for the Island, especially machine cleanliness.

In mid-2025, signage (see "BIN IT" sign opposite) was installed at Adelaide Airport highlighting biosecurity requirements for Kangaroo Island, and directing travellers to further information. The signage was installed at gate 50, the usual gate used for Kangaroo Island flights. Previously, there has been little signage at Adelaide Airport, leaving interception of prohibited materials up to the signage and biosecurity bins at Kingscote Airport.

Comparison checks at Kingscote Airport are to be completed to assess how effective signage is at Adelaide Airport.

Take Home Messages

- If you see anything coming to or on Kangaroo Island that you think shouldn't be here, call the Biosecurity Team Leader or the PIRSA office in Kingscote.
- The Kangaroo Island Biosecurity Checks Program is continuing for a further year.

Above: A screenshot of our dashboard showing total number of checks by our hard-working biosecurity team from July 2023 to May 2025. It shows that potatoes make up over 60% of products examined, with inspecting live plants the next most common interaction.

Funding/Sponsors

The Kangaroo Island Biosecurity Program is jointly funded by the South Australian and Commonwealth Governments.

Further Information

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Scan for more information about keeping our region safe from pests and disease.

Update: KI Feral Pig Eradication

Background

The 2019-20 summer fires devastated Kangaroo Island. A silver lining to emerge from this devastation was a once in a lifetime opportunity to eradicate feral pigs from the island while their numbers were low, and the vegetation was recovering.

It is estimated that feral pigs were costing Kangaroo Island $1 million annually. Feral pigs were severely impacting Kangaroo Island producers through the destruction of pastures and farm infrastructure, and preying on lambs. Feral pigs were also a biosecurity risk as they spread livestock and human diseases.

What's being done

The project team used the latest technology in control tools to achieve eradication, including:

- Remotely triggered traps
- HOGGONE® sodium nitrite-based poison baits
- Thermal ground shooting
- Thermally Assisted Aerial Culling (TAAC)
- Artificial Intelligent (AI) 4G camera network

The eradication project began in September 2020 and has achieved the following:

- 878 feral pigs culled to date
- currently there are no **confirmed** feral pigs on Kangaroo Island
- implementation of the largest Artificial Intelligent mobile camera network in Australia with over 300 cameras
- first in Australia to implement a thermally assisted aerial cull
- six thermally assisted aerial culling operations completed across Western Kangaroo Island
- the thermally assisted aerial culling operations have flew a total area of over 700,000 hectares, the equivalent of 1.6 times the entire area of Kangaroo Island.

With all known feral pigs destroyed, the project has now moved into to a proof-of-freedom stage from 1 July 2024 till 30 June 2026. Proof-of-freedom is the final stage of the eradication, where intensive monitoring is undertaken to ensure the eradication has been successful. To ensure proof-of-freedom, multiple different tools will be used, including:

- ground monitoring: on ground staff looking for signs of feral pigs – concentrating on waterways during summer
- 4G artificial intelligence camera network: a network of 300 cameras across the eradication area will continue to be monitored for feral pigs
- standard camera network: a network of about 200 cameras in areas where 4G is unavailable
- detection dogs working at intervals throughout the year to detect feral pigs through scent
- eDNA water sampling: 25 sites will be sampled each month to check for the presence of feral pig DNA
- community education and reporting: engaging with the community and visitors at key events.

The eradication project has a strong relationship with the Kangaroo Island community, ensuring any sightings are reported.

Above: The same dam during and after eradication, showing disturbance and damage beforehand and recovery after removal of pigs. The lack of disturbance is evidence of successful eradication.

Visit the PIRSA website to learn more.

Funding/Sponsors

The Kangaroo Island Feral Pig Eradication is being delivered by PIRSA in partnership with the KI Landscape Board and KI National Parks and Wildlife Service. It is jointly funded by the South Australian and Australian Governments under the National Disaster Recovery Funding Arrangements including Local Economic Recovery Funding until 30 June 2023.

The State Government and Commonwealth Government has committed further funds to continue monitoring and implement the Proof of Freedom program.

Further Information

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Working Together to Catch Feral Cats on the Dudley

Background

Last year, the Kangaroo Island Landscape Board (KILB) ran a landholder feral cat trapping blitz using Celium trap monitoring technology to support the Dudley Peninsula Feral Cat Eradication Program with the aim to minimise impacts of feral cats on primary producers and livestock. This built on the success of the 2023 program at Stokes Bay, with key lessons learnt allowing the program to expand and deliver its largest program to date.

Cage trapping is labour-intensive and time-consuming, and landholders often do not have the time to undertake intensive trapping for sustained periods. Using Celium technology helped landholders manage traps more efficiently, as they can monitor the status (open/closed) of their traps via an app.

In addition, the KILB, in response to advice from community members, set up a new 'Feline Hotline' for Dudley Peninsula residents to 'Call in a Cat'.

What was done

1. Support for Landholders

Supported by Agriculture Kangaroo Island and Livestock SA through funding from the Kangaroo Island Bushfire Recovery Innovation Projects, the KILB partnered with 35 landholders across the Dudley Peninsula to undertake a landholder-led trapping blitz.

The KILB fitted landholder traps with Celium trap monitoring technology, enabling them to check their traps in real time using the Rappt.IO app. Rappt.IO is a free app that makes it easy to visualise cage traps and their status, record capture data and see overall results.

Participating landholders were provided with traps, bait and support in the use of the associated technology. Regular updates were also sent through at the end of each week, keeping everyone up to date with the results of the project and to keep up the motivation.

2. Call in a cat - Feline Hotline

The KILB has set up a new 'Feline Hotline' for Dudley Peninsula residents to 'Call in a Cat' on 0459 952 830.

Rapid reporting of cat sightings gives the Kangaroo Island Feral Cat Eradication team the best chance of capture. The team can use a variety of tools and techniques based on the location and detailed information provided by the community, including coat pattern, sex, and if there was more than one cat.

This information, when paired with our camera detections, is crucial in determining the most effective methods to use and in targeting known cats with high accuracy.

The KILB are very grateful for the advice received from community members, and this information led to the removal of several feral cats.

Results

Landholders managed 115 cat traps on their properties, achieving a total of 3,100 trap nights, which helped the program remove **202** feral cats during the blitz, including 145 from the Dudley Peninsula and 57 from the Pelican Lagoon isthmus.

The extremely dry conditions and very late break to the season made the year very challenging, so the team are especially grateful to the participants for their efforts and contribution. Winter is an extremely busy time for primary producers but is also the best season to catch feral cats.

Use of technology means that primary producers can assist in such programs without having to commit a large amount of time and resources. In addition, a total of 18 cat sightings were reported from May to September 2024, enabling the KI Feral Cat Eradication Team to target specific cats using specialised tactics.

Take home messages

- Feral cats, as an apex predator, have been able to breed up large populations, which negatively impact both primary production and biodiversity on Kangaroo Island.
- Novel technology makes it easier for primary producers and community members to assist in trapping. This resulted in the majority of participants continuing their trapping efforts even past the end of the program date.
- Improved trapping technology and information received via the Feline Hotline resulted in greater participation from primary producers and community members across the Dudley Peninsula.

Above: KILB feral cat eradication team member Chantal Geissler with Glenn Willson, a Dudley East resident, who took part in the 2024 landholder-led trapping blitz and spotted and captured feral cats around Moffatt Road on the Dudley Peninsula.

Below: Community member Jacom discussing trapping with KILB feral cat eradication team member Josh Mulvaney.

Scan to learn more about the progress of the Dudley Peninsula Feral Cat Eradication Program.

Funding/Sponsors

Kangaroo Island Landscape Board

Agriculture Kangaroo Island, receiving funding from Livestock SA's KI Bushfire Recovery Innovation Grants.

Further Information

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Little Corella Control Trial

Background

Little Corellas have been an issue on Kangaroo Island and across South Australia for decades.

The Department of Primary Industries and Regions SA has a proposal to develop a bait specifically designed to target pest birds, such as little corellas. However, due to the rigorous testing and approval process, this bait is at least five years from being broadly available.

In response to community concerns and ongoing discussions with the community and the Kangaroo Island Council, the Kangaroo Island Landscape Board began a Little Corella trial program in November 2024.

The trial was not designed to reduce population density pressure during the past season alone. The purpose of the pilot was to demonstrate that control is possible and provide supporting information to other key Kangaroo Island partners to inform and enable funding decisions targeted at the delivery of tangible control actions.

Landholders are permitted to use control tactics on their properties.

Little Corellas are an impact-causing native species and are listed as unprotected under Schedule 10 of the National Parks and Wildlife Act 1972 (NPW Act). That means that, unlike most native species, people are permitted to shoot Little Corellas without a permit issued under the NPW Act, but a permit is required to kill a Little Corella by means other than shooting.

Department for Environment and Water encourages people shooting Little Corellas to abide by the Code of Practice for the Humane Destruction of Birds by Shooting, available on their website: www.environment.sa.gov.au.

It is a legal requirement that all Little Corella management activities comply with the Animal Welfare Act 1985, and acting in accordance with the code will satisfy that requirement.

Landowners and shooters acting on behalf of the landowners must hold a valid and current firearms license, and police approval is required to discharge firearms in a built-up area.

Rural property owners must comply with requirements and regulations set by the Environmental Protection Authority (EPA) and the Country Fire Service (CFS) when using gas guns to deter these birds from their property.

What Was Done

To support the trial, the Board, in collaboration with the Kangaroo Island Council, embarked on a community campaign to educate landholders on how to control Little Corella flocks on their properties proactively and to encourage residents to report Little Corella roosting sites across the island.

The Islander and the ABC news published a series of media articles and radio broadcasts urging community members to report Little Corella roosting sites in support of the trial program.

Vital to the control trial's success was accurate community reporting focused on roosting sites, which meant the Little Corellas were present in the same location one hour after dark.

The community reported nearly 20 roosting sites to the Board and the Council, with the information passed on to the Board's Feral Animal Control Officer.

This officer, with extensive experience from previous feral goat, deer, and pig eradication programs, led the work.

Over the course of the trial, the Board's Feral Animal Control Officer focused on studying bird behaviour and refining his techniques. He used thermal optics, red light hunting torches, and suppressed firearms to gain a deeper understanding of how the birds would react to control tactics.

Challenges faced by the Feral Animal Control Officer included undertaking the trial program in an urban area, requiring sophisticated risk mitigation strategies that considered housing, curious residents, and barking dogs.

Results

The purpose of the Kangaroo Island Landscape Board's trial control program was to assess the impact of targeted management actions and demonstrate that control can be undertaken effectively. The trial was not intended to significantly reduce population densities.

Little Corellas are extremely intelligent birds, and during the breeding season, they spread in flocks of thousands across the island.

Approximately 1,500 Little Corellas were removed from the landscape around Kingscote because of the trial control program.

Board staff involved in the Kangaroo Island Glossy black cockatoo and Woodland Bird project are assessing the effectiveness of targeting roosting sites and will prepare a report on the findings.

Take Home Messages

- A Little Corella control trial has been instigated in response to community concern.
- The trial was not designed to significantly reduce populations, but to explore control methods and demonstrate that control is possible.
- While PIRSA has proposed the development of an appropriate bait, this will take some years to develop.
- In partnership with KI Council and the community, KILB identified around 20 roosting sites.
- Landholders are permitted to shoot Little Corellas without a permit, but all such control activities must comply with the Animal Welfare Act 1985 and a valid and current firearms license must be held. Police approval is required to discharge firearms in a built-up area.
- Gas guns can be used to deter Little Corellas but compliance with EPA and CFS requirements must be ensured.

Scan the QR code for information about management options for property owners available on the Department for Environment and Water's website.

Funding/Sponsors

The Kangaroo Island Landscape Board funded this program with support from the Kangaroo Island Council.

Further Information

Contact the Kangaroo Island Landscape Board.

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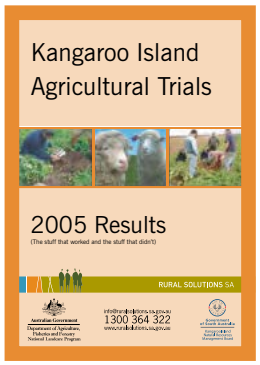
In the absence of the champion proof-reader, Faye Stephenson, there may be the odd mistake in this booklet. However, we have left them in delibrately to see if you can match Faye's calibre in spotting them. The first person to find the error can see Lyn to claim a chocolate prize.
Still missing you, Faye.



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