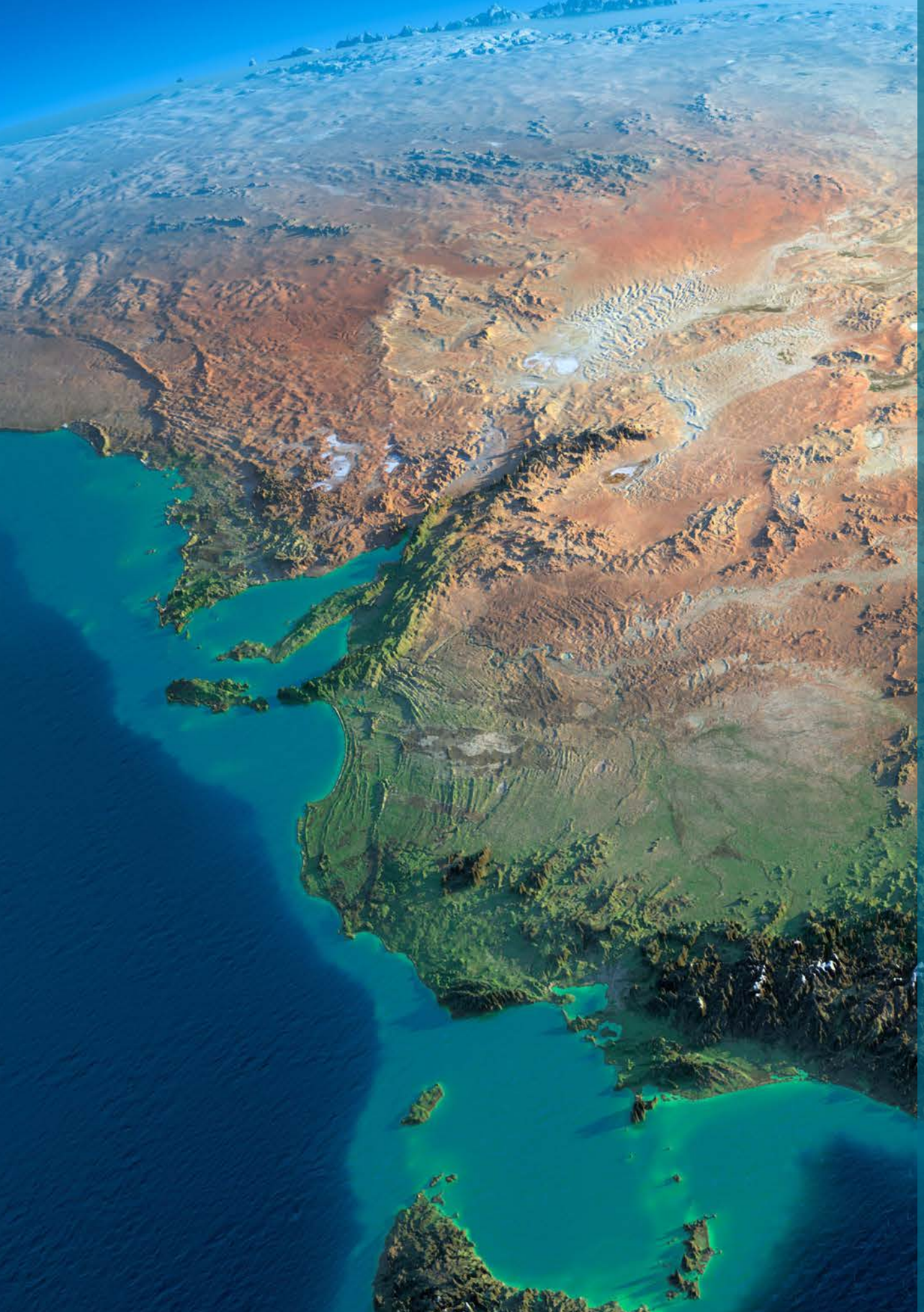


TALS INSTITUTE

THE AUSTRALIAN LANDSCAPE SCIENCE

Australia's Blueprint for Thriving Landscapes

Introducing the Whole of Landscape approach to land use and management

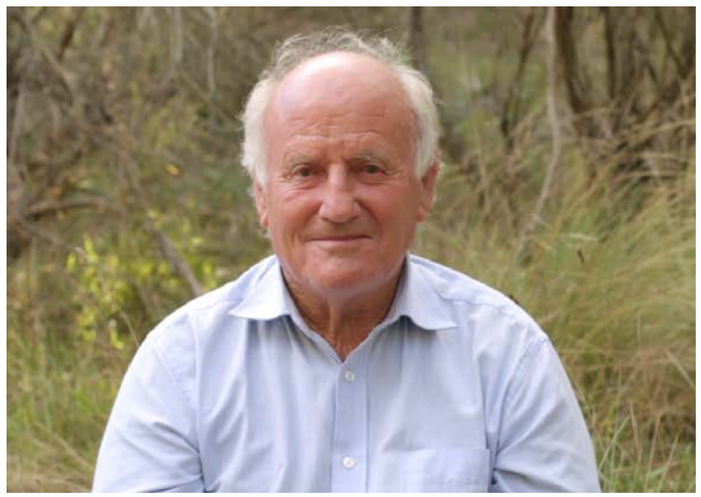
The Australian Landscape Science Institute

www.tals.org.au

Watch the story on Youtube: https://youtu.be/UZmIJcQZJEY

Australia's landscape is a living laboratory

- an open letter to the Australian Government from Peter Andrews OAM



Rigorous science can show Australian land managers that they have the best potential to manage climate change while increasing productivity. The current mode of scientific assessment and advice lacks the inclusion of hydrology and its interrelatedness with the function of all plants, as would apply if a 'Whole of Landscape' view was adopted by the scientific community.

By referencing the historic evidence [1] of the productivity of the Australian landscape prior to modern agricultural practices, scientists would get a true picture of the function of all plants and the vital role plants play in harnessing the sun's energy, water management and producing and recycling fertility. These functions result in increased productivity, climate moderation and healthy ecosystems.

Billion of dollars of current expenditure on land repair, water security and carbon offsets could be saved through strategically placed and relatively inexpensive interventions. Significant benefits would be delivered across our watersheds, allowing profits from increased farm productivity to occur in as little as three years.[2, 3, 4]

All of the above can be confirmed from a critical examination and assessment of the examples found currently in the hundreds of demonstration sites, and the natural examples that are still evident in the landscape. The formation of a professional advisory group of highly qualified landscape scientists would give the public confidence that the opportunity for increased productivity, climate moderation and reduction of the devastating effects of drought, fire and flood damage can be fully realised.

An Australian landscape scientific advisory group would restore the trust of the public and ensure that all land owners and practitioners have the best available landscape benchmark from which to operate. We can no longer afford to experiment at the basic level and repeat the failings of the last 230 years. We need to implement landscape recovery now, and it has to be done using the solutions that are scientifically proven, tested and validated.

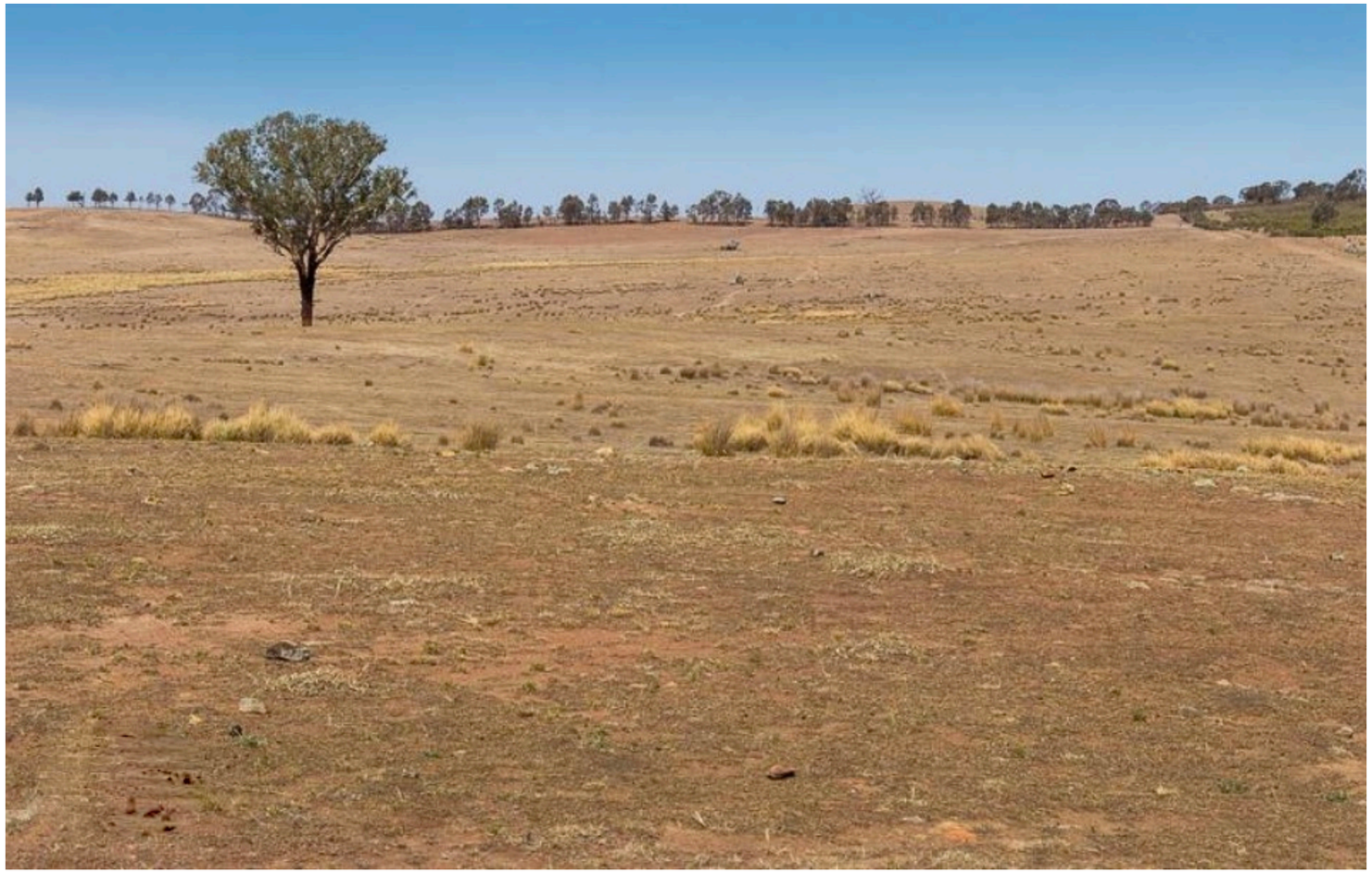
Peter Andrews OAM
peterandrews@tals.org.au

The Australian landscape contains the blueprint for thriving landscapes and climate recovery.

Australia's landscape managers can lead the world in climate recovery by following the incredible blueprint of the Australian landscape.

The rapidly emerging science of bio-geomorphology allows us to observe and replicate the natural patterns, sequences and cycles embedded in more than 50 million years of Australia's evolutionary history to recreate thriving landscapes today.

Climate change is linked with the rapid decline in landscape function



A quarter of the Earth's landmass is desertified

Today's increasingly severe impacts of climate change, such as droughts, fires and floods are exacerbated by poor land use and management decisions.

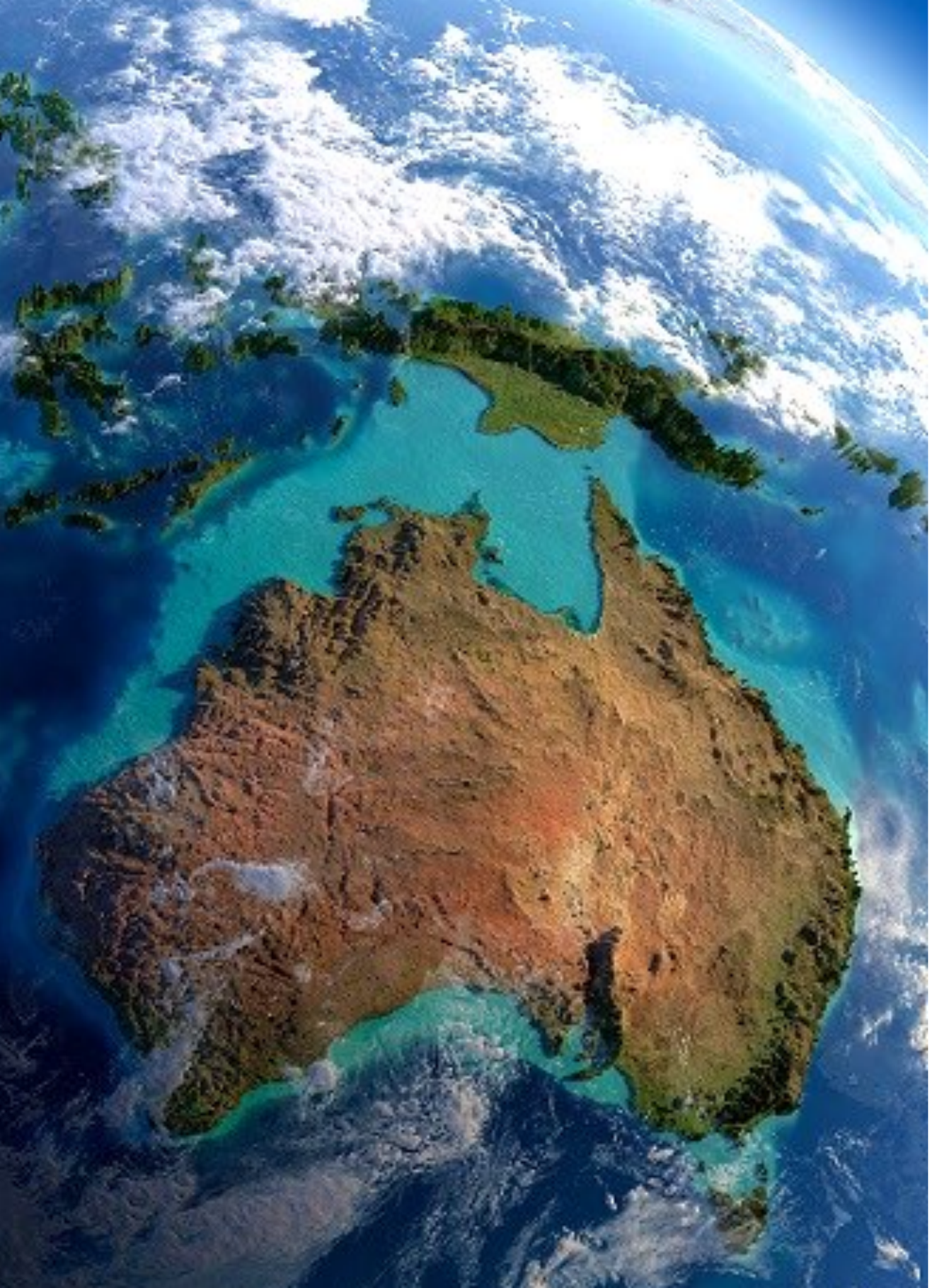
Australia has seen a 60% increase in the amount of water run-off [5] into the sea as a result of our current agricultural practices.

Temperatures are rising in deforested areas due to increased heat island effects when thermal regulation is no longer provided by vegetation cover.

The disruption to nature-based climate management systems has increased land temperatures dramatically, shifting atmospheric moisture from previously vegetated areas to the ocean.

Compounding these effects, the thermal signature of harvested cropping areas is similar to that of a desert, threatening agricultural production both locally and half a world away. [6, 7]

Australia urgently requires a new paradigm in land use and management.



The Whole of Landscape approach - a new paradigm in land use and management

We can achieve a paradigm shift to more holistic land use and management practices with the Whole of Landscape approach.

The most effective basis for landscape decision making arises from understanding how complex ecosystems evolve and adapt across large areas, over long timeframes.

Australia's landscape provides us with the perfect reference model.

It was engineered and managed by plants over millions of years, through the widest variety of extreme climate examples. Australia surfaced and sank below the ocean time after time as it broke away from the Gondwana supercontinent and drifted north in isolation for more than 60 million years. It constantly replenished and rejuvenated itself into an abundant landscape with the most astonishing megaflora and megafauna imaginable.

The Whole of Landscape approach calls for us to understand how this was possible.

Contoured farming systems as a Nature-based Solution

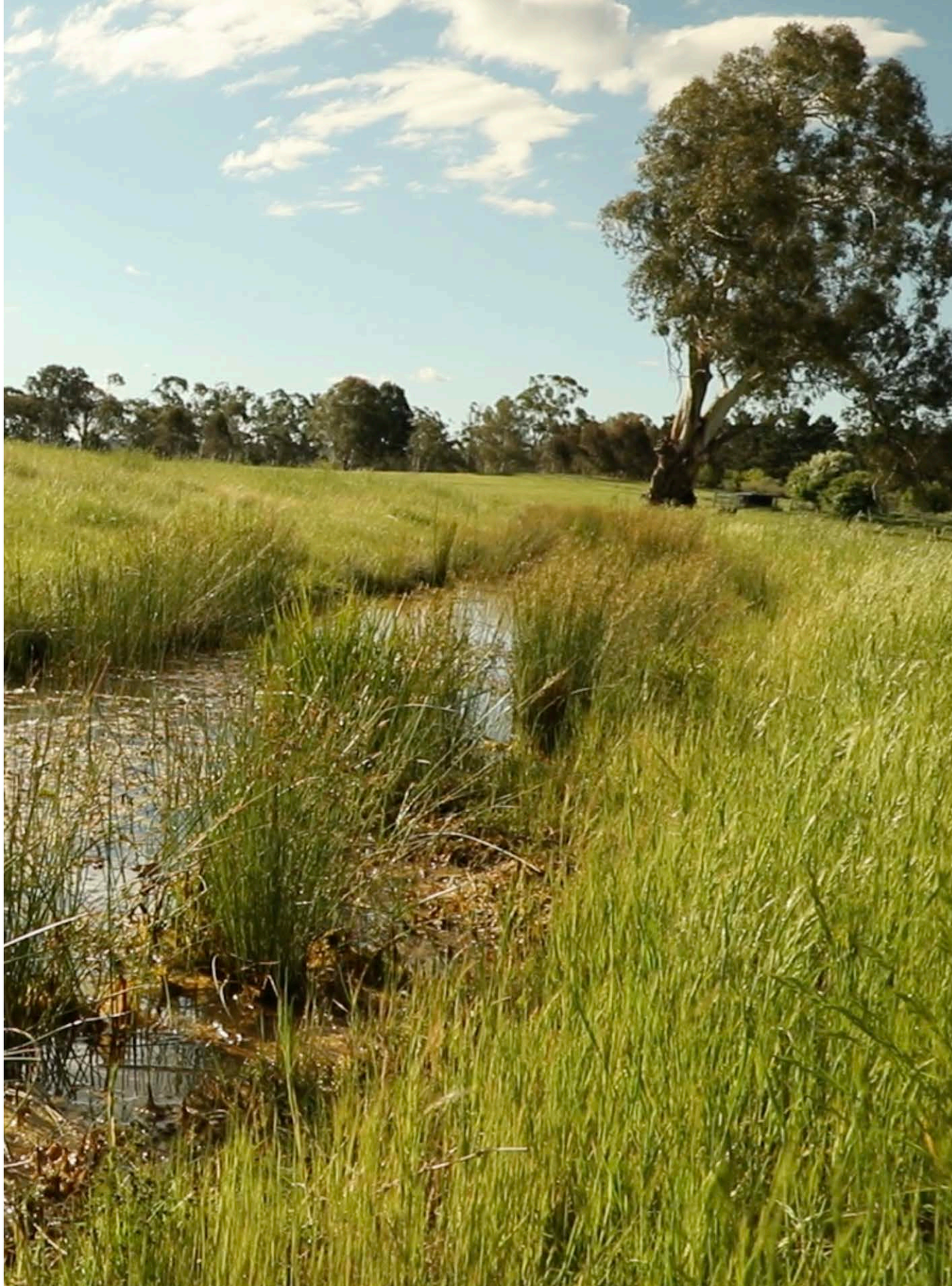
Contoured farming systems are designed to replicate the positive functions that once existed in the Australian landscape, before the great rainforests were cleared and 94% of wetlands were drained and lost.

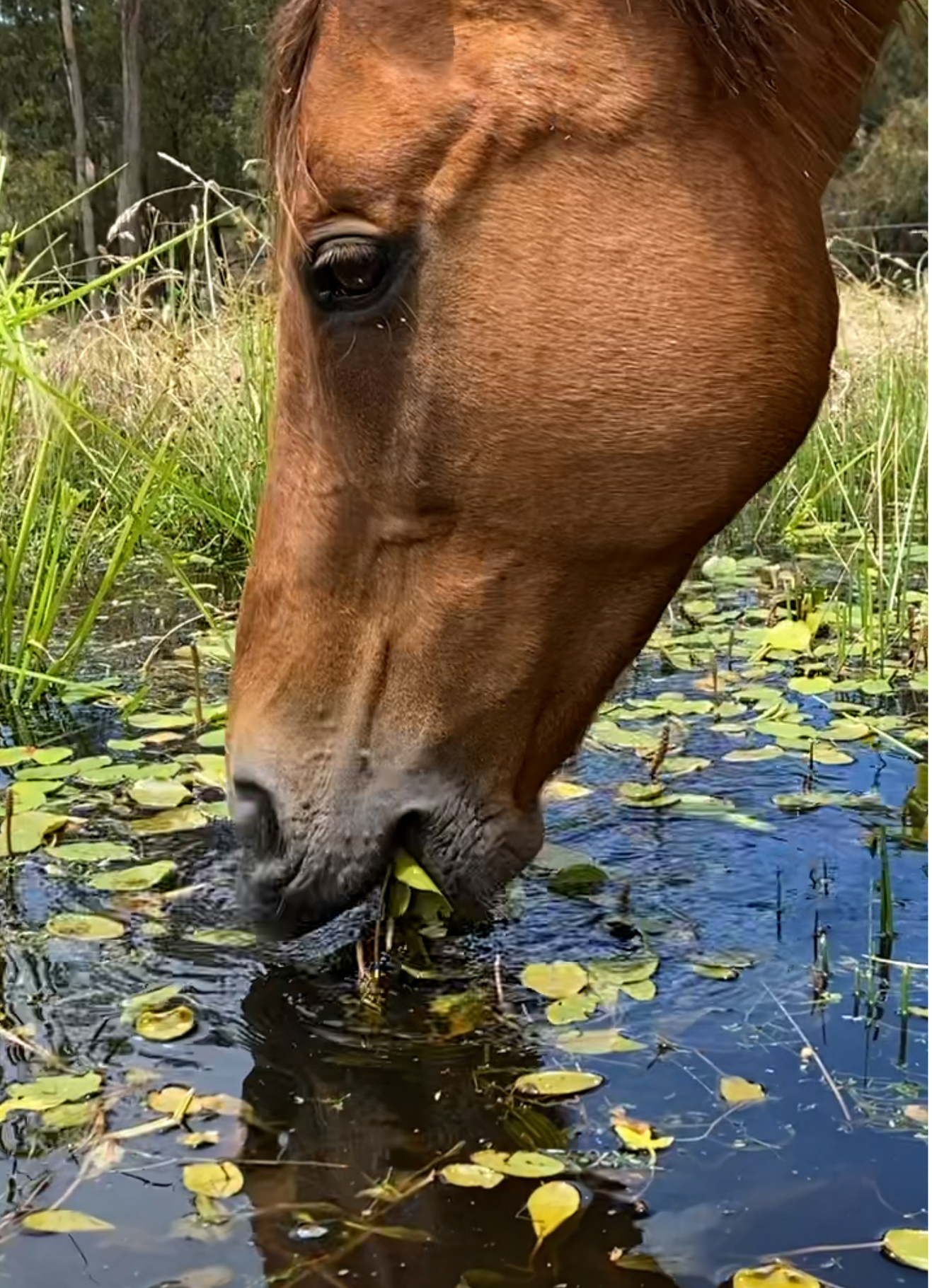
Stepped diffusion broadacre hydroponics is a scientific description of a contoured farming method that installs perched wetlands to mimic the ecosystem function of rainforests high in the watershed.

Contours are long, angled trenches that are graded across the landscape on level, slowing water and spreading fertility throughout the landscape. Nutrient dense food is produced along the contours by accelerating compound recycling through plant roots using capillary action. Contours prevent gully erosion and salinity outbreaks, and also enable run-off water to be distributed and utilised to maximum efficiency, reducing flood peaks across the watershed.

If adopted right across Australia, the overall effect of contoured farming systems would be a reduction of drought, fire and flood damage, while optimising the productivity of farmland and moderating the climate.

This represents Australia's best available Nature-based Solution for land use and management.





Commercial benefits reported by Australian farmers

The commercial benefits of contoured farming systems naturally arise from nutrient recycling that replenishes soils while minimising losses.

A noted increase of cattle weight contributing to an increase of income of $45,000/1000 head.[8]

250% increase in cattle carrying capacity, 15-23% profit margin on cattle production, constant river outflow regardless of inflow, improved landscape hydrology, increased native biodiversity.[9]

230% profit between 2005 and 2014, significant reduction in costs, satisfaction across all levels.[10]

Productivity increase from 1.73 to 1.13 hectares per cow.

Total profit per hectare per 100mm of rain more than 10 times greater than local average.[11]

How did ancient Australia become a thriving landscape?

Australia supported one of the largest examples of megafauna species on the planet. *(Source: Artist's impression by Dorothy Dunphy)*

Australia is experiencing the devastating impacts of climate change through the declining stability of its water cycle with increasingly severe droughts, fires and floods. Yet Australia contains many unique ecosystem examples which could solve many of the worst environmental and agricultural problems.

The landscape once looked very different. Australia was once highly vegetated and fertile. It was a land teeming with diverse plants, wildlife and soft-footed marsupials. All plants and animals were in relationship and had a role in maintaining landscape function. Before human activity, this land was resilient to droughts, fires and floods, supporting the largest examples of megafauna species on the planet. It flourished for millions of years without external inputs, making it the most highly efficient landscape example available.

How did the oldest, hottest and flattest continent in the world come to be the most prosperous and biologically diverse?

Plants managed the landscape

The answer lies largely in plants and the way in which they are able to convert, arrange and manage environmental forces such as sunlight, water and gravity.

Plants are able to moderate the temperature through evapotranspiration, transforming the energy of the Sun from sensible heat to latent heat, cooling the day and warming the night.

Evapotranspiration also harvests atmospheric moisture to create the small water cycle. The position, variety and density of plants manages the movement of water and distribution of fertility throughout the landscape.

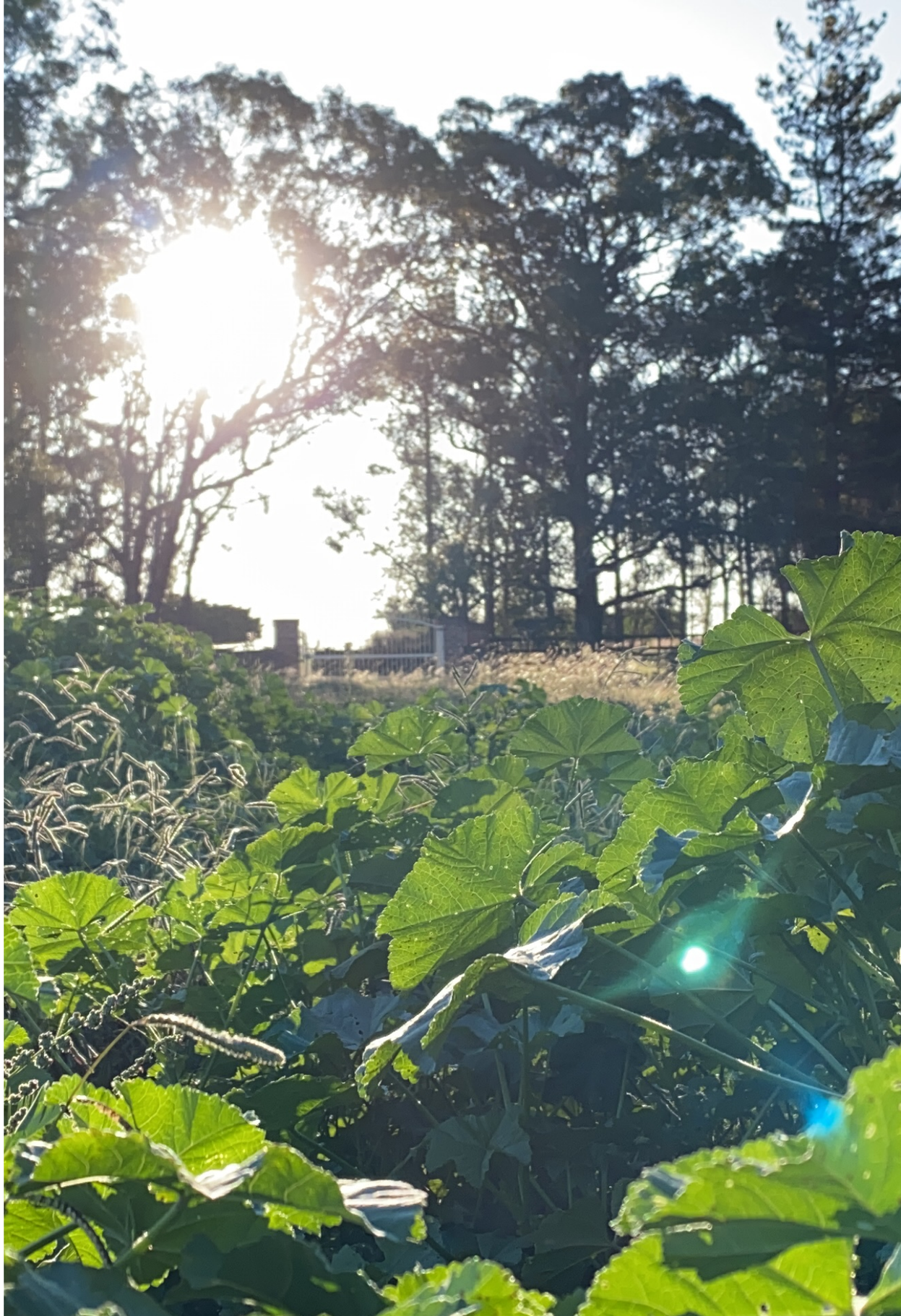
Contrary to Europe, Australia did not have the freeze, thaw and snow cycle to recharge its thirsty inland watershed.

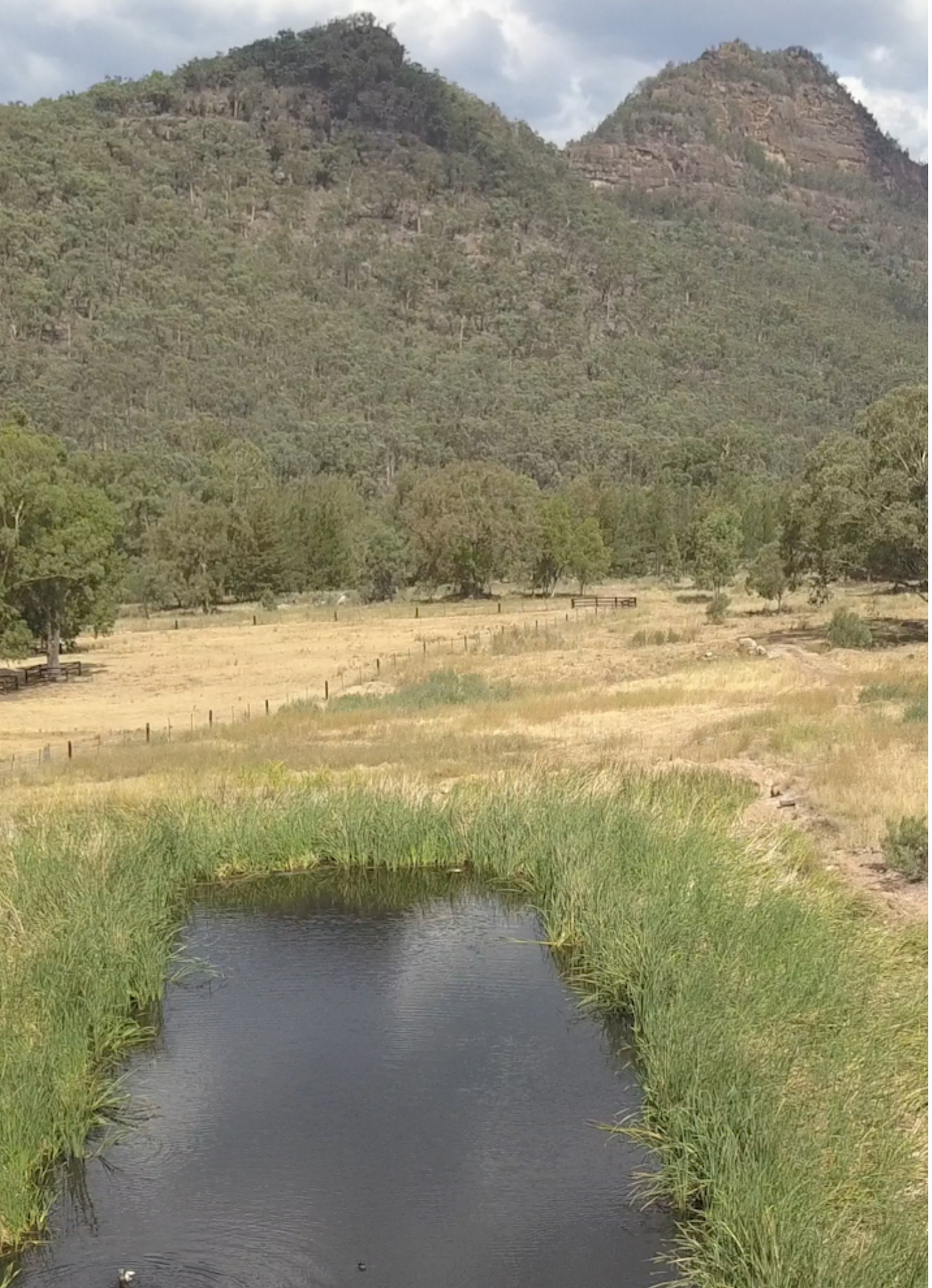
Water did not flow freely in incised rivers. Instead, there was a vast network of interconnected wetlands and floodplains which stored many times more water than lakes, without evaporation.

Water moved slowly through the landscape, keeping the soil hydrated, distributing nutrients and fertility, managing salinity and preventing erosion.

Everything was recycled.

What Australia has proven over the largest area and the longest period of time is that when plants manage the landscape, ecosystems thrive. All living things come into balance through natural processes, supporting each other harmoniously.





Plants are the key to thriving landscapes and climate recovery

Presently, our landscape is degrading rapidly, largely due to the loss of plants that has taken place in the last two centuries and the excess heat this creates in the atmosphere.

The skeleton of the ancient system still exists in the landscape and provides us with a blueprint.

Obviously, we can't turn back the clock 100,000 years and re-create the landscape as it used to exist before humans disrupted it.

What we can do, however, is reinstate the basic functions of the ancient landscape.

The Australian landscape models a science that holds the key to thriving landscapes and climate recovery.

Following the blueprint of the Australian landscape allows us to achieve maximum productivity, biodiversity and a moderated climate, quickly and affordably, for the benefit of all Australians.

Natural Sequence Farming - a successful method to restore landscape function

Natural Sequence Farming (NSF) was developed by Peter Andrews OAM at Tarwyn Park in Bylong Valley to provide practical methods for reinstating the natural functions that once made this land thrive automatically. NSF offers the most efficient water and fertility management systems possible.

For more than 40 years, Peter carefully observed the historical and environmental evidence contained within the Nullo Mountain watershed, particularly in the twin valleys of Bylong and Widden. Peter realised that replicating the efficiencies of the ancient landscape into an automatically aggrading agricultural system represents the greatest opportunity available. Understanding the principles and processes of Australia's landscape became his life's work.

Peter travelled widely to identify as many scientific landscape functions and processes as possible, from the tropics to the temperate zones. He modelled them at Tarwyn Park and subsequently at many other properties across Australia. There are over 50 unique installations of NSF still positioned at Tarwyn Park. Peter used these installations to assess their independent and collective impact on landscape function.

The Mulloon Community Landscape Rehydration Project has since implemented several principles of NSF and has been recognised by the United Nations as a sustainable model of agriculture under the Sustainable Development Solutions project.

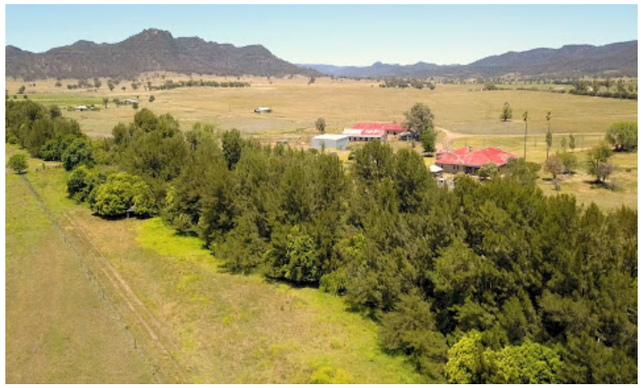
SUSTAINABLE DEVELOPMENT
SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

Some of the Science of the Australian Landscape Modelled at Tarwyn Park and Other Sites

1. Salt and fertility management
2. Water recharge and discharge
3. Nitrate stripping
4. pH management
5. Water prepared for groundwater storage
6. Plant progressions
7. The effect of introduced plants
8. Contour water storage, fire access and control
9. Impact of Eucalyptus trees
10. Eucalyptus trees' effect on climate
11. Water de-energising
12. Water table profiling
13. Sand extraction
14. Water supply, run by gravity
15. Native fish management
16. Whole of Landscape water management
17. Broad-acre natural hydration, water and fertility control
18. Road flood-proofing
19. Managing water and erosion
20. Extraction of floating material
21. No till, no kill gardening
22. No till, no kill agriculture
23. Recycling of all wastes by plants
24. Weed management
25. Filtering grass covered dams
26. Blue green algae management
27. Water efficiency, evaporation and recycling
28. Small water cycle (dew)
29. Diseased land recovery
30. Pasture mix impacts on horse vitality

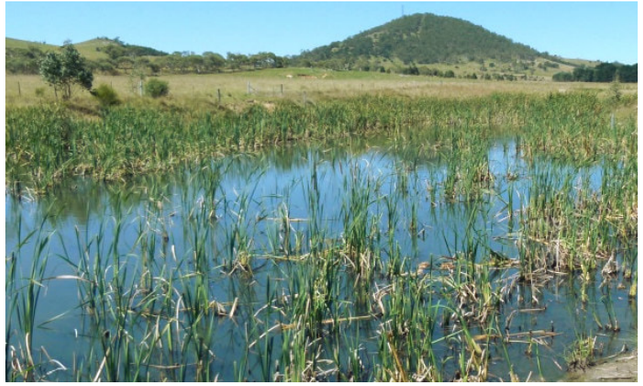
Whole of Landscape / NSF Confirmation Sites

The following is a small sample of restored confirmation sites. They demonstrate that by following the scientific blueprint of the Australian landscape and using methods such as Natural Sequence Farming to restore basic functions, restoration work can be commercially viable while improving ecosystems and moderating the climate.



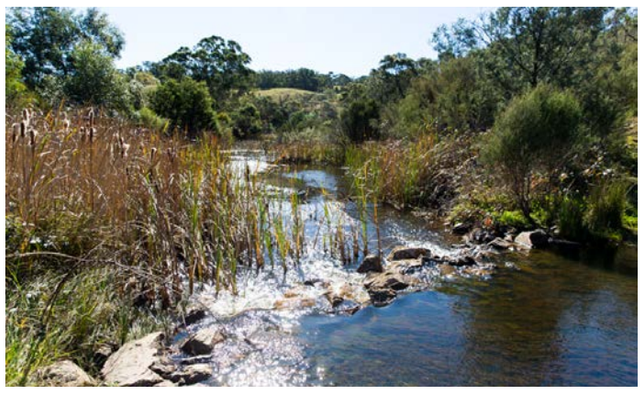
Tarwyn Park, Upper Bylong, NSW (32°26'56.6"S 150°08'59.1"E)

- Significant reduction in stream and floodplain salinity; reversal of valley salinisation; low dissolved salts indicating reduced export of site's nutrient capital.
- Increased pasture productivity and substantial agronomic and environmental improvements; increased aquifer storage providing effective subsurface pasture irrigation; reduced velocities of stream and floodplain flow, reducing channel incision and soil erosion; recreation of a "chain of ponds" system colonised by dense reed beds; a sustainable farming system with no inputs of chemical fertiliser through the effective internal cycling of nutrients; major positive changes to soil chemical and biological properties.



Jillamatong, via Braidwood, NSW (35°27'47.4"S 149°45'47.8"E)

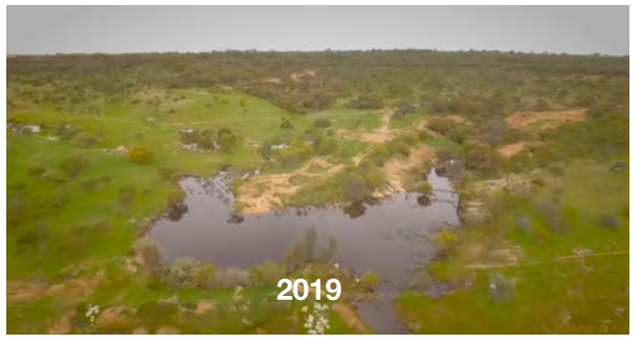
- Following reinstatement of a chain-of-ponds systems and other landscape rehydration interventions, farm productivity and profitability significantly improved; soil organic matter increased by several orders of magnitude; greater local recycling of nutrients; significant biodiversity improvements.
- Significant reduction in costs; **230% increase in profit between 2005 and 2014**; satisfaction across all levels.[13]
- **Productivity increase from 1.73 to 1.13 hectares per cow**. **Total profit per hectare** per 100mm of rain more than **10 times greater than local average**.[14]



Mulloon Creek, Bungendore, NSW (35°16'32.6"S 149°34'10.8"E)

- Significant reversal of channel and floodplain incision; reinstatement of chain-of-ponds system.
- Evidence that the project is "banking" water during higher flows and maintaining higher low flows when the weather is dry.

Whole of Landscape / NSF Confirmation Sites (cont.)



Yanget Farm, 25km East of Geraldton (8V29+H9 Kojarena), 1414Western Australia

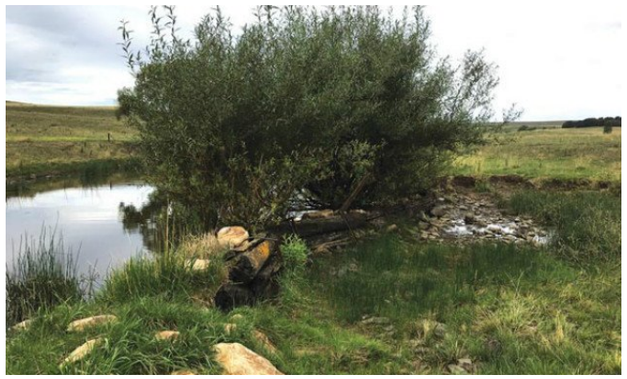
- Purchased in 2008 by Rod and Bridie O'Bree, erosion control measures were mostly put into place in 2009.
- Intervention work comprised: installing erosion control earth banks to recreate the steps in the flow line that once occurred naturally; planting trees and vegetation behind those steps to recreate the wetlands in the ponds behind those steps; constructing contour channels and banks that hold the water high in the landscape with spill points on the ridges so that water spreads out over the largest area possible; using manures at strategic points across the landscape so that the nutrients spread, allowing deep rooted 'weeds' to grow and repair the soil; reintroducing perennials back into the cleared land.
- Within four years with almost identical amount and timing of February rainfalls, the time the landscape was hydrated changed by 100 fold. That is, water in the creek remained for 1 day in 2009 versus 100 days in 2013.
- A variety of perennial grass and some perennial legume pastures are now persisting throughout the

Bevendale, Southern Tablelands, NSW

- Purchased in December 2020, erosion control measures were put in place in mid February 2021 in 4 days of work for under $10,000.
- In August/September 2020 this area in the Southern Tablelands had experienced flooding. By the end of January 2021, no flood water remained on the property.
- Intervention work comprised: installing erosion control earth banks in creek that was previously dry most of the year; constructing kilometres of contour channels on the Western, Eastern and Northern sides of the creek line to hold the water high in the landscape and let it seep slowly through the land.

From 11th March to 19th July 2021 this property experienced 326ml of rain, with April only having 1 ml. On 19 July there was over a megalitre remaining in the creek, on top of the volume of water flowing down the creek. The contours channels are holding water high and the land beneath is being rehydrated by the slow seepage of water from the contour channels.

Whole of Landscape / NSF Confirmation Sites (cont.)



Gunningrah, Bombala, NSW (36°47'58.5"S 149°06'23.6"E)

- By constructing “leaky weirs”, implementing cell grazing and fencing out stock from highly degraded riparian areas, dependency on rainfall per se was reduced through more effective management of water flowing through the landscape; pasture growing periods increased, and there is greater continuity of streamflow within and downstream of the farm.
- “We now have a healthier creek system, it acts like a sponge, absorbing rain as it falls, and conserving water for the inevitable dry years.” Charles & Ann Maslin.[15]

Tallawang, Willow Tree, NSW (31°45'39.6"S 150°21'12.9"E)

- Intervention works comprising weirs, swales and contour banks were undertaken to manage erosion, soil compaction, impoverished pastures and severely eroded drainage lines; cell grazing was established for pasture management.
- 250% increase in carrying capacity, 15-23% profit margin on cattle production; constant river outflow regardless of inflow; improved landscape hydrology; increased native biodiversity.[16]
-

Gumlu, Rocky Ponds Creek, via Bowen, Qld (19°50'31"S 147°37'39"E)

- Flow-retarding structures enabled a complete halt to the pumping of bore water and recharging of aquifers; a 75% reduction in salinity; improved productive land capacity; a 70% reduction in needed water supply.
- Approx. 85% reduction in pesticide use; 20% reduction in use of artificial fertiliser; 30% reduction in herbicide use with significantly reduced runoff onto the Great Barrier Reef.
- The Gumlu property is now drought proof for up to two years with salinity levels continuing to decline.

Advisory Group: We need the highest standard of care for working with the Australian landscape

There is a massive opportunity to learn from the ancient Australian landscape and the way it once functioned. The bones are still there. Scientific confirmation of this interrelatedness is easily identifiable in the Australian sedimentary skeleton.

Through rigorously analysing and observing the evidence in our present landscape, we can reinstate processes which once enabled complex and diverse ecosystems to flourish.

However, there are many misconceptions and misunderstandings in our current paradigm, which inhibit a deeper understanding of the mechanisms at play in the landscape.

The current mode of scientific assessment and advice lacks the inclusion of bio-geomorphology, as would apply if the Whole of Landscape lens was applied by the scientific community.

When it comes to reinstating these systems, if action is taken without an extensive understanding of complexity and interrelations, it will only lead to further disasters.

That is why it is paramount that there be an independent Whole of Landscape advisory board that would be able to uphold a standard of care for practitioners who are implementing these systems.

There can be no interference from commercial agendas when it comes to maintaining the health of the land. Organisations are free to provide services which reinstate these systems, but they will not be the authority.

The board must be independent. Its primary purpose is to serve the people, to make the information accessible and available to all.

When it comes to managing the Australian landscape correctly, why shouldn't we go through the same due process that applies to the health care system or any other industry that society depends on?

~ Peter Andrews OAM

Joint Declaration by the Whole of Landscape Alliance

We believe that Australia now has an unprecedented opportunity to adopt the 'Whole of Landscape' approach to land use and management.

A new beginning for the Australian Landscape.

For many millions of years, the Australian landscape developed a highly productive and fully automated ecosystem, evolving a huge diversity of plants and animals that managed the landscape from catchment to estuary, with maximum efficiency, despite enduring many cycles of extreme climatic conditions.

The ancient Australian landscape contains the blueprint we need for achieving the highest levels of farm productivity, restoring biodiversity and a climate recovery that will benefit all future generations.

The 'Whole of Landscape' approach requires a whole of society effort.

This special moment represents the greatest opportunity of our time.

Together, we can make it happen.

Peter Andrews OAM, Chair, TALS Institute

John Fry, Director, TALS Institute

Beatrice Ludwig, Director, TALS Institute

Peter Dowson, Contributor, TALS Institute

Colin Steddy, Contributor, TALS Institute

Adrian Drew, Contributor, TALS Institute

Marama Grace Brownsdon, Contributor, TALS Institute

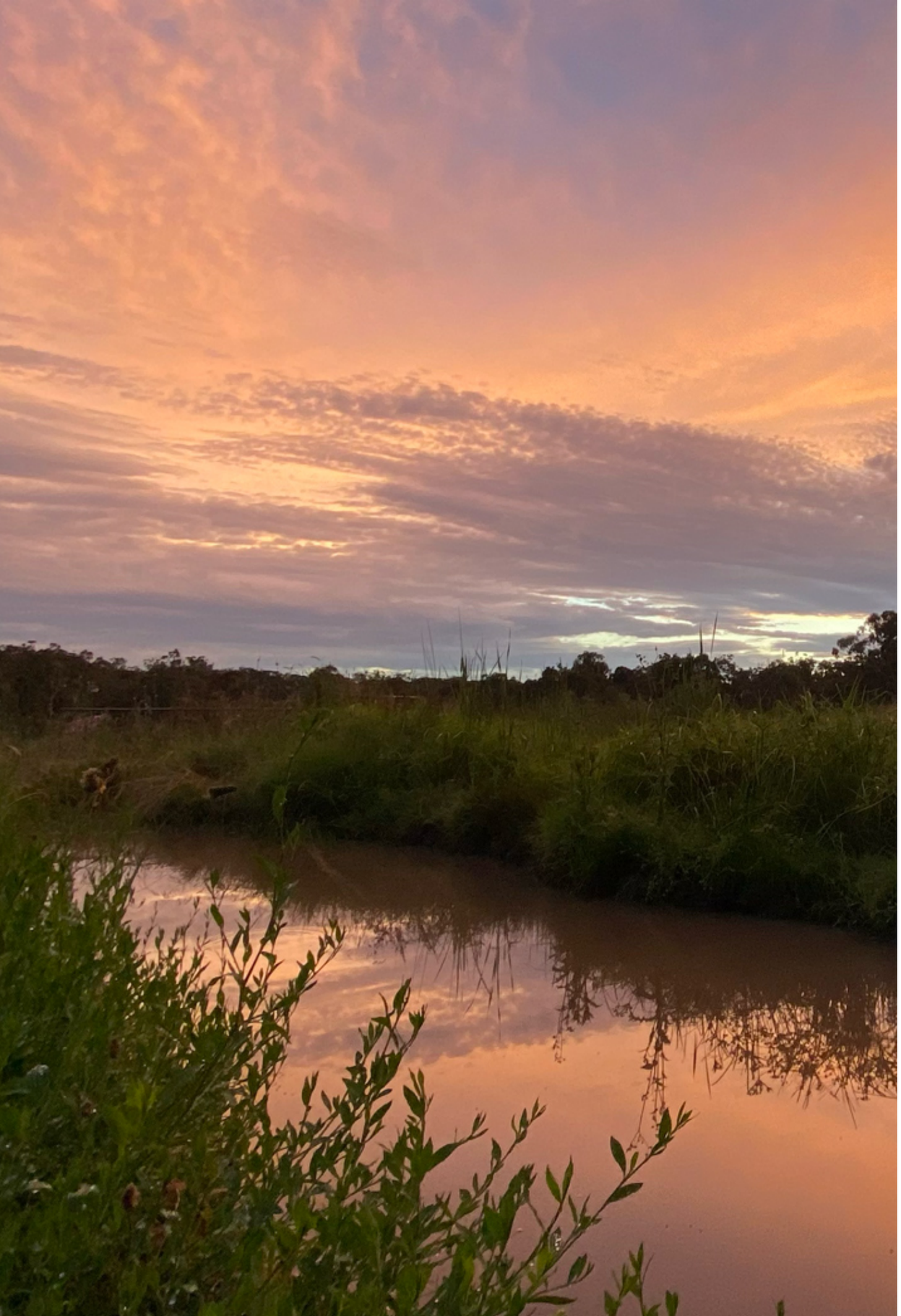
Tony Hollis, Contributor, TALS Institute

Martin Royds, Regenerative Farmer, Jillamatong

Rob Skinner, Member, Regen Action

Charles Body, Landscape Repairer, RIA

Bill Hurditch, Director, Fifth Estate



Supported by preeminent scientists

Prof David Goldney, Landscape Ecologist

“Here [at Baramul Stud], in 18 months, you are seeing soil made on top of sand by a very simple process, and the organic layer is quite significant - that black layer that starts to form. I think it’s the most significant contribution to landscape restoration that I’ve seen in Australia. … It all comes together in this very simple process that he (Peter Andrews) has invented, in a sense what was always there in the Australian landscape.”[17]

Prof Richard Bush, University of Newcastle

“Peter has some theories that really challenge existing theories on how streams and landscapes function. We’ve spoken to landholders upstream and downstream, and they are seeing results and virtually beating on the door to get involved in some way from the top of the valley right to the bottom of the valley. What’s interesting here, he’s trying to raise the groundwater, and elsewhere in Australia, the message is to lower the groundwater, because of salinity, but the results are startling.”

Supported by preeminent scientists (cont.)

European Scientific Associates: Dr Jan Pokorný, Prof Wilhelm Ripl, Michal Kravčik, Martina Eiseltova, Libuse Vlasakova.

“We consider the ancient land of Australia to be an excellent outside laboratory that, to an observative mind, is able to reveal and show the importance of plants in the recovery from desertification and the NSF system to be a suitable tool to bring about the recovery of the climate.”

“In our opinion, it would be highly desirable to disseminate this valuable knowledge and practical experience widely amongst land and water managers and decision-makers in Australia as well as outside the Australian continent through a coordinated training programme to which we would be happy to contribute with our respective expertise. At the same time, we – the European signatories of this letter – would welcome an opportunity to test the NSF approach in Europe.”

Prof Tim Roberts, Emeritus Professor
School of Environmental & Life Sciences

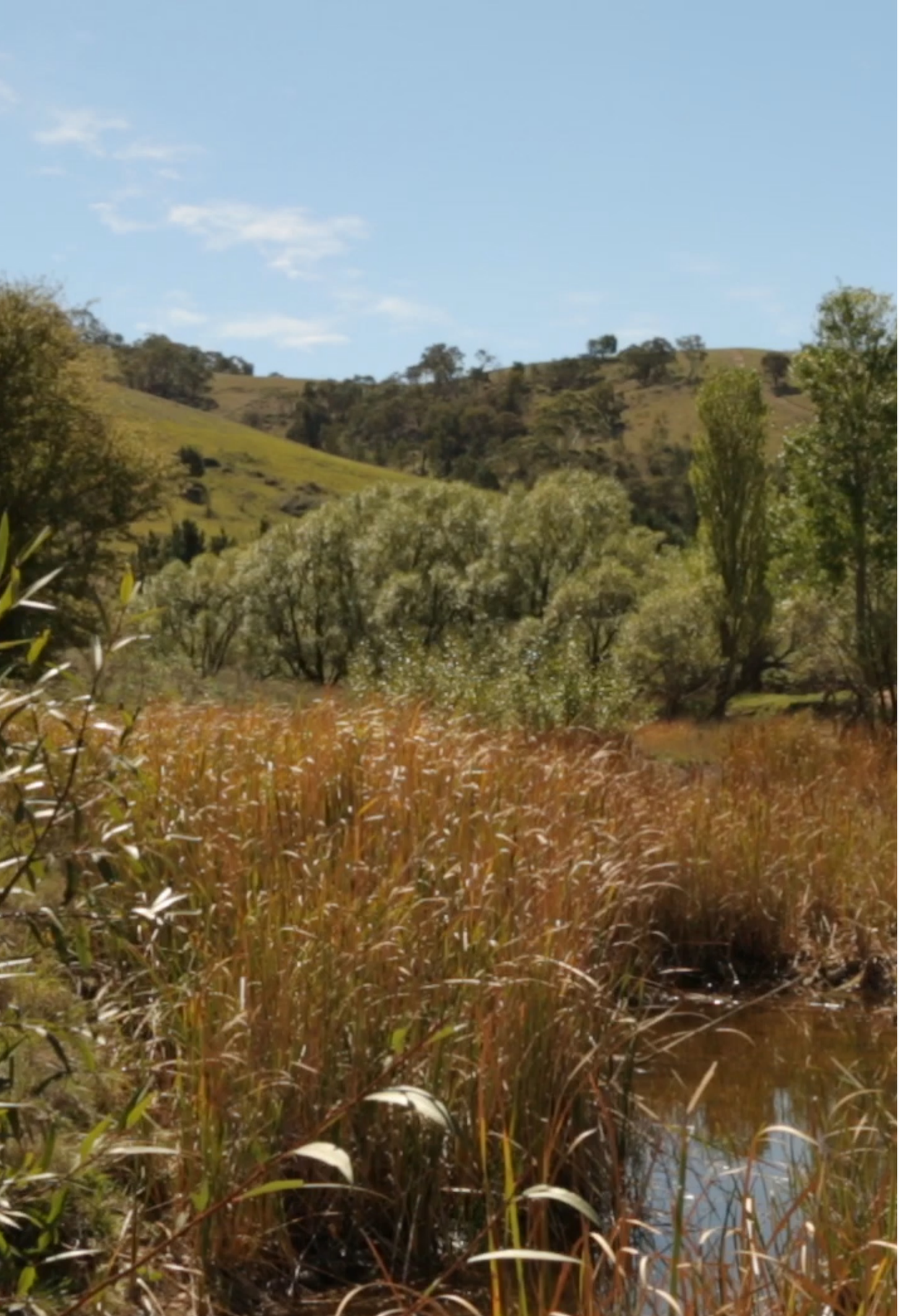
“Peter Andrews has been telling us for the past 40 years that plants build soil, with his landmark work at Tarwyn Park and Mulloon Creek as living testimonials.

For those of us who have watched the seven ABC Australian Story episodes about Peter Andrews, we are familiar with his mission to save Australian agriculture through using plants to grow the soil, prevent erosion and re-water the land by slowing the flow of water runoff after rain, slowing the flow in the creeks by leaky weirs, willows and other trees along the banks and in the streams.

Our recent floods, the floods of 2015 that caused such devastation in Dungog, are testament to the need to implement such programs.

A national body of independent advisors is needed for the restitution of biological capacity and vigour in Australian landscapes. An integrated response is imperative if we are to thrive as a nation.”

For more information on the scientists that support this work see https://www.tals.org.au/science.html



TALS INSTITUTE
THE AUSTRALIAN LANDSCAPE SCIENCE

The Australian Landscape Science Institute (TALS Institute)

TALS Institute has a bold vision:

To restore Australia by 2030 by following the blueprint of the Australian landscape.

Together, we can achieve maximum farm productivity, biodiversity and climate recovery.

TALS Institute is achieving this vision through research and advocacy, community education and training programs and landscape restoration projects.

Chaired by Peter Andrews OAM, the TALS Institute team consists of contributors with a broad range of expertise, qualifications and experience in land restoration, agriculture, business, media and law.

TALS Institute is an ACNC registered charity.

For more information, email: info@tals.org.au

Website: **www.tals.org.au**

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