Australian Government
Department of Agriculture, Fisheries and Forestry

Future Drought Fund

CHRRUP
Advancing rural communities

CASE STUDY
PREPARING FOR DROUGHT

SPECULATION

BRUCE AND ANNETTE CURRIE

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SPECULATION

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BACKGROUND

In 2005, the Currie Family purchased Speculation, a 24,680-hectare cattle property located in the Desert Uplands Bioregion, 70 kilometres away from Jericho. The property is comprised mainly of native forest and native grasses, with some areas having established buffel grass. The owners have also planted legumes such as Wynn Cassia, Secca Stylo, and Desmanthes into the pasture, which can improve the soil quality by fixing nitrogen. In some areas, tree thickening has occurred, resulting in dense forests of Bendee, Board-leaf Ironbark, and Lancewood. While these forests can provide important habitat for wildlife, they also destroy ground cover, increase erosion, and reduce water infiltration. This, in turn, can adversely affect soil quality and reduce biodiversity.

Over the past 17 years, the property has received an average annual rainfall of 575mm, with most of the rainfall occurring in December, January, and February. Drought conditions started in 2013 and lasted for several years. However, in 2021, there was a significant increase in rainfall to 828mm, and the years 2022 and 2023 have been favourable for grazing management and provided the conditions for preparing for future droughts.

The Currie Family's business model involves breeding Brahman cross cattle. During droughts, the property is destocked, with cattle either sold or agisted. The specific criteria for keeping cattle includes being able to breed each year, and being quiet and manageable during mustering. All heifers are kept, and new breeding stock is purchased after rainfall.

Speculation is divided into 14 paddocks and is watered by 5 dams and 2 bores. The management strategy involves rotating 2 mobs of cattle for an average of 3 weeks, with breeders kept separate from the rest. This approach has potential to improve soil health by promoting the even distribution of nutrients across the paddocks.

The Currie family believe that landscape hydration is crucial for sustainable agriculture in the Desert Uplands Bioregion. To achieve this, they have implemented

a strategy of constructing a series of water control banks or whoa boys to prevent erosion, especially along roadways and fencelines. These banks help to spread the water, allowing it to return to the natural flow lines across the paddocks. This approach not only helps to hydrate the land but also minimizes erosion, which can further contribute to landscape degradation.

THE KEY PROBLEMS

Erosion caused by fencelines and roadways:

Fencelines and roadways can contribute to erosion by altering the flow of water and increasing the amount of exposed soil. When a fence or road is built, it often cuts through the natural contour of the land, creating a slope that directs water runoff in a concentrated flow. This can cause erosion by increasing the velocity and volume of water that moves across the land, which can carry away soil and sediment.

To prevent erosion caused by fencelines and roadways, it is important to properly design and construct the water control infrastructure. The slope of the land should be taken into consideration, and measures such as installing drainage ditches, and erosion control banks can be implemented to manage water flow and reduce erosion.

Erosion caused by tree thickening:

Tree thickening occurs when the number of trees in an area increases beyond the natural carrying capacity of the soil. This can lead to a number of issues, including soil compaction, decreased water infiltration, and increased erosion. As more trees grow in an area, their roots can compete for resources, causing soil to become compacted and less able to absorb water. This can increase runoff, leading to erosion.

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PROPERTY DESCRIPTION

Property name	Speculation
Nearest town	Jericho
Bioregion	Desert Uplands
*Average rainfall (mean rainfall)	575mm average rainfall in last 17 years 553.5mm – 2020 – most falls Dec, Jan, Feb 828mm – 2021 –evenly distributed. 587 mm - 2022 – evenly distributed. Getting rain every month of the year is unexpected, it was a very good year as the regular falls maintained the energy levels in the pastures for the whole year. 760.5 mm – 2023 Despite the high yearly total it was very tough because as the big rain events were at the very start and end of the year this created a long dry season and an extended period of low pasture energy levels. We did lose some stock. This mainly happened when we received the big rain in November because the cattle were too wet and cold for too long before the energy levels increased in the pasture. 196.5 mm to May 2024
Livestock business (breeding/backgrounding and market destination)	Breeding – brahman cross. Criteria to keep cattle: must breed each year; must be able to catch them. Cattle are quiet and can muster on foot. During drought – destock – either sell or agistment.
Livestock number 2022	675 breeders; 137 steers, 38bulls.
What are the main degraded areas on the property	Roadway and fenceline erosion, particularly at the bottom of hills. Scalded areas where timber is too thick.
Provide a description of biodiversity on your property fungi.	Tree thickening problems in Bendee, Board-leaf Ironbark and Lancewood forests. Tree thickening destroys ground cover, increases erosion, reduces water infiltration, reduces biodiversity. No significant pest problem – weeds, kangaroo, dingo or feral animal.
What are your main pests/weeds and how do you control them	Stramonium datura, poison heartleaf; coffee senna
What practices do you use for land management	Spray with herbicide

MANAGEMENT

How long have you owned the property?	2005 (19YEARS)
Grazing management system	Rotate 3 weeks on average. 2 mobs. Separate breeders from rest. Each mob has 7 paddocks. Sell weaners – keep all heifers as replacement. Destock in drought. Sell breeding stock and buy new ones after rain.

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What shortcoming did this management practice have?	Selling when dry – it is difficult to predict drought. Stock water system needs to be upgraded
Stock water management	Currently have 5 dams and 2 bores. Water is trickled 15km from a tank near the house.
What shortcoming did this management practice have?	Selling when dry – it is difficult to predict drought.
Pasture species	Native grass species are dominant. Have planted Buffel grass, Wynn Cassia, Secca Stylo, Desmanthes into pasture
Time of calving	Calf drop is normally from the 1st of October until the end of January
Burning management	Use a property burning plan. Normally burning 20 to 25% of the property each year.
Adequacy of current infrastructure and plans for new or improvements	Plan to: Split 1 paddock – increase rotation. Install fire breaks Install erosion control - need 10 woa boys/km Improve water system

THE PROJECT

Reasons for taking part in the project	We believe landscape hydration is essential for sustainable agriculture. Woa- boys provide the ultimate drought resilience in this county – highly erodible soils in the desert uplands bioregion. Seed funding allows us to start on work planned for the future. Technical assistance. Interaction and visits with other landholders.
What are the "on-ground" objectives that you want to achieve as part of your project?	Establish woa boys. This will include surveying, fencing and seeding the area with Secca Stylo, Wynn Cassia and Desmanthes.
What were the essential requirements that you need - to consider the project a success?	Currently have 270 woa-boys (approx. 20m long). It is estimated (estimated from water in borrow pits) these capture 110megaL water. This system has changed the land condition from C-D classification to A in two wet seasons. In this project we want to build new woa- boys control erosion and return water flow to its natural state. Receive practical one on one technical advice; attend field workshops

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What are the financial implications of entering into this project?	The improvements are expected to increase production and sustainability. The application of woa-boys addresses all principles of sustainable agriculture operations. Increased ground cover, no soil erosion, increased moisture, biodiversity and soil carbon.
What additional activities do you plan to implement in future eg. Wire and water, riparian protection,	Eventually want to have 1000 woa boys across the property.
How long do you think it will take to improve the drought preparedness of all your property?	I plan to establish 50 who boys per year. This is my key drought resilience strategy.
Do you envisage any impediments along the way? ..... What are they? (risk analysis)	Rainfall – high risk Contractor lack – low risk Time span – short – medium risk

FUTURE PLANS

What are the main degraded areas on the property	Roadway and fenceline erosion, particularly at the bottom of hills. Scalded areas where timber is too thick.
Main pests/weeds and how do you control them	Stramonium datura, poison heartleaf; coffee senna
Land management	Spray with herbicide
Is technology used to assist in your management	Plan on using drone for water monitoring and management because we have no phone coverage and poor internet.
Have you made any improvement in water retention and management in the past? -	Woa boys, used for gully reclamation, slowing gully erosion. Have tried to dump soil across start of gully. This has not proved ideal
If you had your time again, what would you do differently?	Would like to have used evidence-based management decisions. Need to quantify actions using science eg simple things like how to best grow cattle on my country. Have destocked 5 times and put cattle on agistment due to drought. This has not been a problem.
Do you believe the project innovations will improve the value of your property? Do you have evidence for this?	Yes. More water, more cattle, more grass, reduce erosion etc. This is based on prior experience with improved land conditions due to woa-boys.

PROJECT ACTIVITIES

Speculation is one of five properties that have implemented one or more newness factors that enhance drought resilience including:

Soil Conservation and Management:
Implementing soil conservation practices like contour plowing/ripping, to reduce soil erosion, improve soil fertility, and enhance its water-holding capacity.

Erosion Control Structures:
Installing erosion control structures such as check dams, contour bunds, and gabions to slow down water runoff and trap sediment. These structures help prevent gully erosion and retain soil moisture.

Speculation has nominated to concentrate on building erosion control structure or woa-boys to halt erosion along fencelines and roadways. This decision was based on the success of previous work that has slowed erosion and led to improved pasture.

Left. Whoa boy diverts water flow off roadways and distributes across the landscape. Right.

Area of previously bare land has recovered after two wet seasons.

Training day on building woa-boys:

The owners of Speculation hosted a field training day. Mr Darryl Hill delivered a workshop and assisted in the development of the system of whoa-boys for Speculation; Topics covered included:

- Cost affective, safe and low maintenance erosion solutions.
- Practical approaches to preventing erosion on property infrastructure- roads, tracks, firebreaks and fence lines.
- Using surveying equipment for erosion management planning.
- Examples of woah boys

Several landholders attended the practical workshop and have adopted the methods described. The Currie family used the Darryl Hill method as the basis for their water management design.

Newly completed woa-boys:

Woa boys on Speculation - completed in March 2024.

Soil analysis

The project only runs for two years but has embarked on a soils baseline program to provide a to inform future management.

Soil samples were collected from seven distinct land types to investigate erosion and soil management practices. Specifically, samples were taken from a depth of 30cm to ensure that a representative profile of the soil was obtained.

Sample sites

Sample 1. 5mth old water control banks. Red brown sand. 60% ground cover. Between 2 water control banks - 100m from fence, just outside area where soil has been deposited following rainfall.

Sample 2. 6 Year old water control banks. Red clay loam. 95% ground cover. The area surrounding the bank has recovered due to increased water infiltration.

Sample 3. Proposed water control bank. Red loam sand. 30% ground cover. Sampled between 2 planned banks. 30m from fence near, but out of the influence of an old eroded road.

Sample 4 & 6 Bare areas between trees in natural forest with native grasses. Sample 5 & 7 grassed areas under trees.

4. Red brown loam sand. 1% ground cover
5. Brown red loam sand. 80% ground cover. Heavy grass - kangaroo, desert mitchell. Near ironbark tree. 14m from bare ground (sample 4)
6. Red brown loan sand. 1% ground cover
7. Brown red loam sand. 80% ground cover. Heavy grass. Kangaroo grass, desert mitchell, spinafex. Under ironbark tree, 9m from bare ground (sample 6).

Total Organic Carbon (TOC)

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.

Samples 1, 2, and 3 were collected to assess the effectiveness of water control measures over time. These samples were taken at different intervals to monitor changes in the soil composition resulting from water management practices.

Samples 4 to 7 were taken to compare the differences in soil characteristics between tree-covered areas and natural ecosystems. This was done to understand how trees affect soil properties such as nutrient content, pH, and erosion rates.

Overall, the study aimed to provide insights into effective soil management practices for different land types and to understand the role of trees in shaping soil properties

Laboratory LECO analysis was used to determine the % Total Organic Carbon (%TOC), the accepted measure of the organic carbon contained within the soil.

RESULTS - 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 Speculation is generally in line with expectations for arid rangeland areas, with some notable exceptions. Samples 4 and 6, collected from bare areas, exhibited lower levels of TOC, measuring 0.31% and 0.44% respectively.

Notably, the results also highlight the positive impact of water control infrastructure on soil carbon content. Sample 1, taken from the area surrounding a water control bank that was only 5 months old, demonstrated an impressive increase in TOC to 1.06%. Similarly, sample 2, taken from a 6-year-old water control bank, exhibited a TOC content of 0.94%, while sample 3, taken from the area of a planned water control bank, showed a TOC content of 0.56%.

There is a notable variation in TOC levels between trees and bare areas. The TOC levels under trees were found to be 0.55% and 0.60%, while the bare areas had lower TOC levels measuring 0.44% and 0.31%.

Possible reasons for these differences could be due to the presence of leaf litter and other organic matter accumulation under trees, which promotes the growth of microorganisms and increases the decomposition of organic matter. Trees also contribute to the physical and chemical properties of the soil by improving soil structure and nutrient availability, which can enhance soil health and promote the accumulation of organic matter.

In contrast, bare areas are more exposed to environmental factors such as wind and water erosion, which can result in a loss of topsoil and organic matter. The lack of vegetation cover and organic matter accumulation can further limit the growth and decomposition of organic matter in these areas, resulting in lower TOC levels.

Overall, these results suggest that vegetation cover and soil management practices play a critical role in maintaining healthy TOC levels in arid rangelands. Proper soil and ground cover management can promote the growth and decomposition of organic matter, improve soil structure and nutrient availability, and reduce erosion, all of which contribute to increasing TOC levels in arid rangelands.

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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.

Achieving balanced biology in the soil enhances the following key functions:

- Nutrient availability - optimal forms in the right place at the right time
- Root health, root depth, water retention, aerobic conditions in soil and improved soil structure - less water needed.
- Decomposition of toxins - removes harmful residues

- Nutrient immobilization – reduces leaching.

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. The laboratory determines what percentage of roots are colonized and look for signs of disease and other damage.

- 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 bacterial & fungal feeders cycle nitrogen into a plant available form.

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.

Legumes can form a symbiotic relationship with nitrogen-fixing soil bacteria called rhizobia. The result of this symbiosis is to form nodules on the plant root where the rhizobia convert atmospheric nitrogen into ammonia that can be used by the plant. Potassium is an essential nutrient for legumes. It is an activator for many enzymes, especially those involved in the synthesis of protein. Potassium also maintains water balance in the plant. In legumes, potassium is necessary for the proper development and functioning of root nodules.

Nitrogen is an important component of protein, which is essential for the growth and maintenance of cattle. Without enough protein in their diets, cattle may suffer from slow growth, low milk production, and reduced immune function. While nitrogen can be obtained from non-protein sources like urea, it is most to cattle with protein-rich feeds like legumes and grasses.

Phosphorus is also an essential nutrient for cattle, as it is involved in many biological processes including bone formation, energy metabolism, and cellular signalling. Phosphorus deficiency in cattle can cause a range of health problems, including poor growth, reduced milk production, and reproductive issues. Cattle with the highest phosphorus requirements are usually growing stock, late-pregnant heifers and cows, and lactating cows.

RESULTS - Nitrogen

According to some studies, the total soil nitrogen content in arid rangelands can range from 0.01 to 0.5% by weight, with the highest levels typically found in areas with more favorable soil conditions and vegetation cover. 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.

The soil nitrogen (N) content at Speculation is generally low, ranging from 0.03% to 0.06%. However, there are notable variations across different areas. The areas with good stands of natural grass, Sample 5 and Sample 7, have the highest soil nitrogen levels of 0.6% and 0.5%, respectively. This could be due to the fact that natural grasses have deeper roots and greater biomass, which can facilitate the accumulation of nitrogen in the soil.

On the other hand, the soil nitrogen levels in the areas surrounding the 6-year-old, 5-month-old, and proposed water control bank are similar to those in the bare ground of the natural forested area (0.4%). This could be attributed to the disturbance caused by the construction of the water control bank, which may have led to the loss of organic matter and nitrogen from the soil. Additionally, the bare ground in the natural forested area may have experienced less disturbance and therefore retained more nitrogen than the disturbed areas.

Overall, the differences in soil nitrogen content across the different areas of Speculation can be attributed to a combination of factors, including vegetation type, root depth and biomass, and land use history.

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: Introducing nitrogen-fixing legume species (e.g., clovers, alfalfa, or native legumes) 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 plants can use.

- Rotational grazing: 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: Preventing soil erosion and maintaining soil structure through practices like maintaining ground cover, and establishing windbreaks can help retain soil nitrogen and promote its cycling.

- Diversifying plant species: Encouraging a diverse range of plant species in the rangeland can help improve soil health and nutrient cycling. Different plants can contribute to soil nitrogen in various ways, and a diverse plant community is more resilient to disturbances like drought or pests.

RESULTS - Phosphorus

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. However, the test can provide a useful indicator of the potential availability of P for plant growth in rangeland soils.

The test results show Speculation soils ranging from a high of 3.80mg/ to a low of 1.74mg/kg are consistent with the average for arid rangeland soils in Australia.

The reasons for low P levels include:

- P is often tightly bound to mineral particles or organic matter, making it less available for uptake by plants.

- low and unpredictable rainfall can limit the weathering of rock and mineral particles, which is an important source of phosphorus for many ecosystems.

- the removal of vegetation through grazing can further reduce the amount of phosphorus in the ecosystem, as plants are the primary source of phosphorus in many ecosystems.

Management practices that promote the conservation and accumulation of organic matter and the reduction of soil erosion can help to improve phosphorus availability and promote the health and productivity of pastures.

Biodiversity Assessment

Assessment Methodology and disclaimer: These assessments are solely based on available bioregional information without ground truthing at this time. These summaries are for general information and to inform the locations of future ground survey.

General Landscape descriptions for Speculation

Desert Uplands Bioregion - Alice Tableland Sub-bioregion is 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.

Desert Uplands Bioregion - Jericho Sub-bioregion is dominated by alluvial plains with clay and alluvial soils. The climate and vegetation show similarities with the adjoining Brigalow Belt Bioregion.

Speculation Station

Local Government	Barcaldine Regional
Bioregion	Desert Uplands
Subregions	Jericho, Alice Tableland
Catchment	Burdekin, Cooper Creek

Speculation Station is situated in the Desert Uplands Bioregion. Most of the property is within the Alice Tableland Sub-Bioregion dominated by open woodlands and plains, with areas of spinifex and tussock grasses, of high refugial value and often contain a high level of species richness for reptiles and terrestrial birds and animals.

Species of note include, these areas, where they are largely intact, support priority species including, Capricorn Ctenotus, (*Ctenotus capricorni*); Black-necked stork, (*Ephippiorhynchus asiaticus*); Squatter pigeon, (*Geophaps scripta scripta*); Pictorella mannikin, (*Heteromunia pectoralis*); Lewin's rail, (*Lewinia pectoralis*); Square-tailed kite, (*Lophoictinia isura*).
Black-chinned honeyeater, (*Melithreptus gularis*); Black-throated finch, (*Poephila cincta cincta*); Australian painted snipe, (*Rostratula australis*); Rufous bettong, (*Aepyprymnus rufescens*); Brown tree-creeper, (*Climacteris picumnus*); Wood gecko, (*Diplodactylus vittatus*); Spectacled hare-wallaby, (*Lagorchestes conspicillatus*); White-eared honeyeater, (*Lichenostomus leucotis*); Red-capped robin, (*Petroica goodenovii*); Brown tree-creeper, (*Climacteris picumnus*); Desert mouse, (*Pseudomys deser*tor).

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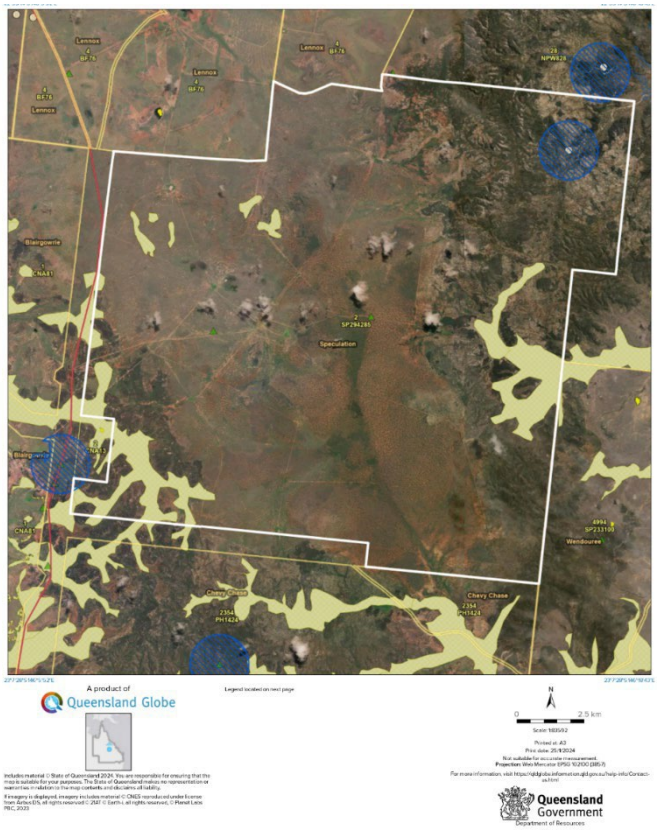
The sandstone ranges of the Jericho Sub-bioregion form the eastern and southwestern parts of the property, dominated by ranges, escarpments and caves with skeletal soils supporting Eucalypt, Bloodwood (*Corymbia spp*), Acacia woodlands with a Spinifex (*Triodia spp*), tussock grass and scrubby understory. This habitat supports many species specialised to bare stony ground, mesic gorges or the cave habitats and crevices in the sandstone rock.
The special biodiversity value of these areas is very high for the conservation of the faunal diversity of the bioregion.



Species include Black-throated finch, (*Poephila cincta cincta*); Black-chinned honeyeater, (*Melithreptus gularis*); Square-tailed kite, (*Lophoictinia isura*); Common death adder, (*Acanthophis antarcticus*); Grey goshawk, (*Accipiter novaehollandiae*); Grey falcon, (*Falco hypoleucos*); Rufous bettong, (*Aepyprymnus rufescens*); Bush stone-curlew, (*Burhinus grallarius*); Brown treecreeper, (*Climacteris picumnus*); Red earth skink, (*Ctenotus rosarium*); Wood gecko, (*Diplodactylus vittatus*); White-eared honeyeater, (*Lichenostomus leucotis*); Hooded robin, (*Melanodryas cucullata*); Greater glider, (*Petauroides volans*); Red- capped robin, (*Petroica goodenovii*); Grey-crowned babbler, (*Pomatostomus temporalis*); Painted button quail, (*Turnix varius*); Common rock-rat, (*Zygomys argurus*).

Speculation Station adjoins the Cudmore National Park to its northeast and a number of significant species have been recorded on or near the property including threatened species; *Cerbera dumicola,* Central greater glider, (*Petauroides armillatus); Koala, (Phascolarctos cinereus);* and priority species Greater glider, (*Petauroides volans); R*ufous bettong, (*Aepyprymnus rufescens); W*hite-eared honeyeater, (*Nesoptilotis leucotis).*

Conclusions

The Speculation demonstration successfully highlighted the importance of fence-line and road erosion in fragile soils.

Mitigating Fence Line Erosion: Erosion along fence lines can weaken fence structures and lead to their eventual collapse. By actively participating in fence line erosion control measures, the whoa boys help stabilize the soil around fences, preserving their integrity and functionality.

Managing Road Erosion: Road erosion can lead to unsafe travel conditions, increased maintenance costs, and environmental degradation. By addressing road erosion, the whoa boys help maintain safe and stable transportation routes, ensuring efficient access for farm operations and minimizing environmental impact.

Effective Water Management: The water spreading outcomes ensure that water is distributed evenly across the land. This helps maximize the usage of available water resources, promote better plant growth, and prevent waterlogging or drought conditions in specific areas. The whoa boys' efforts in water spreading contribute to the overall health of the ecosystem.

Sustainable Land Use: The combination of controlling fence line erosion, managing road erosion, and effective water spreading supports sustainable land use practices. It helps maintain ecological balance, promote biodiversity, and ensure the long-term productivity of the land.

Educational and Practical Experience: Training field days and videos have provided valuable hands-on experience and education in land management techniques. This knowledge is essential for fostering future generations of responsible land stewards.

The installation of whoa boys not only support the immediate operational needs of the property but also contributes to the long-term sustainability and health of the environment. The boundary adjacency of Speculation with Cudmore National Park may offer potential for future nature-based economic opportunities. This proximity enhances biodiversity management through effective land stewardship, supporting wildlife corridors and habitat preservation. Such practices not only safeguard ecological integrity but also lay the groundwork for possible new revenue streams in eco-tourism and sustainable agriculture.