Australian Government
Department of Agriculture, Fisheries and Forestry

Future Drought Fund

CHRRUP
Advancing rural communities

CASE STUDY
PREPARING FOR DROUGHT

ADELONG

KATE AND GEOFFREY URQUHART

JUNE 30, 2024

Contents

ADELONG SUMMARY OF RESULTS 1
BACKGROUND 3
TRANSITION TO DROUGHT PREPAREDNESS 4
REGENERATION IN ACTION 4
PROBLEMS & SUCCESSFUL SOLUTIONS ON ADELONG 6
DIFFERENT METHODS OF LANDSCAPE HYDRATION 7
Stick rake, rip and seeding. 7
Combining a whoa boy and a stick weir to repair eroded – old road 8
A NOVEL SOLUTION. Use of old tyres to reduce velocity in high water flow area 8
Whoa Boys for roads and fence lines 9
CATTLE ROTATION and WATER INFRASCTURCTURE 9
BASELINE SAMPLING FOR SOIL HEALTH 11
SAMPLE SITE DESCRIPTION 11
Understanding soils and results 15
Total Organic Carbon (TOC) 15
Importance of Soil Nitrogen and Phosphorus 15
Results of soil Nitrogen at Adelong. 16
esults of soil Phosphorus at Adelong 17
Results of soil Microbiology analysis at Adelong 19
Pasture nutrition, rotation grazing, supplements 19
BIODIVERSITY 21
Adelong Station 21
Bioregional Background 21
Large, connected areas of intermittent wetlands and frontage to Reedy Creek 21
CONCLUSIONS 21

ADELONG SUMMARY OF RESULTS

Activity	Situation 2019	Situation 2024
Number of stock water points	11	28
Number of paddocks	1	14
Number of cattle sustainably supported (head)	1400	2000

Geoffrey and Kate Urquhart purchased Adelong in 2019. Before this, they owned a property on the Central Queensland coast and were not as familiar with managing the different conditions of the Desert Uplands. This property demonstration offers an excellent opportunity to follow the development plans for Adelong as new owners in a new environment who use all available technology and information. The priority has been to obtain information and experience from neighbours, highlighting the value of this project's investment in management practice demonstrations.

When purchased, the property was managed as an extensive beef enterprise over one very large paddock. Insufficient infrastructure restricted the ability to increase production or allow recovery of the degraded landscape. Despite abundant sub-artesian water, the lack of a water distribution system limited cattle access, and the lack of fencing prevented herd splitting and paddock resting for good husbandry.

The Urquhart's are keen to learn from others and adopt new ideas. In just four years, they have significantly improved their property by increasing stock water points from 11 to 28 and paddocks from 1 to 14. They plan to continue splitting paddocks and increasing their number. In this project, they have trailed various measures to control water velocity along erosion gullies, fences, roadways, and across paddocks. They have also trailed a range of legumes to identify the best species for the different land types on their property.

Burning strategy differs between landholders. The Urquhart's are reluctant to burn because the ground cover is removed, and they are trying to build soil carbon to reduce moisture loss. However, they have to balance between the possibility uncontrolled hot fires due to lightning strike or fires spreading across the region.

It is difficult for plants to germinate and survive in bare ground during summer in this region. The combination of moisture loss, thermal stress, and disrupted soil biology due to the high temperatures on the bare dirt creates a hostile environment for new plants.

Adelong soil surface temperature was measured at 33°C in the shade and 61°C on bare dirt in the sun.

There has been no formal scientific trial to determine legumes suitable for the desert uplands. The informal trial conducted by the project at Adelong planted mixtures of 3 grasses, 5 legumes, radish, and turnip across three different soil types: claypan – degraded C horizon alluvial soil, sandy loam, and sandy clay. In all cases, Buffel grass, Secca stylo, Caatinga stylo, and Astec atro have established and persisted under heavy grazing pressure by cattle and kangaroos. Desmanthus and Progardes® along with Astec atro, also established in the sandy clay soils.

Adelong demonstrates how strategic investment in infrastructure and changes to management practice can quickly transform degraded land into a more productive and sustainable enterprise, enhancing drought resilience and overall environmental sustainability.

BACKGROUND

Adelong is a 22,000ha cattle property located in the desert uplands bioregion, North of Aramac. The owners purchased the property in 2019 carrying approximately 1400 head. At time of purchase, the property had 11 water points. There are now 28 water points with this number planned for increase so cattle will only have a short walk to water.

The planned improvements in management and infrastructure aim to increase the carrying capacity to 2500 LSU of mixed age cattle and improving drought resilience. Efficient infrastructure is crucial for managing drought conditions effectively and controlling erosion.

The following improvements have been made or are currently underway:

a. Grass Seeding and Natural Regeneration:

Allowing grass to seed naturally promotes the growth of drought-tolerant species, which improve soil stability and provide a resilient forage base. The plan is to prioritise the introduction of legumes to take advantage of the additional nutrition for cattle and soil improvement benefits.

b. Water Point Placement:

Water points have been strategically placed to minimise distance to water, minimise animal movement, especially in the heat, and congregation, particularly in areas susceptible to erosion.

c. Soil Erosion Control and Soil Hydration Measures:

Erosion control and soil hydration measures have been combined to help prevent soil loss and restore natural function to the landscape.

d. Transition to Rotational Grazing:

The adoption of rotational grazing practices promotes soil health, regrowth of vegetation, and erosion control.

Through landscape hydration, infrastructure development and the implementation of rotational grazing along with the increase of paddock number, pasture improvement initiatives, and water management strategies, Kate and Geoffrey Urquhart are actively enhancing drought resilience, promoting pasture health, and controlling erosion at Adelong cattle property.

BASIC INFORMATION ABOUT ADELONG

Property name	Adelong and Coorabah
Average rainfall (mean rainfall)	450mm
Livestock business	Cattle Breeding

TRANSITION TO DROUGHT PREPAREDNESS

Why did you take part in the project?	Need to improve eroded or low ground cover areas.
What is needed to consider the project a success?	Improved land condition and the ability to make better use of rainfall.
Do you plan to continue to expand the project activities into the future?	Yes. Stick weirs have proved effective so will continue building them; will continue ripping and planting seed - mainly legumes
What additional activities are planned in future eg. Wire and water, riparian protection,	Increased water and paddocks; addressing riparian areas by managing as a single paddock. Cattle are removed in the wet but the area provides shade and protection during extreme weather events.
How long will it take to improve the drought preparedness of all your property?	This is dependent on so many factors, rainfall, cattle prices, labour availability. It could take many years.

REGENERATION IN ACTION

What are the main degraded areas on the property	Land adjoining creeks systems, creeks and land surrounding the jump ups.
What are your main pests/weeds and how do you control them	Rubber vine and Parkinsonia – Spray and burn Feral dogs and pigs – trap and shoot
What practices do you use for land management	Cattle rotation and monitoring fodder.
Do you have a farm plan and/or grazing charts	We have an infrastructure map with planned improvements and a stock flow document that keeps track of stock numbers, rainfall
Technology use	Currently only GIS program and the reports form the Long Paddock website. We are working towards adopting satellite pasture budgeting. We intend to trail Farm Bot to monitor water.
In what way have the changes you have made met your expectations?	In the areas of low ground cover where we have intervened with a number of techniques the landscape response has exceeded our expectations.

How has your bottom line been affected by your practices?	Too soon to tell. We've increased ground cover, increased rainfall uses and the landscape is currently responding with high pasture yield.

PROBLEMS & SUCCESSFUL SOLUTIONS ON ADELONG

Historic overgrazing on fragile soils has caused widespread sheet and gully erosion. The country is now recovering due to a management change to cattle rotation and landscape hydration and the introduction of legumes.

Above. Severe gully erosion - large channels developed from intense water runoff, causing severe soil loss and land degradation.

Above. Severe sheet erosion - occurs when topsoil is removed uniformly across a large area by shallow surface water flow due to heavy rainfall or wind.

To fix sheet and gully erosion, use vegetation cover, contour ripping/logs, and check dams to stabilize the soil, reduce runoff, and prevent further erosion.

Above. Recovering areas. Left. Plants establishing after ripping. Right. Bare areas recovering due to stick weirs slowing water flow.

Adelong uses a wide range of soil management strategies to restore degraded gullies and bare land. These methods stabilize soil, reduce erosion, and enhance land productivity.

DIFFERENT METHODS OF LANDSCAPE HYDRATION

Stick rake, rip and seeding.

Above left. Geoff Urquhart describing the design of stick contours that have been effective in slowing water velocity and erosion. Above right. Machine used for stick raking.

Above. Results of ripping deep, hard crust in bare areas. The result allows water infiltration, slows water velocity across the landscape and prepares a seed bed for introduced fodder species.

After one season it was estimated that there is already between 1 and 20 plants per m^2 of previously bare, hard capped areas, depending on the soil type.

Combining a whoa boy and a stick weir to repair eroded – old road

Above left. Shows water is confined to an erosion channel caused by an old road. Right. demonstrates the successful use of a "whoa boy" and stick weir in preventing further erosion. A "whoa boy" is a type of water diversion structure that redirects water off the path, reducing the speed and volume of runoff. A stick weir, on the other hand, is a barrier made of sticks that slows down water flow and traps sediment. Together, these methods have reduced both the width and length of the erosion feature, showing effective erosion control and landscape restoration.

A NOVEL SOLUTION. Use of old tyres to reduce velocity in high water flow area

Above. The use of old tires to control erosion was chosen due to the availability of a good supply on the property. This method was particularly effective in areas with very fast water flow rates, where traditional earthen or stick weirs would not have been able to withstand the velocity. The durability and robustness of the tires, securely held in place by

a combination of wire and soil filling, make them suitable for creating a strong barrier capable of managing high- speed water flow. This setup effectively prevents further erosion and stabilizes the area.

Whoa Boys for roads and fence lines

Above left. Original erosion on fence line. Right. The borrow pit of a whoa boy has filled with soil in only one rainfall event. The purpose of whoa boys along fence lines is to prevent erosion and maintain fence integrity. The design involves piling diagonal mounds of soil across the fence line, spaced based on slope and water flow. Whoa boys along road ways aim to divert surface water to prevent erosion and maintain road stability. The design is to build diagonal trenches or berms across the road, angled to direct water into ditches or vegetated areas. Benefits include prevents ruts and potholes, maintains safe driving conditions, and reduces maintenance costs.

CATTLE ROTATION and WATER INFRASCTURCTURE

The owners of Adelong, when possible, rotate cattle after the grass produces seeds with the aim to maximize pasture productivity and improve soil health. This system involves moving cattle to a new area according to the amount of feed available, weather conditions and the paddock condition eg. Avoid using creek paddocks after rain.

Above left. Area cleared for a fence. The clearing proved valuable to stopping a wildfire origination for a lightning strike. Right The creek paddock.

The creek paddock is managed for production, it also functions as a green corridor. Cattle are not allowed in the paddock when it's wet. It is used as shelter during extreme heat and cold, and grazing is avoided when wet. Cattle are only returned after seed drop to promote vegetation growth. This management benefits the environment by preserving the ecosystem

BASELINE SAMPLING FOR SOIL HEALTH

The project only runs for two years but has embarked on a soils health monitoring program to provide a baseline to inform future management. By monitoring soil health over time, land managers can assess the effectiveness of their management practices and make adjustments to optimize soil health and overall ecosystem function. Eleven samples were collected at a depth of 30cm to represent the different land types and allow the comparison of treated and untreated areas.

SAMPLE SITE DESCRIPTION

No	Site description	Soil	Notes
1	Highly compacted scalded area. Bottom of Jump-up.	Light Brown Silty-Clay. No A Horizon. No moisture in profile. 0% ground cover. Monitoring point for effect of ripping and seeding in scalded areas.	Plan to rip and seed. Have established tyre weir in gully and used dead trees for stick weir to slow water flow. Area will not benefit from water spreading.
2	Highly compacted scalded area.	Light Brown Silty-Clay. Small amount of A Horizon in places. No moisture in profile. 0% ground cover. Monitoring point for effect of ripping and seeding in scalded areas.	Iron Bark, some box. Most Ironbark is dead due to drought. Water moves from fence line to this area. Site is on the bottom side of a series of 6 whoa boys. Have used dead trees to build a timber weir and ripped and seeded the area.
3	Very Highly compacted scalded area. Below project water spreader banks.	Light Brown Silty-Clay. No A Horizon. No moisture in profile. Small ironstone particles on surface. Some pebbles in lower horizon. 0% ground cover. Monitoring effect of water spreading.	Edge of transition between false sandalwood into gydgea dominated forest. Area will be ripped and seeded. This area will receive overland flow due to project earth water spreader banks.
4	Highly compacted scalded area. Near project water spreading banks.	Light Brown Silty-Clay. No A Horizon. No moisture in profile. Small ironstone particles on surface. 0% ground cover. Monitoring point for effect of water spreading.	Gydgea and false sandalwood with some eucalyptus and bauhinia. Used dead trees to build timber weirs and ripped and seeded the area. This area will receive overland flow from water spreader banks.
5	Medium compaction. Near project water spreading bank.	Red Sandy Loam. Some moisture starting at 5cm. Has 1.5cm A Horizon sandy clay loam; then 5cm sandy clay. Remainder clayey sand. Patches of biological soil crust. 55% ground cover. Monitoring point for effect of water spreading.	Silver gydgea. Currently (May 23) prepared stick contours to slow big water flow. Filled drainage points with sticks; ripped and seeded the area

6	Shallow ponded area. Rip Line 80m from pond bank. Low compaction.	Light Brown Sandy Loamy Clay. Moisture below 30cm. 80% ground cover Monitoring point for effect of water ponding. Compare with sample 7.	Pulled gydgea and false sandalwood and border with eucalyptus. Shallow ponds were established Nov 29, 2021; ripped and seeded. Before establishing ponds area had 80% scald and 20% ground cover. Now scalding is limited to 20% with good grass cover to 80%.
7	Shallow ponded area. 1m from pond bank. Low compaction.	Light Brown Sandy Loamy Clay. Moisture below 5cm. 90% ground cover. Monitoring point for effect of water ponding. Compare with sample 6.	Gum tree and false sandalwood. Buffel grass dominant with some native grasses. Area holds water from 100ml fall for 1 – 2 days.
8	Naturally low laying area. Stick contour weir – not ripped or seeded. High Compaction.	Greg Brown Clay. No moisture. 90% ground cover – lot of water weed. Monitoring point for effect of slowed water flow – no other treatment.	Area was pulled. Regrowth is being used for stick weirs. Water flow velocity is slower than other sites. Area needs ripping but slow water flow = low priority.
9	High Compaction. Untreated area (control)	Red sandy clay. Small amount of moisture through water profile. 5% ground cover. Monitoring point for untreated - control. Compare with sample 10.	Cleared Gydgea and Bauhinia forest.
10	Medium compaction. Rip line.	Red sandy clay. 85% ground cover with buffel establishing. Currently (May 21) 60% buffel, 40% native grasses. Note water sedge populates rip lines. Monitoring point for water flow control, rip, seeded area. Compare with sample 9.	Area ripped and seeded in September 2021
11	Medium compaction. Untreated Spinafex country.	Grey Brown Sandy Clay. 98% spinifex. Sampled a bare patch. Some moisture.	Natural native pasture. Plan to slash and seed the area. Can not rip because spinifex get tangled in tynes.

Sample 1. Light Brown Silty-Clay.

Sample 2. Light Brown Silty-Clay.Sample

3. Light Brown Silty-Clay.

Sample 4. Light Brown Silty-Clay.

Sample 5. Red Sandy Loam

Sample 6. Light Brown Sandy Loamy Clay.

Sample 7. Light Brown Sandy Loamy Clay.

Sample 8. Greg Brown Clay.

Sample 9. Red sandy clay.

Sample 10. Red sandy clay.

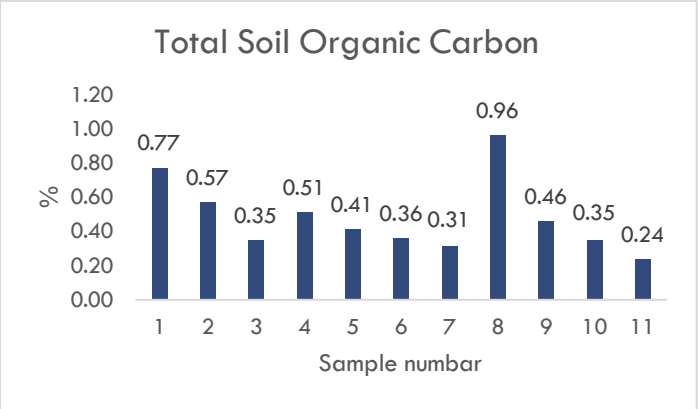
Sample 11. Grey Brown Sandy Clay.

Understanding soils and results

One of the major problems in continuous grazing systems is the depletion of Total Organic Carbon (TOC) in soils, that in turn runs down nutrient levels, particularly nitrogen (N). Soil is a complex mixture of minerals, organic matter, water, air, and living organisms, and its health is essential for the growth of healthy pastures. Understanding how much TOC is currently stored in the soils can be used as an indicator of soil health and will establish a basis for changed management practice.

Total Organic Carbon (TOC)

TOC levels in arid rangelands can range from less than 0.5% to 3%, depending on the specific conditions. However, it is important to note that these values can vary greatly depending on the region and local conditions.



The Total Organic Carbon (TOC) content at Adelong is relatively low, varying from a low of 0.24% in spinifex (sample 11) and a high of 0.96% in grey brown clay (sample 8).

TOC is a vital measure of the carbon present in soil organic matter, and it is an essential indicator of soil fertility and health. The observed differences in TOC content can have significant implications for the ecosystem and agricultural productivity in the region. Therefore, managing soil and ground cover is crucial to maintaining healthy TOC levels for optimal soil health and productivity.

Importance of Soil Nitrogen and Phosphorus

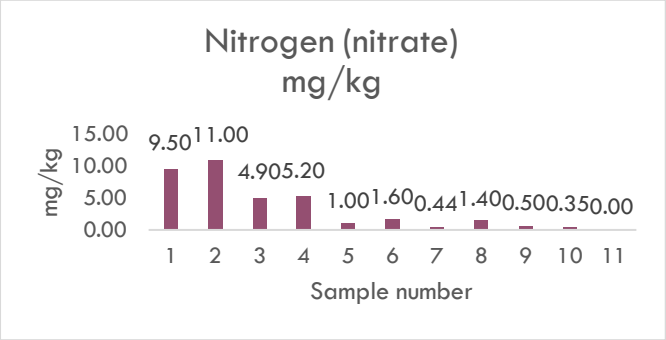
Nitrogen and phosphorus are essential nutrients for all living organisms. Phosphorus is bound to soil minerals, while nitrogen is converted by plants into protein. Plants use Nitrogen for leaf growth and good green colour, while Phosphorous helps form new roots, make seeds, fruit, and flowers.

Soil sample results – Nitrogen & Phosphorus

The results of soil N and P analysis on soils collected at Adelong are depicted in the graphs below.

Results of soil Nitrogen at Adelong.

The soil Nitrogen (N) content at Adelong varies from low (below measurable limit) in spinafex (sample 11) to a high of 11mg/kg in a scalded area of Light Brown Silty-Clay (sample 2).



In arid regions, the expected range of nitrate levels in rangelands using the Colwell method can range from very low to moderate concentrations. In rangelands, a typical range might be around 0-10 mg/kg of soil, but this can vary depending on specific conditions, such as the history of grazing intensity, and soil characteristics. However, it is important to note that the availability and mobility of nitrogen in rangelands can vary widely, depending on factors such as soil moisture, pH, temperature, and vegetation cover.

Improving soil nitrogen levels can be achieved through various management practices that focus on promoting nutrient cycling, enhancing soil organic matter, and supporting diverse plant communities. Some of these practices include:

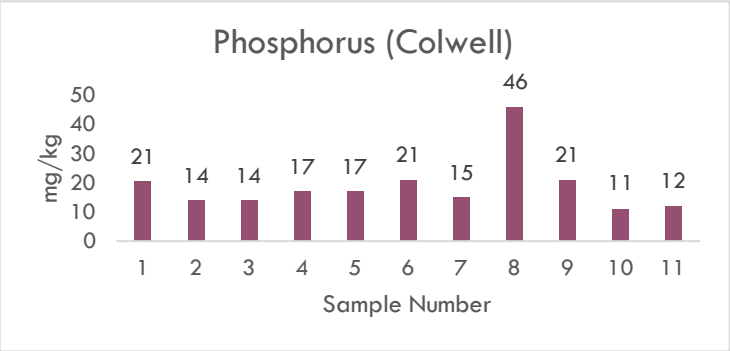
Legume incorporation: Adelong is concentrating on the incorporation of legumes into the grazing system. Introducing nitrogen-fixing legume species into the rangeland can help improve nitrogen levels, as these plants have a symbiotic relationship with nitrogen-fixing bacteria that convert atmospheric nitrogen into a form that plants can use.

Rotational grazing: Adelong is gradually increasing paddock number to allow more regular rotation and increased time of recovery for the paddocks. Implementing rotational grazing or rest periods allows for better nutrient cycling and promotes plant growth. Giving plants time to recover between grazing periods can lead to increased root biomass and nutrient uptake, improving nitrogen levels in the soil.

Soil conservation practices: Adelong has been successful in restoring degraded scalded areas using stick contours and water diversion banks. Preventing soil erosion and maintaining soil structure through practices like maintaining ground cover, minimizing tillage, and establishing windbreaks can help retain soil nitrogen and promote its cycling.

Diversifying plant species: Adelong is encouraging a diverse range of plant species in the rangeland to help improve soil health and nutrient cycling.

Results of soil Phosphorus at Adelong



The test results show high levels of phosphorus (P) in Adelong soils ranging from a high of 46mg/kg to a low of 11mg/kg.

The average Colwell-extractable P level in arid rangeland soils of Australia was found to be around 3.9 mg/kg, with a range of 0.5 to 12.2 mg/kg. It is important to note that the Colwell test measures only a fraction of the total P in the soil, and the results may not necessarily reflect the total P status of the soil.

Rangelands with high levels of phosphorus can have both positive and negative implications for their ecological health and management. Here are some points to consider:

Water quality concerns: Elevated Phosphorus runoff from rangelands can contribute to the eutrophication of lakes, rivers, and streams, promoting excessive algal growth and potentially harming aquatic organisms.

Livestock health implications: While phosphorus is a necessary nutrient for livestock, excessive phosphorus intake can cause health issues. Adelong managers carefully monitor livestock nutrition.

Soil fertility and nutrient cycling: However, excessive phosphorus levels can disrupt nutrient balances in the soil, potentially leading to imbalances in other essential elements. This may affect nutrient availability for plants and can have long-term consequences for ecosystem dynamics.

Management strategies: When dealing with rangelands with high phosphorus levels, implementing appropriate management strategies is important. Adelong is addressing this by adjusting grazing practices, implementing soil conservation measures, and promoting vegetation diversity.

Importance of Soil Microbiology

It is important to consider the soil biology since the health of the soil is directly correlated with profit and resilience of any agricultural enterprise.
Role of microbes in the soil:

- Mycorrhizal Colonization: Over 90% of all plants form symbiotic relationships with mycorrhizal fungi. Mycorrhizae increase the nutrient and water uptake capacity of the plant and protect it against pathogens.
- Total Bacteria: the optimal bacterial biomass in the soil varies according to crop, climate and season.
- Total Fungi: the optimal range also varies according to crop, climate and season.
- Active Bacteria: are counted i.e. those currently metabolizing organic compounds and directly nourishing the plants.
- Active Fungi: are counted: only those fungi currently growing, and metabolizing are directly nourishing the plants.

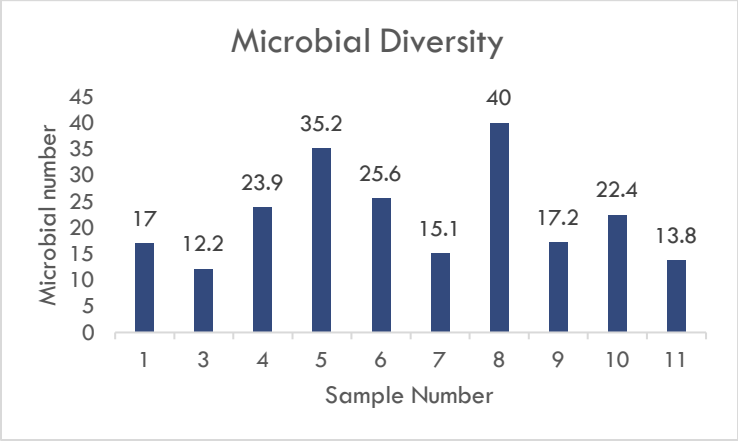
- Protozoa are essential to promote healthy plant growth by feeding on bacteria and excreting nitrogen in the plant-available form of ammonium. One morphological group, the Ciliates are an important indicator of the aerobic conditions of the soil. They feed on anaerobic bacteria, so a high ciliate population may indicate anaerobic conditions.
- Nematodes: some prey on other nematodes, and most graze on bacteria and fungi. Both the predators and acterial & fungal feeders cycle nitrogen into a plant available form.

The long-term goal for Adelong will be to maintain at least 30% of the pasture composition as legume species, and 70% grasses.

Results of soil Microbiology analysis at Adelong

Sample	Total Microbiology Result	Total Microbiology guide	Total bacteria Result	Total bacteria guide	Total fungi Result	Total fungi guide	Diversity result	Diversity guide
1	1.7	50	0.9	15	0.8	33.8	17	80
3	1.2	50	0.7	15	0.5	33.8	12.2	80
4	2.1	50	1.2	15	0.9	33.8	23.9	80
5	3.4	50	1.7	15	1.7	33.8	35.2	80
6	2.8	50	1.0	15	1.8	33.8	25.6	80
7	1.9	50	0.9	15	1.0	33.8	15.1	80
8	6.2	50	3.2	15	3.0	33.8	40	80
9	1.8	50	1.0	15	0.8	33.8	17.2	80
10	2.7	50	1.2	15	1.5	33.8	22.4	80
11	1.4	50	0.7	15	0.7	33.8	13.8	80

The level of microbial activity is low on all sites.



Microbial activity is generally low across most sites, except for samples 5 and 8. Sample 5 is located in the project area where stick contours are being built to mitigate fast water flow, while Sample 8 represents an area where pulled regrowth is being utilized for stick weirs. Both samples show moderate diversity, although the bacteria to fungal ratio is relatively low. These findings are expected to improve with increased soil carbon content, indicating the potential for enhanced microbial activity in the future.

Pasture nutrition, rotation grazing, supplements

When selecting improved pasture species, the owners of Adelong consider the annual cycle of feed demand and supply as well as ensuring there is an appropriate mix of grasses and legumes.

ADELONG

When maintaining a productive pasture, it is necessary to consider the needs of the animal and the plant at the same time. Plants that have been grazed require a period of recovery before being grazed again.

Adelong uses rotation grazing as a key management strategy for maintaining a productive and sustainable pasture system.

Adelong's cattle rotation management helps to ensure adequate nutrition for the cattle, improves soil quality and fertility, and reduce the risk of diseases and parasites:

- The more uniform grazing ensures that all areas of the pasture are utilized and not overgrazed. This helps to prevent underutilization of some areas of the pasture, which can lead to weed infestations and decreased productivity.
- Soil quality and fertility is improved by allowing for adequate rest periods for the plants. The resting period allows the plants to develop stronger root systems, which in turn improves soil structure and water infiltration. This improves soil moisture retention and nutrient availability, which can lead to improved forage growth and quality.
- The risk of diseases and parasites in the cattle is reduced. Moving the cattle to different areas of the pasture breaks the life cycle of parasites and helps to prevent the build-up of pathogens in the soil.

Cattle grazing in the desert uplands are generally limited by protein during the dry season and phosphorus (P) during the wet season. Research has indicated that providing phosphorus in the wet season when cattle are growing and putting on weight gives the most benefit. P supplements may not be required on Adelong due to the high soil P levels.

ADELONG uses nutrient supplements. High-protein and phosphorus supplements are provided as "free choice" lick block system. Four types are provided: 1. trace element, 2. urea, 3. phosphorus, 4. sulphur blocks to meet the needs of the cattle during the dry season.

The blocks are provided during the dry season to help meet the protein needs of the cattle. Cattle condition is monitored and consultation with a lick company nutritionist ensures optimal results.

BIODIVERSITY

Adelong Station

Size (ha)	21,331 ha
Local Government	Barcaldine Regional
Bioregion	Desert Uplands
Subregions	Alice Tableland, Prairie – Torrens Creek Alluvials
Catchment	Cooper Creek

Bioregional Background

Adelong Station is situated within the Alice Tableland and Prairie – Torrens Creek Alluvials Sub-bioregions of the Desert Uplands Bioregion. Wetlands and floodplains associated with Reedy Creek dominate much of the property. The Alice Tableland Sub-bioregion areas are dominated by sandstone ranges and deep red soils of intact Tertiary sand sheets and sandy alluvial fans derived from them. Alluvial clay soils are common along the major watercourses. The southwestern sections of the property are within the Prairie – Torrens Creek Alluvials Sub-bioregion and are dominated by open woodlands on alluvial clays and sand plains with areas of stony downs and calcrete outcrops.

Large, connected areas of intermittent wetlands and frontage to Reedy Creek

The property contains large, connected areas of intermittent wetlands and frontage to Reedy Creek that can have high habitat values for nesting and seasonal nectar supplies. As for other riparian zones, this ecosystem has important values for stabilising stream banks and topsoils, providing corridors for wildlife including migratory waterbirds, and for trapping soil and maintaining water quality.

The northeastern portion of the property includes sandstone scarps and caves of the Alice Tableland Sub bioregion. The escarpments and cave habitats support species that are associated with bare stony ground, the mesic gorges or the caves and crevices in the sandstone rock. These provide significant roosting habitat for many bats species including significant species as well as roosts for owls in environments that may not otherwise have tall hollow-bearing trees.

CONCLUSIONS

Adelong has provided a demonstration of success in addressing erosion and improving production through cattle rotation grazing and carefully prioritised and planned rehydration works.

The recovery of the landscape through cattle rotation is an effective long-term investment while landscape hydration has yielded significant results immediately after significant rainfall events.

The restoration of landscape function has been achieved in just one season with the help of at least two significant rainfall events. Deep erosion gullies have filled with soil due to the use of earthen and log blocks, erosion along fence lines and roadways has been reversed, while large areas of scaled country have recovered due to the

installation of log barriers ploughing capped soils carefully placed on the contour.

Pasture is being "irrigated" by combining earthen barriers to slow water in erosion gullies with water spreader banks. Various legumes and grasses have successfully established in previously bare areas.

ADELONG

Geoffrey and Kate Urquhart are working hard to improve the recently purchased property that previously used extensive continuous grazing in one large paddock with of the area pulled timber (mostly gydgea).

The owners share lessons learned, over 4 years on improving the ground cover and water infiltration on Adelong. This information will be of great value to new people entering the industry or moving from a different location.

Priority of actions

1. Talk to locals for management advice
2. Take time to observe and understand how the landscape functions - monitor the cattle and flow of water during rain to understand what is needed for optimal management (cold – shelter; hot shade; water logged areas – high and dry for cattle)
3. Prioritising gaining new knowledge and attending field days.
4. Develop a property map and property infrastructure plan.
5. Understand your financial situation – create a budget = that fits cash flow.

New management of increasing paddock number has allowed:

- Allows rest for fodder species
- Breeding management: Cattle classes can be split eg. keep bulls away from young females (heifers) to prevent death during calving
- Nutrition management according to requirement provides economic benefits eg. can tailor feed supplements requirements to age or pregnancy status.
- Ability to move cattle according to grass quality eg lower quality grass and supplement is provided to young heifer while good quality grass is reserved for first calf heifers or cattle being prepared for sale

- Animal husbandry is more efficient. It is easier to muster for branding, vaccinations.

Successful erosion work practices are:

- shallow water ponding;
- yeoman ripping on contour;
- stick banks,
- stick weirs;
- diversion and spreader banks;
- whoa boys for old and existing roads and fence lines