VICTORIAN
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MANAGING SOILS

Fungi provide soil architecture

Are we soil managers or just soil users?

Chicken manure for soil health

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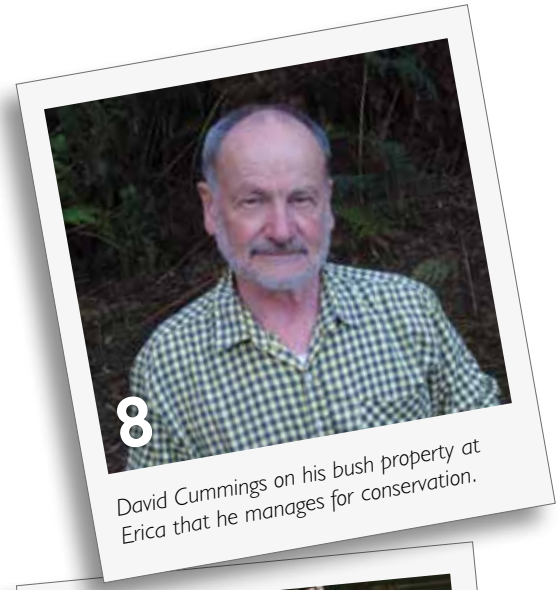
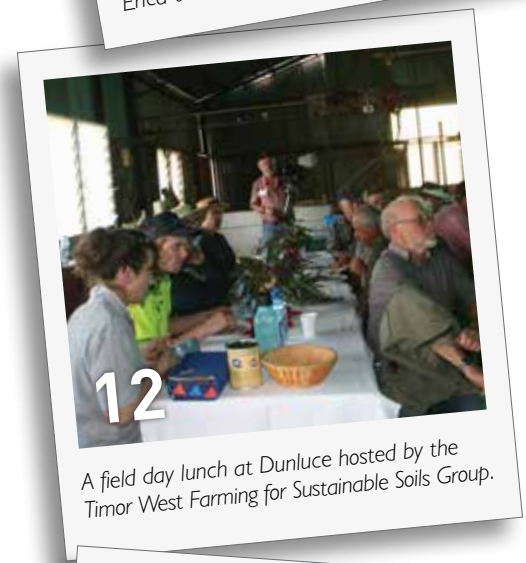


David Cummings on his bush property at Erica that he manages for conservation.



A field day lunch at Dunluce hosted by the Timor West Farming for Sustainable Soils Group.

Peter and Meg Johnson comparing root development of pastures growing on each of the three treatment plots in November 2017.

Contents

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Editorial Committee
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Editorial contributions
Carrie Tiffany Email: editorviclandcare@gmail.com

Cover photograph
Saprobes are the great recyclers of organic matter in terrestrial ecosystems. By Alison Pouliot.

From the Minister

September is biodiversity month, and this year we're marking the occasion by providing $34.77 million for 89 new projects that will go a long way to improving biodiversity and helping us deliver our ambitious environmental agenda – to ensure Victoria's environment is healthy, valued and actively cared for over the years to come.

Eighty-five of the new projects are for on-ground biodiversity action and are being provided with $33.67 million of funding. A further $1.1 million is being provided to four new projects for Marine Environment Targeted Actions.

These projects are part of the Government's $86.3 million investment to implement *Protecting Victoria's Environment – Biodiversity 2037*, over four years; the most significant investment in protecting our biodiversity ever provided by a Victorian Government.

Talking about investing in our future, I'd like to congratulate the next generation of our environmental volunteers who were recently awarded a 2018 Victorian Junior Landcare and Biodiversity Grant. More than $400,000 was made available to 109 successful grant recipients, which included schools, kindergartens, childcare centres, Scouts, Guides, and youth groups. The grants funding supports educational and on-ground projects that restore, protect or enhance habitat for native plants and animals.

And best wishes to the State finalists from Victoria who are representing our state at the 2018 National Landcare Awards, which will be announced on 11 October at the awards ceremony in Brisbane.

Now it's the time to sow and a time for plants to grow, so it's important that our soils are healthy. This issue of the magazine is packed with information on the latest in soil research and soil management.

Our story on Geoff and Helen Henderson's Hanslow Cup win for the Otway district covers more than 50 years of soil conservation history. Geoff and Helen were awarded the cup in 1968 for extensive erosion control work on their farm at St Leonards. Geoff, now 90 and retired to Queenscliff, shares his memories of the win and the ingenious and backbreaking work he did to halt runoff and erosion and make the family farm productive.

The story from Cundare Duverney Landcare Group outlines the results of their trial treatments to assist decomposition of stubble into the soil, rather than burning stubble in cropping areas. This issue also features a story on whether chicken manure can benefit soils that are hard setting and prone to water logging.

Peter Ronalds from the Western Port Catchment Landcare Network shares the latest news from the multi-storey farming project. This innovative project was the brainchild of Clinton Tepper, a forester and farmer from Warragul. Clinton proposed a three-tier design of crops on the ground, stock grazing at mid-level and surrounding trees providing an upper storey. A trial site to evaluate the idea is attracting a lot of interest.

I also recommend to readers the thoughtful article by retired soil conservationist, David Cummings. David asks some pertinent questions about how we define healthy soil and encourages us to look to the past for wisdom, as well as the future.

Enjoy the season and keep a look out for biodiversity-related events that may be happening in your local area.

Hon. Lily D'Ambrosio MP
Minister for Energy, Environment and Climate Change

Minister for Suburban Development

> *This issue of the magazine is packed with information on the latest in soil research and soil management.*

Fungi provide the architecture of the soil

By Dr Alison Pouliot

With their earthy fragrances and myriad colours, fungi capture the essence of autumn. Often better known for their edible varieties that enhance our seasonal cuisine, fungi underpin the health of almost every terrestrial ecosystem on the planet.

We are often only aware of fungi when mushrooms push through the earth, but the growing and feeding part of the fungus exists underground as a network of connective fibres known as mycelia. This scaffold of mycelia provides the basic architecture of soil, underpinning its structure and function.

Many fungi also form connections with a huge variety of plants in a process called mycorrhizal symbioses. In these subterranean alliances, fungi greatly extend plant root systems, helping them to access water and nutrients. Fungi also improve the resilience and health of plants by increasing their drought tolerance and resistance to soil-borne disease.

In return for this work, plants supply fungi with sugars produced through photosynthesis. These symbiotic relationships are especially important in old and weathered, phosphorus-poor soils typically found throughout Australia.

We also know that mycorrhizal networks stretch beyond individual trees. Fungi extend relationships through the soil to other plants, facilitating nutrient transfer between them and working to unite plant communities. Mycorrhizal networks orchestrate plant interactions, promoting their growth and survival.

Fungi are the prime recyclers of organic matter, returning nutrients to the soil and making them available to plants. They do this by secreting enzymes that can degrade almost any organic material containing carbon. Bacteria and invertebrates also contribute to decomposition processes, but only fungi degrade lignin – the hard woody structure in plants. Every leaf and stick that falls to the ground is likely to be recycled by fungi.

Members of Southern Otway Landcare Network examine a fairy ring of toxic yellow stainer mushrooms (Agaricus xanthodermus).

Mycelia provide the architecture of soils underpinning their health and resilience.

When planning a revegetation project, it is important that we understand how to accommodate different species of plants and their fungal partners as well. Landcarers can encourage fungi by maximising habitat types and microclimates that retain a variety of organic matter (leaves, sticks, branches and bark of varying age and size). This provides the best opportunity for a diversity of fungi to colonise.

Removing or minimising stresses to fungi through soil compaction, physical disturbance to soils, over-watering, fire, excessive use of fertilisers and chemicals will allow fungi to reach their full potential.

Many Landcare groups and networks are now recognising the importance of including fungi in their land rehabilitation projects. Fungus workshops were held in autumn 2018 by the Torquay Landcare Group, Southern Otways Landcare Network, Otway Barham Catchment Landcare Group, Strathbogie Tablelands Landcare Group, Moorabool Catchment Landcare Group, Upper Spring Creek Landcare Group, West Marong Landcare Group, Hindmarsh Landcare Network, as well as several groups and networks in NSW.

Dr Alison Pouliot is an ecologist and environmental photographer who has been involved in Landcare for more than 20 years. For further information email alison@alisonpouliot.com

Chris Alenson discussing the scarcity of topsoil typical of the Macclesfield area.

> *Chris's session covered the four components of soil – minerals, water, air and organic matter. He discussed each component and the role it played in soil fertility.*

Soil workshops a hit in the Yarra Ranges

By Anne Fitzpatrick

More than 100 people attended a one-day conference held in Lilydale in May on property management in the Yarra Valley and Dandenong Ranges.

Owning and managing land in the peri-urban and semi-rural fringe of Melbourne presents a number of challenges. The area is made up of 69 per cent Crown and local government managed land that is rich in biodiversity. Alongside this are many small and productive properties including vineyards, orchards, beef and equestrian pursuits, and bush lovers.

The conference was a collaborative effort between Yarra Ranges Council, Cardinia Shire, Melbourne Water, Yarra Ranges Landcare Network, the Box Hill Institute and the Port Phillip and Westernport CMA. It was funded through the National Landcare Program.

Don Watson, author and former speechwriter for Prime Minister Paul Keating, was the keynote speaker. Don provided reflections on the history of farming and land clearing in Australia and discussed his book *The Bush* (2014).

A series of speakers and workshops addressed pasture management, soil health, weed management and grazing densities.

Local soil expert Chris Alenson ran two popular sessions on what your soil is telling you.

According to Chris one of the guiding principles of sustainable agriculture is the encouragement and maintenance of healthy, fertile, soil.

"It is important to understand that a fertile soil can do more than just produce healthy pasture," Chris said.

"It can also assist in controlling plant disease, benefit the association between roots and soil nutrients, recycle nutrients, improve soil structure, and store more nutrients, air and water."

Chris's session covered the four components of soil – minerals, water, air and organic matter. He discussed each component and the role it played in soil fertility.

He provided a great mix of practical and scientific information, broke down some of the mysteries of soil, and took us on a journey below the horizon.

Other speakers included Patrick Francis who spoke on comfortable livestock farming by managing pasture species selection and grazing rates, and David Stewart on property management planning.

Sessions on biodiversity stewardship, water, and weed and pest animal management were also well attended.

We have received a lot of positive comments from people attending the conference and we are hoping it will become a biennial event in the Yarra Ranges.

Anne Fitzpatrick is the Landcare Facilitator for the Yarra Ranges Landcare Network. Her position is funded through the Victorian Landcare Facilitator Program. For further information email landcare@yrl.org.au

Bringing the Hanslow Cup home

By Carrie Tiffany and John Fyfe

"Mr Henderson is awarded first prize in this competition because of his efforts in controlling severe erosion problems whilst at the same time maintaining a highly productive farm unit."

Mr G. B. Ebbs, Soil Conservation Authority, 1968.

On a warm sunny day in early May this year Geoff and Helen Henderson met at their former property Inverness, at St Leonards, with present owners Peter and Patricia Millar. Joining them were neighbours, staff and volunteers from the Bellarine Catchment Network. The day was an opportunity to reunite the Hendersons with an important artefact from their past – the Hanslow Cup for Soil Conservation.

Geoff (now 89) and Helen were awarded the cup for their outstanding efforts in controlling soil erosion in the Otway District soil conservation competition 50 years previously – back in 1968.

Standing in front of one of the smaller dams he created to control extensive runoff and erosion, Geoff remembered the pride they felt receiving the award.

"The Soil Conservation Authority produced a booklet about what we'd done, and there was a field day. We didn't get to keep the cup, but our names were engraved on a small plaque on the side of the cup – and it's good to see that it's still there after all of this time," Geoff said.

"We also received a medal for our keeping: the Harold Hanslow Medal for soil conservation."

Huge eroding gullies

Geoff purchased the property in 1951 when the property was in extremely poor condition, full of rabbits and with severe erosion problems. At this time Geoff was still working at the family farm at Bellarine.

Mr A.F. Saunders (left) from the Soil Conservation Authority presents the Hanslow Cup for Soil Conservation in the Otway District to Helen and Geoff Henderson at their property Inverness at St Leonards in 1968. They are standing in front of a large, recently constructed dam on the property.

Geoff and Helen married in 1954 and built their home, Inverness in 1957. The property had numerous eroded gullies. Each one ran half the width of the property and in places were up to four metres deep and 30 metres wide. The heads of the gullies were moving at up to 50 metres a year and carrying the eroded soil into Swan Bay.

Gully erosion on Inverness in 1955. Geoff Henderson's work on the property saw these gullies completely halted and repaired. Son Tim is standing in the gully.

Geoff worked alongside experts from the Soil Conservation Authority to develop ways of controlling runoff water that fed into the property from an 1820-hectare catchment area. Geoff built four small dams at the head of the gullies and one very large dam, utilising the eroded gullies as water storage.

The overflow from the large dam was designed to be carried along a grassed waterway and trainer bank that discharged down a grassed chute back to the gully floor below the dam wall. Geoff built the chute by mixing 160 bags of cement. It took 10 days of backbreaking work.

"The chute worked well for a while, but eventually developed cracks. Some years later I worked with the Soil Conservation Authority again to build a fibreglass chute. We built it in the Bacchus Marsh workshop in six different parts and brought it out to the property to install," Geoff said.

Large dam controls runoff and produces income

The big dam brought income to the farm for many years. Geoff and Helen purchased second hand irrigation equipment and grew new potatoes that were sold at the Victoria Market.

Over the years Geoff improved the pastures on the property, leased more land and grazed sheep and produced fat lambs. During this time Helen developed an extensive garden around Inverness, including a wide collection of roses.

Geoff's knowledge of soil erosion was widely sought after in the district and he went on to participate in the Otway and Moorabool District Advisory Committees of the Soil Conservation Authority in the 1970s and early 1980s.

"It was great to travel around and talk to other farmers, see what they were doing and offer some advice. Some of the areas were quite salted up by then and we saw some really top-notch work being done to control it," Geoff said.

Helen and Geoff Henderson stand in front of the dam, holding the Hanslow Cup again in 2018.

Landcare gets farmers talking

Geoff said a lot of credit was due to the late Joan Kirner, former Premier of Victoria, for her role in establishing Landcare.

"Mrs Kirner was a terrific person – very sensible and down to earth. She really got people talking and sharing their knowledge."

To this day, the erosion control work done by Geoff and Helen protects the RAMSAR wetlands of Swan Bay.

Geoff and Helen lived on the property for 50 years and raised their two sons, Tim and Andy there.

Geoff said that he missed the farming life, but there came a time when it had to be passed on to younger folk with the energy for it. Helen also misses the beautiful garden that she established.

"I don't support land being bought and sat on as an investment. Land should be managed and managed well so it can be as productive as possible," Geoff said.

In his characteristically understated fashion, Geoff said it wasn't really an even playing field when he won the Hanslow Cup back in 1968.

"You couldn't have won the cup if you didn't have very bad soil erosion to start off with – and we certainly had that!"

However, reports from the time and from other farmers in the district demonstrate that Geoff's ingenuity, hard work and unwavering commitment to repairing the landscape and making it productive were the reasons for his win.

The current owners of Inverness, Peter and Patricia Millar, have also benefited from Geoff and Helen Henderson's management of the property. Geoff has provided Peter with advice on managing a recent minor erosion issue.

Current owners of Inverness (from left) Peter and Patricia Millar, with Geoff and Helen Henderson.

"Geoff has vast knowledge on both erosion and on how running water behaves. He has shown me that the key is to slow the flow down so that the energy is removed from the water. It's very useful to have someone with that knowledge and who is very willing to share it close at hand," Peter said.

Geoff Henderson stands on the concrete chute he built to control runoff on the property in the mid-1950s.

John Fyfe is a friend and former neighbour of Geoff and Helen Henderson. He is on the Bellarine Catchment Network Committee and has spent many years supporting local community groups.

For further information about Landcare in the Bellarine area go to www.environmentbellarine.org.au

Are we soil managers – or just users?

By David Cummings

Soil is a remarkable asset, effectively gifted to this planet, and consequently to us. It is for this reason that I cringe at our cavalier treatment of soil. We regularly take it for granted, compromise it and abuse it.

Severe tunnel erosion near Avenel in Victoria in the late 1940s. Fortunately these sights are quite rare today.

> *If humanity is to have a reasonable future, it is the soil that will both facilitate and moderate it.*

If humanity is to have a reasonable future, it is the soil that will both facilitate and moderate it.

I trained as a soil scientist and have many years of experience as a hands-on land manager. I am a soil enthusiast. I see a powerful need for us to both respect and embrace soil.

Soil was in place and doing an outstanding job long before humans. It didn't develop to meet our needs, but because planetary evolution required a moderating and buffering layer between the atmosphere, the hydrosphere and the geosphere. It is simply our good fortune that this thin layer went on to become the cradle for land-based life.

Common characteristics of soil

Soils differ in terms of their particular physical, chemical and biological composition, but they have some common characteristics.

These include:

- a permeable and porous surface;
- lots of internal pores and associated spaces;
- a vast area on the perimeter of the pores which in combination with the pore space enables physical, chemical and biological activity;
- a powerfully functioning set of internal transport routes for water, gases, nutrients, organic matter, microorganisms and plant roots.

I believe that it is these fundamental characteristics of soil that should determine how we define soil health. Many current soil health indicators are based on the ability of soil to produce particular crops. However, a soil that can push out a high yielding crop of wheat isn't necessarily healthy. We need a definition of soil health that encompasses all the roles of soil.

An article in *The Age* in 2006 defined human health as, "…not merely the absence of disease or infirmity, but a state of complete physical, mental and social wellbeing. It is a state where every part functions to sustain, that enables you to reach your full potential, and build maximum resilience to illness". Soil managers have a lot to learn from this.

Soil can also be thought of as a city. It has living spaces, working spaces, and many entry and exit points. There are transport routes for water, gases, nutrients, energy and organisms, and there are many cross dependencies. To create a liveable city all of the different components must be performing their roles effectively. We don't want ghettos to form, or damage from insurrection or physical disruption.

The caption under this image of a dust storm near Barrapoort in the Mallee in 1944 warns that the productive capacity of the soil, in the form of fertility, is blowing away.

A dust storm rolling towards Melbourne from the direction of Geelong in February 1983.

Effective soil function

Soil function is dependent on the pores contained within the soil's physical structure. Approximately 50 per cent of soil volume is pore space.
Pore space is usually jam-packed with moisture, roots, fungus mycelium, roots, nutrients, organic matter and gases. Moist pores are a sign of dynamic activity. It is important to avoid impacts that damage pore space.

Pores also allow for lots of surface lining.

In the 1960s distinguished CSIRO soil scientist Bill Emerson calculated that one cubic centimetre of a clay soil might have up to seven square metres of active surface contained within it. It is on these hidden surfaces that organic exchanges, nutrient release, recycling, respiration and the production of soil stabilising compounds occurs.

Is soil health declining?

Once we have decided how to define a healthy soil, our next task is to question whether soil health is declining. There are the soils we have turned off by covering them with impermeable surfaces (buildings, roads, carparks) and there are the impacts on soil caused by high input land management practices. The axe, cloven-hoofed animals, the plough, fertilisers and herbicides have all caused significant changes to soil. Recent trends towards high inputs for high yields are seeing soils managed in an industrial fashion.

Taking a historical perspective can expand how we think about soil.
In this country we have been oblivious, until very recently, to how Aboriginal people managed the soil. We didn't recognise or appreciate the techniques they had developed over many thousands of years.

Some recent thinkers and writers are encouraging us to look at what was achieved by the historic set of management practices of Australia's Aboriginal population, to think carefully about what we have done since then, and to reframe our view of the future. I recommend Bill Gammage's *The Biggest Estate on Earth* (2012), Bruce Pascoe's *Dark Emu* (2014), Don Watson's *The Bush* (2014) and Charles Massy's *Call of the Reed Warbler* (2017).

None of these writers are suggesting we can or should revert to pre-1788 Australian land management, but there are significant lessons to be learnt that can help us to evaluate and improve our land management to get better productivity (not necessarily production) and sustainability of our natural resources.

True environmental sustainability

The time is right for us to start asking some important questions about what we need from the land and how we can transition to true environmental sustainability.

We can't continue to allow environmental extraction and argue that it is economically sustainable. To ask and answer these questions we need to better understand how dependent we are on soil, and in turn, how critical soil condition is for ecosystem management.

Perhaps we should expand our thinking outwards too - to consider the planetary interdependencies between soil, atmosphere, hydrosphere and biosphere. Soil is not just an industrial medium to grow food. Soil and its attendant ecosystem is far too valuable for that.

We cannot continue to treat soil simply as a business asset. If we cause a gradual decrease in the economic value of soil through use, wear and tear, or obsolescence, or change in demand, we cannot replace it. Soil depreciation is not an option, but soil appreciation is.

David Cummings is a soil conservationist and land manager. He is a member of the Environmental Farmers Network, the Mountain Rivers Landcare Group (West Gippsland) and an associate of the Victorian Catchment Management Council. For further information contact David at davidcummings01@gmail.com

David Cummings on his bush property at Erica that he manages for conservation.

Incorporating stubble can improve soil condition

By Rod Eldridge

Formed in 1994, the Cundare Duverney Landcare Group is part of the Corangamite Lakes Landcare area, which takes in the areas around Cressy, Lismore, Derrinallum and Beeac and extends south to Camperdown.

"Traditionally it was predominantly a grazing area with some cropping, but over the past 20 years there has been a rapid conversion to continuous cropping," said Bill Charles of Cundare Duverney Landcare Group.

"This impacts soil condition and raises the question of what to do with the cereal stubbles. Presently cereal stubbles are mostly burnt, which leads to a loss of soil carbon and production of greenhouse gases, and it is becoming logistically more difficult to burn due to tighter regulations," Bill said.

To address this issue the group applied for and received funding from Landcare Australia's Workplace Giving Program to trial methods to manage crop stubbles.

According to group president, Justin Alexander, research shows that soil carbon levels are declining under continuous cropping systems.

"Soil carbon is declining, even under no-tillage cropping systems. This could have significant impact on the health of our soils and we want to address it before it is too late," Justin said.

"Soil carbon is declining, even under no-tillage cropping systems. This could have significant impact on the health of our soils and we want to address it before it is too late," Justin said.

Soils need adequate nutrients

Research by Clive Kirkby, CSIRO, has found that to increase soil carbon levels, crop stubbles must be incorporated into the soil with adequate nutrients available to enable soil microbes to decompose the organic material into humus.

A number of local farmers have tried stubble incorporation in the past, but the poorly drained clay soils, cold and wet winters, and heavy stubble loads resulted in poor decomposition of the stubbles. This caused blockages to air-seeders at sowing, increased incidence of slugs, snails and disease, and reduced crop yields. Consequently, many farmers abandoned the practice and reverted to burning cereal stubbles.

The group trialled three treatments to assist decomposition of stubble incorporated into soil:

- adding extra nutrients (nitrogen, phosphorous and sulphur) to meet the biological demand of the microbial biomass required to decompose the stubble. This is based on the work of Clive Kirkby;
- addition of stubble digesters (beneficial fungi) to promote breakdown of cellulose in stubble to aid its decomposition;
- addition of a biological blend of stimulants (comprising a mixture of humic acid, nutrients and coal dust) and stubble digesters to promote microbial decomposition of stubbles;
- a control with only stubble incorporated.

Each trial treatment and control was four hectares in area, with the remainder of the paddock being burnt. The six tonne per hectare wheat stubbles were incorporated and trial treatments applied in February 2017.

A soil sample from the control plot

A sample of soil treated with extra nutrients.

A soil sample treated with the biological blend.

Bill Charles (left) and Justin Alexander inspecting the crop for the Cundare Duverney Landcare Group soil trials.

Good autumn rains provided sufficient moisture while soil temperatures were high enough to stimulate soil microbial activity to break down the stubbles.

According to Justin Alexander, by the time of sowing barley in May, the incorporated stubbles had decomposed sufficiently on all treatments and there were no problems with blockages to the air-seeder.

"We had minimal problems with slugs and snails, and no worse than elsewhere on burnt paddocks. There was an issue with herbicide efficacy, which we overcame. By about July we could see that the crop was struggling a bit for nitrogen on all plots except where we added the extra nutrients. We applied extra urea in July, then again in late August across all plots."

Improved soil condition

A site inspection in October showed that almost all the stubble had decomposed on the biological blend and extra nutrients treatments, with very few larger fragments of stubble remaining compared to the control.

The soil was more friable with improved soil structure and better aggregation of soil particles, and it was less 'cloddy' than on the stubble digester treatment, control plot, and the rest of paddock.

The plot with extra nutrients yielded about 5.75 tonnes per hectare, while the two other trial treatments and the control area each yielded about 5.4 tonnes per hectare.

The rest of the paddock where stubbles were burnt yielded about six tonnes per hectare.

Justin believes that despite the blanket application of extra mid-season nitrogen, the lower yields on treatments with no additional nutrition show that microbes robbed the crop of some of the midseason nitrogen to use in stubble decomposition.

"The higher yield and better soil condition on the extra nutrition treatment shows the benefit of extra nutrients in assisting stubble decomposition. In hindsight we could have increased our mid-season nitrogen application a bit on the treatments, and probably got towards a six tonne yield on the extra nutrient treatment but overall the result of the stubble incorporation is about as expected and we are happy with it.

"We are encouraged by the results and plan to do more stubble incorporation in the future using the added nutrients treatment, as it is relatively easy to spread a bit of fertiliser when we are incorporating the stubbles.

"The cost is somewhat offset by the value of nutrients lost by burning, and the long-term cost of declining soil health, which often requires increased inputs to maintain yields. We won't rule out burning totally, but if we can reduce the amount or frequency of burning while improving soil health and maintaining yield, then it could be a win-win result," Justin said.

Rod Eldridge is the Landcare Facilitator of the Cundare Duverney Landcare Group. His position is funded through the Victorian Landcare Facilitator Program. For more information email Rod at llpgrod@westnet.com.au

We are encouraged by the results and plan to do more stubble incorporation in the future using the added nutrients treatment, as it is relatively easy to spread a bit of fertiliser when we are incorporating the stubbles.

A field day west of Mitiamo in northern Victoria looked at how chicken manure had changed the structure of sodic subsoils.

Farming for sustainable soils in northern and north

Problems with soil health are not restricted to northern and north central Victoria – they are endemic to south eastern and southern Australia, and present in most countries around the world. According to the United Nations Food and Agriculture Organisation, if we continue with current agricultural practices the world will be depleted of topsoil within the next 60 years. Viewed alongside exponential population growth and climate change, this is a cause for great alarm.

> *More than 150 years of traditional agriculture has left many soils in north central and northern Victoria depleted.*

To feed a world population of more than nine billion in the coming decades will require almost doubling our productive capacity, which will require considerable improvements in soil health. How do we deliver against this challenge?

More than 150 years of traditional agriculture has left many soils in north central and northern Victoria depleted. The inherent properties of the soils in these parts of the state mean they are sodic and dispersive, and in consequence issues with salinity, wind and water erosion, compaction, and a host of other soil issues are now common.

Farming communities take responsibility for soil health

In 2009 the North Central CMA launched its Farming for Sustainable Soils (FSS) project. The project recognised the best opportunity to improve the soils of the region was to work in partnership with farming communities, encouraging them to assume responsibility for the condition of their soils.

The project has brought farmers from across the catchment together to build soil health programs suited to local conditions and local circumstances. Fourteen FSS groups involving more than 400 farmers were established. Each group employed a part-time community facilitator. The facilitators and CMA project managers formed an over-reaching FSS task force.

The groups have conducted extensive local soil sampling, laboratory analyses and field assessments, which has improved understanding of local soil condition and soil management. The groups have been sharing their knowledge with each other and also bringing in expert scientists from across Australia.

The biggest challenge for all groups is how to increase organic carbon in their soils.

A field day lunch at Dunluce hosted by the Timor West Farming for Sustainable Soils Group.

central Victoria

By Phil Dyson, Suzanne Johnstone and Darren Bain

Organic carbon improves the biology of soils and aids the formation and retention of soil peds (aggregates of soil particles that are separated by pores or voids), which provide soil structure. This is particularly important in the sodosols that account for three quarters of the soils in North Central CMA region.

When the dispersive sodic subsoils that lie below the shallow topsoils lose structure and the entry of rainfall is limited, as is the penetration of plant roots, the productive capacity and health of the soil declines. These subsoil constraints limit the water available to plants and alter landscape hydrology.

The challenge of improving organic carbon content

Improving the organic carbon content of soils is not easy, particularly where farmers are locked into continuous cropping regimes that have little or no capacity to hold on to carbon.

The FSS groups are attempting to identify economically viable farm management practices that will produce sufficient improvements in soil biology to enhance soil structure. It is a 'chicken and egg' problem because good soil structure is needed to support the active growing plants that supply the root mass in support of improving the biology.

There's still much to learn, but the FSS groups are now devising, developing and testing potential solutions. The groups have a variety of local trials underway that include injecting manures into subsoils, experimenting with growing cover crops, using the tap rooted tillage radish to break-up subsoil hard pans, deep ripping and gypsum applications to shatter subsoils, and experimenting with liquid fertilisers.

The groups are continually looking for options and new ideas and actively seeking support from experts for guidance and advice. The CMA is committed to the partnership approach that underpins the FSS project. Numerous industry groups have also been involved in the FSS project, as well as local Landcare groups and networks.

The Farming for Sustainable Soils project is supported by North Central CMA through funding from the Australian Government's National Landcare Program. For further information go to www.northcentralcma.vic.gov.au (Sustainable Agriculture).

Phil Dyson, Suzanne Johnstone and Darren Bain are part of the North Central CMA's FSS project team. For further information email phil.dyson@nccma.vic.gov.au

Anthrax awareness and prevention

By Dr Leanna Dries

Anthrax is an infectious bacterial disease that occurs in most countries around the world. It can affect humans, but mainly occurs naturally in wild and domestic animals. Anthrax bacterial spores can survive for a long time in the environment, which makes disease control very challenging.

Bacillus anthracis forms spores when in contact with air (outside of an animal host). These spores are the dormant form of the vegetative bacteria and are extremely resistant, being able to survive for decades in soil and may also persist in animal hair, hide or wool.

A grazing animal typically becomes infected by eating anthrax spores in the soil. Once ingested the bacterial spores start reproducing and produce potent toxins that usually cause the death of the animal. If the carcass of the affected animal is opened and the bacteria are exposed to air, more highly resistant long-lived spores are produced, contaminating the soil and continuing the cycle.

Effective control of anthrax outbreaks involves acting quickly to vaccinate all at-risk livestock, reporting and testing of sudden unexplained deaths to detect additional cases early, safe disposal of infected carcasses to reduce further environmental contamination and movement controls of susceptible livestock from high-risk properties.

If livestock die suddenly and without an obvious cause on your property:

- report the incident immediately to your veterinarian or the Agriculture Victoria 24-hour Emergency Animal Disease Watch hotline on 1800 675 888;
- do not move the carcass;
- get the carcass tested for anthrax by your veterinarian or Agriculture Victoria Animal Health and Welfare staff. This service is free.

Previous outbreaks in Victoria have occurred in locations where there was no recent documented history of anthrax. This reminds us to be vigilant and consider anthrax as a possible cause of sudden, unexplained deaths in susceptible livestock anywhere in the state.

For further information contact your local Agriculture Victoria staff, call the Customer Service Centre on 136 186 or go to www.agriculture.vic.gov.au and search for anthrax.

Clinton was determined to develop a practical method to add value to trees on farms while reducing some of the common problems they can cause.

From left, Lucy, Hayley, Michelle, Ben, Zach and Clinton Tepper. The Tepper's are trialling a new way of farming on their property at Buln Buln in Gippsland.

The many benefits of multi-storey farming

By Peter Ronalds

Clinton and Michelle Tepper purchased their 45-hectare beef farm at Buln Buln near Warragul in 2011. Clinton has worked as a forester since leaving university and has been involved with planting millions of trees on hundreds of different farms all over Victoria.

However, he would often become dispirited when he heard people complain about problems caused by trees on their farms – including weed and pest animal issues, fire, and falling trees damaging fences.

Clinton was determined to develop a practical method to add value to trees on farms while reducing some of the common problems they can cause.

In partnership with the Westernport Catchment Landcare Network (WPCLN), Clinton proposed a design for trees to be planted with a larger space between them, which would allow pastures, crops and cattle to better utilise the land around the trees to fill feed gaps and provide protection, while providing additional income opportunities.

Layers mimic a forest

The term 'multi-storey farming' came from Clinton's trade as a forester where the top, middle and lower layers of a forest are referred to as storeys.

According to Clinton, the results were evident from the first planting.

"One crop we put in was huge with beautiful long seed heads. At this stage the trees were low, so the crop gave the trees fantastic protection," Clinton said.

The system is continually changing in its physical appearance, with the early crops providing protection for the trees, followed by the trees growing and then providing shelter and cover for livestock and the crops.

"At this stage I realised what a dynamic system it was. A site might start with a particular crop but once the trees start to exert some shade influence, other crops will be better suited. The final result being totally different than at the beginning," Clinton said.

The system also allows for livestock grazing and for the pasture or crops between the rows to be harvested for hay, silage or grain.

Clinton stresses that the system is about optimising soil use and photosynthesis through using deeper reserves of soil and intercepting more sunlight, which creates a more robust and diverse system.

The multi-storey trial area on the Tepper's property was established in 2014. A 1.2-hectare exposed location was selected – with the hope it could provide future shade and shelter for livestock. Clinton planted the trees in 13 rows, at 5.25 metres apart. Within the row trees were planted two metres apart.

A mix of silvertop ash, spotted gum and silver wattle were planted. Within one month of planting the trees different blends of pasture and cereal crops were planted in the rows between the trees. Cattle were first grazed on the site 14 months after planting and many times since.

It's important to monitor the cattle and be responsive, but they choose to graze the crops and pastures in preference to the trees.

Four years after establishment, the results show that the system works. The trees have grown quickly and more than 70 different types of pasture and crops have been trialled. Clinton measures the trees regularly for height, diameter and form. The trees compare favourably with other forestry plantings of the same species in the region.

During the dry summer months, the demonstration area retained water. Several grass species have shown potential to grow significantly further into the dry season than conventional rye grass varieties. This will provide green feed for the cattle well into summer. Other grass, legume, cereal and fodder species are also growing strongly adjacent to the rapidly growing trees.

Clinton Tepper checking the trees on the multi-storey farming trial site in 2014.

> *The system is continually changing in its physical appearance, with the early crops providing protection for the trees, followed by the trees growing and then providing shelter and cover for livestock and the crops.*

The trial site in October 2014 immediately after tree planting.

The trial site in December 2017 showing strong tree and pasture growth.

Positive soil results

The soils in the demonstration area are regularly analysed for nutrients, microbiology, moisture and bulk density. All ungrazed pasture and crop residues along with tree thinnings and prunings are mulched on the surface to be broken down by the soil.

Soil test results in the trial area, compared to the control plot, show good nitrogen levels and decreased sodium. Soil microbes play an important role in the multi-storey farming system. They help decompose organic matter such as grass, leaves and thinnings into nutrients and stable humus compounds. Soil microbes also provide services such as nitrogen fixation and plant disease suppression and produce products that stimulate plant growth and help solubilise nutrients from soil mineral particles.

Results indicate significant increases in total microorganisms, total bacteria, fungi and mycorrhiza in the trial site compared with the control. This indicates that the mulched biomass, produced by tree management activities (pruning and thinning) is having a positive impact on soil microbial populations.

The multi-storey farming concept that Clinton and Michelle have created can be applied to other types of trees, including fruit and nut trees, and the grazing of chickens, pigs, sheep or other animals. It can also be adapted to suit any farm of any size.

Clinton's design is relatively simple – plant the trees further apart and use the additional space between the trees for crops, pasture and/or livestock. This system allows for a natural symbiosis to occur, improving sustainability and productivity.

"The demonstration trial is changing the direction of where we're going with the farm," Clinton said.

Peter Ronalds is the Sustainable Agriculture Manager for the Western Port Catchment Landcare Network. For further information go to www.wpcln.org.au (Resources/Fact Sheets) to download the multi-storey farming brochure or email peter@wpcln.org.au

Can soil aeration and earthworm compost improve soil health?

By Ethne Green and Dr John Russell

Four farms in the Warrenbayne Boho Land Protection Group (WBLPG) area have participated in a trial to capture airborne nutrients in the soil through soil aeration and the use of biological amendments extracted from earthworm compost.

Dreadlock roots were evident in samples taken from Hillside Manor at Warrenbayne, near Violet Town, in July 2017.

The community farm trials came about in response to soil health decline, soil acidity and poor pasture growth in this area of north east Victoria. The trials were part of the Goulburn Broken CMA's Beyond-SoilCare project. The objectives of the trials were to double soil carbon, soil depth and pasture growth while reducing soil acidity, in one year.

Trial sites of approximately 1.5 hectares were established on each of the four properties in January 2017. Each site included a plot for the aeration treatment, a plot for the aeration and biological amendment treatment, and a control. Each treatment plot was separated by a 10-metre buffer zone.

The soil was aerated by using a modified Wallace-style aeration plough. Often confused with deep ripping, aeration is achieved when the plough's aeration slippers pass beneath the soil surface. This raises the level of the soil and creates an air-tunnel at a depth of about 250 millimetres. It also shatters any compacted layers of soil above the tunnel. The finely shattered soil provides the existing soil microbes with oxygen for 'nitrogen-binding' and gives the roots unrestricted passage for rapid growth.

Two of the trial farms were cattle properties with a history of high fertiliser use. Two sheep enterprises that had used minimal farm inputs and artificial fertilisers in recent times were also involved.

Dramatic results on cattle properties

Results at Peter and Meg Johnson's cattle property Glen Shee showed an exceptionally heavy crop of high-quality annual rye grass on the trial plot where aeration and biological amendments had been applied. Before the trial began in January 2017 the soil profile had high extractable aluminium (which is toxic to plants) and low pH levels. Aeration and biological amendments produced a 116 per cent increase in pasture in one year

> *The objectives of the trials were to double soil carbon, soil depth and pasture growth while reducing soil acidity, in one year.*

Peter and Meg Johnson comparing root development of pastures growing on each of the three treatment plots in November 2017.

Ken Heywood from Warrenbayne, near Violet Town, demonstrating the soil aeration slipper underneath the aeration plough.

compared to the control. Peter and Meg Johnson were pleased with the results.

"The aeration and application of biology (amendments extracted from earthworm compost) did add to the pasture growth. However, we don't have an aeration plough, so we will only use biology on our pastures in the future," Peter said.

The results on Ken and May Heywood's cattle property Trevista showed a lack of vigorous root and hair-root development below 120 millimetres and that bacterium below this level in the soil profile were 'stressed.' This was revealed in laboratory tests. Microbial presence in the 0–100 millimetre depth range enhanced nutrient recycling and enabled root development, while in the 100–200 millimetre depth range this was not the case due to the 'stressed' bacteria.

Ken Heywood is planning to continue the trials by using an aerator plough and added biology. He is going to hold off on applying other additives and observe the ongoing results.

Value as soil and pasture sweetener

Marg Davis believes that soil aeration and biological amendments have shown value for sweetening the pasture on her sheep property, Hillside Manor, by developing soil roots and soil structure at depth.

The soils on the property below 120 millimetres had plot-aggregated extractable aluminium levels consistently greater than 80 parts per million and soil acidity at pH 5.1 before the trial began in January 2017. The most striking finding after the trial was the vigorous root and hair-root development below 120 millimetres despite the high extractable aluminium levels. This vigorous root and hair-root development and related pasture growth is attributed to the aggregated treated plot pH rising to pH 5.5 (less acidity) and neutralising the toxic levels of the extractable aluminium.

"The biological amendments have also had the effect of sweetening up the pasture, and a massive reduction in earth-mites," Marg said.

Results on Drusilla and Ethne Green's sheep property Spion Kopje saw vigorous root and hair-root development along the aeration lines where toxic levels of extractable aluminium were consistently greater than 100 parts per million and the trial plot aggregated soil acidity was at pH 4.9. The vigorous root and hair-root development along the aeration lines is attributed to higher localised pH values (less acidity) in the root zones along the aeration lines.

No artificial fertiliser had been applied at Spion Kopje for the past ten years so the property acted as a blank slate.

Members of the WBLPG, including those involved in the early trials, hope to obtain further grants to extend the research and to purchase an aeration plough so the local farming community can evaluate the benefits of aeration and biological amendments for their properties.

The journey towards understanding the processes that encourage healthy soils, independent of artificial fertilisers, has begun.

Dr John Russell is an Agricultural Engineer from La Trobe University and Ethne Green is the secretary of the WBLPG. To see the full reports for each of the four farms go to the Gecko Clan website, www.geckoclan.com.au/projects/ or email Dr John Russell at jvrussell100@gmail.com

The journey towards understanding the processes that encourage healthy soils, independent of artificial fertilisers, has begun.

Regenerative grazing controls topsoil and improves productivity at Perry Bridge

By Eleanor McKay

Perry Bridge farmers Jen Ribolli and David and Ruth Read take a regenerative approach to pasture management. Over the last 16 years the family's beef and sheep farm, Woodcote, has pioneered innovative techniques in soil health and perennial pastures with impressive results.

Despite a hot and dry summer, there's no dust in sight as cattle are moved on the Perry Bridge property.

Jen recalls the amount of time her father spent on weed management, feeding out and fertilising when she was growing up on the farm.

Jen recalls the amount of time her father spent on weed management, feeding out and fertilising when she was growing up on the farm.

"It didn't feel right," Jen said. "We felt there had to be a better way."

The prospect of decreasing rainfall provided strong motivation for change.

"We've seen a lot of drought through here. I don't like to see paddocks blowing dust," Jen said.

Jen, David and Ruth attended workshops and programs organised by the Maffra and District Landcare Network and the West Gippsland CMA to explore other approaches to farm management.

"We had access to some very good educators – people with a lot of experience in holistic management and soil health," explained Jen.

"We learned about dividing paddocks into smaller lots and rotating the stock to allow the pasture to recover. We started to focus on the function of living soil and understanding the relationship between the health of soil and pasture."

Holistic grazing principles

According to David, the first change they made was moving to cell grazing.

"It didn't get us where we wanted to be. We were getting good production, but not the finish we wanted on the stock to get them to a suitable market weight. Then, through a grazing management course, we learned about a holistic approach to grazing that focused on a long recovery period for the plants," David said.

By adopting the new principles, they increased perennial pasture, which now covers 80-90 per cent of the property. The farm's original 25 paddocks were divided up into 88 smaller lots, with large mobs feeding in small areas, while the rest of the property recovered. Moveable electric fences created wagon-wheel divisions in the larger paddocks, allowing stock to be rotated around central watering points.

"Stock density is a way of managing ground cover and diversity," said Jen. "We currently have around 30 different plant species. We manage the weeds when we need to, but weeds can show us what's going on with our management."

In this year's challenging conditions, the results are clear to see.

"In late April, after a week of 30-degree temperatures, with a howling northerly and topsoil blowing across much of the district, we shifted a mob of cattle without raising any dust. That demonstrates the benefits of managing your ground cover," David said.

David Read (third from left) leads a farm walk at Woodcote.

> *Despite a hot and dry summer there is still plenty of feed for their stock and a solid cover of perennial grasses.*

Despite a hot and dry summer there is still plenty of feed for their stock and a solid cover of perennial grasses.

"The perennial grasses still have active solar panels and the soil and its microbes are protected with a litter layer. The stock has enough to eat and keep performing and that creates turn-over for our business," David said.

Highly efficient use of rainfall

David believes that the grazing and pasture management system ensures they use every available drop of rain and maximise their production.

"When the rain comes it will all soak in. There will be no loss of soil, no room for weeds to grow, the grass will take off and give us plenty of winter-feed. With deep-rooted perennials that have time to recover, the plants also access more nutrients which cuts our fertiliser bill dramatically.

"Our grazing charts track the number of animals and the amount of feed we have ahead of us. We know exactly how many animals we can run per hectare, based on an average rainfall. Each animal that comes on to the property will have three months of feed in front of them. This means there is always time to make a decision about our stock levels, so we have the right number of animals for the rain that we've had," David said.

This approach helps Ruth, David and Jen to purchase or take on agistment stock with the knowledge they have plenty of feed and groundcover. In many instances, this occurs while others are selling off their stock or feeding out when fodder is at inflated prices.

Every 12 months the Woodcote team meet up with their grazing group, made up of farmers from across Australia. Firm friendships have been made and it's an opportunity to share ideas and compare the results of grazing management on different farms in different climates. Workshops from grazing experts challenge established knowledge and encourage the group to trial new approaches.

"We wanted to have a neat formula, but you need that chaos in there. That chaos is some new learning we added to our system in the last two years. We match our stock to slightly below our carrying capacity, so that gives us a bit of flexibility. Even if we get it wrong, the system is resilient, we know how to fix it and how to let the land recover," Jen said.

This project is part of the Healthy Soils Sustainable Farms initiative supported by the West Gippsland CMA with funding from the National Landcare Program.

Eleanor McKay is Communications and Marketing Project Officer for the West Gippsland CMA. For more information visit www.wgcma.vic.gov.au (Soil Trial Directory)

Ruth Read explains regenerative grazing principles.

Can chicken manure increase soil health

Soil health is an important issue for all farmers, and ensuring healthy soils starts with understanding what type of soils you have and how you can improve them. The Goulburn Broken CMA's Beyond SoilCare project (funded through the Australian Government's National Landcare Program) was launched in 2011 and has increased community understanding and awarenss of soil health in the region.

Community groups have received grants to investigate issues they see as important. In 2013 the Soil Health BestWool BestLamb Group was keen to learn more about sodic soils – this refers to soils that are chemically inhospitable, hard setting and prone to waterlogging. The group decided to investigate if chicken manure could increase soil health by increasing soil structure in sodic soils.

Chicken manure had been successful in increasing organic matter on soils on a cropping country project in western Victoria. In addition, chicken manure is easily accessible in the region due to the large chicken farms.

The research was conducted on Neil Harris's farm at Costerfield. Neil chose some of his worst country for the trial. Chicken manure was applied at depth in plots that were then sowed to a high value seed oat crop. The aim of the oat crop was to recoup the costs of the manure quickly (from previous trial work, $1200 per hectare), then use the paddock with its increased porosity and water holding capacity for grazing. It was hoped the better-quality pasture would produce a longer growing and grazing season.

Neil Harris (centre) checking the soil on his Costerfield property during a soil health field day in 2013.

> *Soil health is an important issue for all farmers, and ensuring healthy soils starts with understanding what type of soils you have and how you can improve them.*

The practice is expensive, depending on cartage for the manure, but could still be cheaper than purchasing more land, as surrounding land prices start at around $3000 per hectare.

The trial included three replications of four treatments and a control treatment where nothing was done. The trial sites were 0.4 hectare in size. The project got underway in June 2013 when the oat crop was planted.

A contractor who collected and carted (from local sheds), also spread the chicken manure. Soil samples were collected in October 2013 and September 2014.

The four trials included:

- a deep rip to 30 centimetres;
- a deep rip adding chicken manure at 20 tonnes per hectare to 40 centimetres in depth;
- a deep rip adding chicken manure at 12 tonnes per hectare plus humates at one tonne per hectare to 40 centimetres depth;
- chicken manure applied on the surface at 20 tonnes per hectare and lightly worked in.

and productivity in sodic soils?

By Karen Brisbane-Bullock and Norm Tozer

In 2013 the crop failed due to poor germination and waterlogging after sowing. In 2014 the crop failed again, however annual rye grass was evident.

By November 2014 results showed an average increase in crop production ranging from 43 per cent in the surface applied chicken manure treatment, to 54 per cent in the treatment where 20 tonnes of chicken manure were applied per hectare and deep ripped to 40 centimetres.

The trial was complicated by waterlogging after sowing in 2013 and 2014 and a shift in crop in 2015 due to volunteer rye grass showing better persistence than the original seed oats.

Despite these challenges the group expects the trial site to enhance ecosystem functions by improving soil moisture, nutrient retention and carbon cycling. Subsequent improvements in soil health and water holding capacity may also see changes to the use of the land, such as moving into cropping perennials, which was not feasible before.

Neil Harris believes the trial has demonstrated the possibility of turning poor land into more productive land for grazing sheep or cropping.

"I am glad we tried this on our land as it shows us what can be achieved. The future is looking drier, so trying to grow more with less water is the way to go," Neil said.

The partnership between the Goulburn Broken CMA and the BestWool and BestLamb Group has seen 92 community groups supported with soil health projects involving more than 4500 participants.

Karen Brisbane-Bullock is the Goulburn Broken CMA's Soil Health Project Officer. Norm Tozer is the Coordinator of the Soil Health BestWool BestLamb Group. For further information email Karen at karenb@gbcma.vic.gov.au

The trial site in October 2013. This was taken three months after treatments were applied with rip lines still evident. The capeweed is outside of the trial area.

The trial site in May 2018. This was taken five years after the trial and with no autumn rain.

> *Neil Harris believes the trial has demonstrated the possibility of turning poor land into more productive land for grazing sheep or cropping.*

Around the State – News from the Regional

Aboriginal Landcare Facilitator

In July, NAIDOC celebrations were held across Victoria. Many groups came together to celebrate the history, culture and achievements of Aboriginal and Torres Strait Islander peoples. This year's theme 'Because of Her, We Can' gave us the opportunity to showcase the amazing work of our female Elders and leaders.

The Glenelg Hopkins CMA, in partnership with Gunditj Mirring Traditional Owner Corporation and Winda-Mara Aboriginal Corporation, recently celebrated the CMA's flagship waterway project – Budj Bim Connections – at the Tyrendarra Indigenous Protected Area. Traditional Owners, local landholders, CMA staff, and members of the Southwest Environment Alliance enjoyed some traditional Aboriginal foods such as kooyang (eel), before taking a guided tour of the World Heritage nominated site from Gunditjmara Elder Aunty Eileen Alberts.

For further information contact Jackson Chatfield on 0419 504 541.

Corangamite

The Heysterbury District Landcare Network's (HDLN) Connecting Corridors and Improving Productivity with Biofund project, supported by a Victorian Landcare Grant, is combining education and revegetation to help fire-affected farmers. The March 2018 fires interrupted some projects in the region, but all are now underway.

Students from Gilson College at Taylors Hill and Timboon P-12 School will join with Parks Victoria Junior Rangers to plant trees and learn about revegetation techniques and safety management from the HDLN during the spring planting season.

The HDLN have also been running community nursery events to teach students about native flora and the importance of biodiversity.

Bret Ryan has been appointed as Regional Landcare and Volunteer Coordinator. Bret has an extensive background in Landcare. He previously worked for the CMA as a Regional Landcare Facilitator and is a member of the Stony Rises Landcare Group.

For further information visit www.ccma.vic.gov.au (What we do/Community/Landcare) or contact Bret Ryan on 0433 569 972.

Gunditjmara Elder Aunty Eileen Alberts explains the 6600-year-old aquaculture system constructed by Gunditjmara people to a tour group at the Tyrendarra Indigenous Protected Area.

East Gippsland

Landcare groups in the region were inspired by a workshop run in Bairnsdale in May by Les Robinson. Titled 'Passion Mashin' the workshop was designed to reinvigorate groups by encouraging members to strengthen and then use their networks to grow memberships. It encouraged participants to think differently and challenge their current practices.

The CMA's Community Programs Committee undertook a bus tour to several sites across the region in May to review current projects and meet with Landcare volunteers. The committee was very impressed with the commitment and passion of the volunteers.

For further information visit www.egcma.com.au (What we do/Landcare) or contact Carloyn Cameron on 5150 3582.

Glenelg Hopkins

A number of excellent community events that have brought people together to celebrate and learn about our natural environment have been held throughout the region in recent months.

The inaugural Cavendish Red Gum Festival attracted more than 1000 people on a wet and windy weekend in April. Participants enjoyed a range of crafts, food, music and art. The committee has decided to run the festival as a biennial event.

CMA staff were on hand at Sheepvention in Hamilton in early August to highlight local projects and discuss farming issues with the local community.

The biennial Lake Bolac Eel Festival was a great success in March. This vibrant festival attracts visitors from all over Australia. This year's event celebrated Aboriginal culture, art, music, history and tradition.

For more information visit www.ghcma.vic.gov.au (Get involved/Landcare) or contact Tony Lithgow on 5571 2526.

Goulburn Broken

In early winter the region's groups, networks and CMA staff were busy working hard on grant applications. Much effort has been put into making the most of the available funding. Our communities have had the greatest success with Victorian Landcare Grants. Accessing some of the larger grants, for example, Australian Governments National Landcare Program Smart Farming Partnership funding, is becoming increasingly difficult.

The planting season is underway with revegetation projects well into implementation thanks to the winter rain. Planting days are a great way to engage with schools and the broader community and get out into the landscape.

The Minister for Agriculture Jaala Pulford visited the region in July to highlight the Victorian State Government's Recreational Fishing Grants that are available for local community groups.

For further information visit www.gbcma.vic.gov.au (Community natural resource management) or contact Tony Kubeil on 5761 1619.

Landcare Coordinators

Mallee

Landcare groups in the region have been busy with controlling rabbits, revegetation projects, monitoring and reporting. Many groups submitted applications for the 2018-19 Victorian Landcare Grants. Interest from local schools in applying for Victorian Junior Landcare Grants and Biodiversity Grants was also strong.

In the dryland regions landholders have finished sowing their crops. However, growers are anxiously watching the sky for follow up rain after a fairly dry autumn with sub-soil moisture levels tending to be low.

Mildura hosted the sixth National Malleefowl Forum in August 2018. For the latest findings from the forum visit www.nationalmalleefowl.com.au

For further information visit www.malleecma.vic.gov.au (Get Involved/ Landcare) or contact Louise Nicholas on on 0408 615 846.

North Central

Preparing grant applications has kept the region's groups and networks busy, with strong interest in the 2018-19 Victorian Landcare Grants. Eleven project grants and 44 group support grants were successful across the region.

Training for Landcare facilitators is the focus for the coming months. The training will be held in partnership with the Goulburn Broken CMA. The key topics include revitalising groups, engagement and building partnerships, and the basics of mapping.

Landcare groups and networks can now map projects and activities of any kind through the CMA's online mapping portal, iMap. Free training workshops for groups and networks are available on request.

This year's Chicks in the Sticks event will be held on 20 October 2018 in Echuca. Make sure you are on the North Central Chat newsletter mailing list to secure your ticket.

Regional Landcare Coordinator Tess Grieves is on leave until early October 2018.

For more information visit www.nccma.vic.gov.au (Landcare) or contact Darren Bain on 5440 1893.

North East

The CMA has welcomed Katie Warner as the new Chief Executive Officer. Katie was previously Business Development Manager and Deputy CEO of the Goulburn Broken CMA.

The CMA is working with the Upper Ovens Valley Landcare Group and Myrtleford and District Landcare and Sustainability Group to develop and implement priorities for the Upper Ovens River Catchment Action Plan. This project is funded through the Victorian Government Water for Victoria project, which involves extensive community consultation to identify and implement community environmental, social and cultural priorities for catchments and waterways.

Landcare and other community groups in the region are now beginning to deliver their 2018/19 Victorian Landcare Grant projects.

For more information visit www.necma.vic.gov.au (Landcare and community projects) or contact Tom Croft on 02 6043 7648.

Port Phillip and Western Port

Congratulations to the groups and networks in the region that had a project supported through the 2018-19 Victorian Landcare Grants. Landcare received a boost in Whittlesea with a start-up grant to help the formation of the new Whittlesea Landcare Group.

The Intrepid Landcare movement is now underway in the region with the formation of the Western Port Intrepid Landcare Group following a successful leadership retreat in June for young and aspiring Landcarers.

With the completion of their five-year Australian Government funded projects, the CMA's two Sustainable Land Management Coordinators, Anthony Dufty and Sarah Halligan, have moved to new positions. Regional Landcare Coordinator Doug Evans recently left his role after a sixteen-year contribution. Doug's commitment, knowledge and wisdom will be greatly missed. Please see the story on page 24.

For further information visit www.ppwcma.vic.gov.au (Landcare and Sustainable Agriculture) or contact 8781 7900.

West Gippsland

The region's Landcare networks and groups have been extremely busy over the past few months with field days, strategic planning and training workshops.

The biennial Strategic Planning Gathering at Wilsons Promontory was a valuable two-day event filled with new ideas and networking. Topics included working with shires, branding projects, why retrospective mapping of Landcare projects is a good idea and prioritising projects.

A coastal retreat hosted by Gippsland Intrepid Landcare in May saw 23 young people weeding along the Wilsons Promontory foreshore, surfing, listening to inspirational speakers and undertaking leadership training.

All of the region's Landcare networks are looking to support new on-ground projects. If you have an idea for work you would like to do on your property, please get in touch with your local Landcare facilitator or coordinator.

For more information visit www.wgcma.vic.gov.au (Getting involved/ Landcare) or contact Marnie Ellis on 1300 094 262 (Kathleen Brack is on maternity leave).

Wimmera

Congratulations to all volunteers and support personnel on another successful planting season in the region. Thousands of new trees, shrubs and understorey plants have been planted.

2018-19 Victorian Landcare Grant projects are now well underway. Groups are implementing a wide range of activities including tree planting, on-farm demonstrations, engagement events, training, and community-based pest plant and animal control works.

The annual Wimmera Biodiversity Seminar was held on 6 September 2018. The event will include a celebration of the 50-year anniversary of the establishment of the Little Desert National Park, an early precursor to the Landcare movement.

Landcare partnerships with local Traditional Owners continue to grow. The community is planning a second Yunguip bark canoe event for later in 2018. This will be held in partnership with Barengi Gadjin Land Council to support community aspirations and celebrate the rich cultural values of the lower Wimmera River.

For further information visit www.wcma.vic.gov.au (Get involved/ Landcare) or contact Joel Boyd on 5382 9919.

In brief

Farewell Doug Evans

In August, Doug Evans left his position of Regional Landcare Coordinator with the Port Phillip and Westernport CMA. Doug started in the role in 2002 and has been a committed advocate for Landcare in his region.

His love of nature started when he was young. Collecting lizards and keeping a few birds as a boy led to a zoology degree. His work with environment groups started with the establishment of the Greenlink Sandbelt community indigenous nursery.

Doug has been the Chair of the Christmas Hills Landcare Group since its formation in 2006, and a founding Board member on the Nillumbik Landcare Network since it began in 2013.

Doug believes that Landcare groups and networks are most successful when they have clarity of direction.

"Common goals and a shared sense of purpose is unifying for members and partners. It's worth taking the time to do good planning and see how you fit into the bigger picture," Doug said.

He also considers that being socially inclusive, having good governance, organisation, and access to resources are the necessary ingredients for Landcare groups to really fly.

Doug Evans with the President of the Western Port Catchment Landcare Network, Marijke de Bever-Price, at a planning session at the Bunyip Community Hall last year.

Soil resources

***Soil Health Guide North Central Victoria* (2016)**

This practical guide provides instructions for farmers on visual soil assessments in the paddock in order to identify soil health issues. Soil health observations and results are linked to soil condition, limits to productivity, and management actions to improve soil health. The guide uses nine simple visual tests that can be conducted in the paddock and includes a score card for farmers to record test results.

The guide is available on the North Central CMA website at www.nccma.vic.gov.au (Resources/Publications).

Corangamite Region Brown Book

The *Brown Book* is an online resource for managing soil health in the Corangamite CMA region. Simple solutions are provided to a series of soil health problems and questions. Topics covered include assessing soil condition, managing soil biology, soil carbon, soil structure, nutrient imbalances, soil acidity and soil health for grazing and cropping.

The resource is available online at www.ccmaknowledgebase.vic.gov.au (Soil health)

***Understanding Your Soil Test, Step by Step* (2015)**

Produced by Cath Botta from the Yea River Catchment Landcare Group, this practical booklet aims to assist land managers in understanding and interpreting soil test data. The information was written for the dryland grazing zones of the Goulburn Broken CMA region, but can be applied to other dryland grazing zones in Victoria.

The booklet is available to download from the Yea River Catchment Landcare Group's website at www.yearriverlandcare.wordpress.com/

The *Victorian Landcare & Catchment Management* magazine is published by the Victorian Government Department of Environment, Land, Water and Planning and distributed in partnership with Landcare Victoria Incorporated and the Victorian Catchment Management Council. The magazine aims to raise awareness of Landcare and natural resource management among Victorian farmers, landholders, the Victorian Landcare community and the wider community.

Mailing list enquiries and to receive your copy via email alert
Contact Landcare Victoria Incorporated
Phone: 9207 5527 Fax: 9207 5500 Email: info@lvi.org.au

Read the magazine online
To access the Victorian Landcare & Catchment Management magazine online (as web pages or pdfs) go to www.landcarevic.org.au/landcare-magazine/
Back issues of the magazine can be accessed online as pdfs.

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Next issue

The next issue of the magazine, to be published in January 2019, will feature stories on women in Landcare. Stories on the women who have shaped Landcare in Victoria, and continue to contribute to it at a local and broader level, are sought.

We are also interested in hearing about the challenges women have experienced through their involvement in Landcare and how we can encourage more young women to participate.

Please contact the editor with your story ideas and suggestions for inspirational women that we can feature in this issue. The magazine fills up very quickly so please get in touch well before the contribution deadline.

Contributions should be sent to the editor by Friday 7 November 2018.

Carrie Tiffany, editor

Victorian Landcare and Catchment Management Magazine

Email: editorviclandcare@gmail.com