

Case studies: Two communities reviving natural water systems

Author: Paul Martin

Directly north of Sydney, halfway to the Queensland border and a little south of the city of Tamworth, two communities are working to revive natural water systems that underpin rich biodiversity and valuable grazing and cropping. A record-breaking drought that ravaged NSW from 2015-2019 brought the Murray-Darling river system to the brink of collapse. It amply demonstrated the need to protect and restore the functioning of natural water systems across the landscape, which confirmed the commitment of these communities to create a more drought resilient landscape. Both communities are keen to maintain groundwater security and reduce drought risk, while protecting native plants and animals and the sustainable use of water consistent with State and Federal priorities.

Both groups aim to retain water in the landscape, by re-establishing natural structures within streams/drainages and the landscape that help to hold water and assist percolation into the soil and into local aquifers. As well, they are changing how the natural resources are used (including how vegetation and livestock are managed) to protect landscape structure and vegetation. Both groups expect that by reducing the loss of water from their local landscape they will support biodiversity and create natural resilience to unreliable rainfall.

North-Western Local Land Services have provided financial assistance for the physical work and to assist with community events, but the bulk of the investment in cash and kind comes from the community. Community members and contractors are working at individual property and landscape scale across tenures, and the stewardship capabilities and ethos of the community is being strengthened in the process.



This case study is based on interviews with leaders in each group and a review of some of their documents.

Rehydrating the Upper Mooki

The Mooki River forms near Quirindi, and ultimately joins the Namoi River (part of the Murray Darling river system) near Gunnedah, some 90 km to the north-west. Its irregularly shaped catchment is about 80m at its maximum width. The Upper Mooki system includes the Warrah, Big Jack's, Little Jacks, Miller's, McDonalds, Pump Station, Yarramanbah, Phillips and Black creeks that flow through the fertile grazing and cropping country. The Upper Mooki Landcare Inc (UMLC) membership fluctuates around 30 landowners and managers from across this large area.

UMLC has a strategic focus on water; functional ecosystems, climate change adaptation, soil health, habitat, aboriginal culture, and strengthening human capital (through information, education and mutual support). Over the years its members have carried out many projects, addressing revegetation, invasive species control, protecting riparian zones, habitat protection, and (particularly) assisting landholders with environmentally sensitive farming methods such as regenerative agriculture.

The major drought at the turn of this century caused UMLC members to become even more aware that damage to the ability of the landscape to hold water in the soil, creek beds and large subsurface gravel beds was a growing risk to sustainable agriculture and the environment. UMLC decided that this needed to be addressed.

UMLMC members who are responsible for 13 properties covering approximately a quarter of the Mooki catchment worked with the Local Land Services and the Landcare offices in Tamworth to create an ambitious Rehydrating Upper Mooki Catchment project. Particularly focused around nine creeks (and ephemeral streams, aquifers and ponds or dams), the landholders have a systemic approach to that restoration, combining on-ground works, changes to farming practices, capacity building, and mutual support. Details are available at <https://landcare.nsw.gov.au/groups/upper-mooki-landcare-group/upper-mooki-rehydration-project/>

Earthworks, riparian repair, enhanced grazing management practices, tree planting and multi-species vegetation are being used to increase groundcover, re-establish hydrological and ecological functions, and build agricultural and environmental productivity and drought resilience. Some UMLMC members are exploring potential biobanking and carbon farming opportunities, to strengthen the financial basis for ongoing environmental stewardship.

Workshops and site visits, designed to enhance team-work and motivation as well as to improve practices, continue to be conducted.

By May 2021, work had been underway for 16 months, across the Upper Mooki. The achievements include:

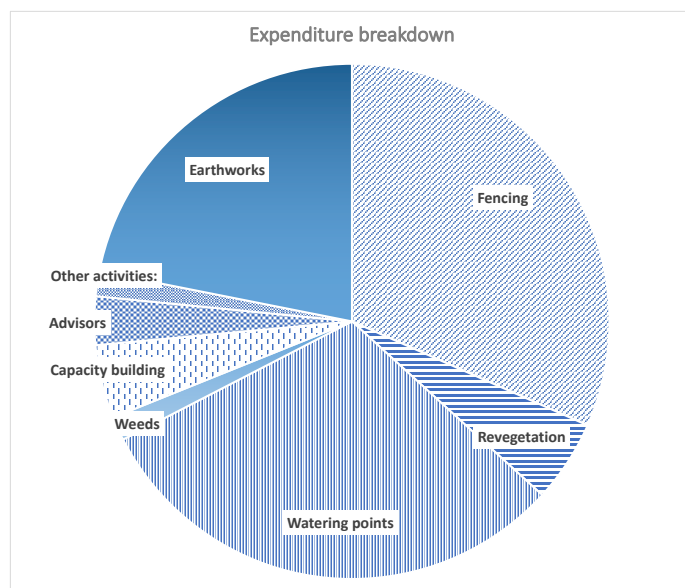
- Physical works: sill spills, gully diversions, “wire and water” (creeks fenced out and alternative stock water points installed), rebuilding contour banks and culvert management;
- Training of landholders in holistic management;
- Tree plantings;

- Events including
 - 3 workshops on the functional restoration of creeks;
 - a public theatre event showing “Kiss the Ground”, with expert speakers;
 - a large (200+) event, featuring the strategies and achievements of 8 innovative farmers;
- A new UMLC 5-year strategic plan, to build on and maintain the momentum.

Resourcing the Upper Mooki rehydration.

The voluntary contribution of landholders has been the core resourcing approach. Re-establishing the natural functions of hydrological systems is an ambitious (and nationally important) aim for land stewards who have limited resources and volatile incomes. The assistance from the LLS and Landcare was however indispensable, given the severe economic (and motivational) impacts of the major drought on those who have voluntarily committed time and money

The direct cost of on-ground works was estimated as \$658,604, jointly funded by the UMLMC members and the LLS. The breakdown is indicated below.



What is not reported is the voluntary investment by UMLMC members in coordination and management, meeting attendance, hire of facilities, travel, and communications, catering, or the cost of changing production practises, or foregone production. The Chair of the UMLMC guesses that she and the committee invest over 200 hours each year, and that members contribute over 400 hours, in management, coordination, capacity building activities, or stewardship activities outside this project. At a standard cost of \$40 per hour, this investment exceeds

\$24,960 pa. The substantial (but incalculable) investment that members make to change their production system to implement the more sustainable methods promoted through the UMLMC is additional to these numbers .

Wallabadah: building on social capital

The second case study is the work of the Wallabadah Creek Catchment Community (“WCCC”). Their area is east of the Upper Mooki Landcare community area, nestled against the Great Dividing Range. The 13 landholders who occupy the Wallabadah Creek valley are all members of the group, which operates as a subcommittee of Tamworth Regional Landcare. The NSW National Parks and Wildlife Service, which operates the Wallabadah Nature Reserve, and the Liverpool Plains Shire Council, which is responsible for the

Wallabadah village water supply which is derived from the valley, are interested stakeholders.

The Wallabadah Creek valley has 3 principal creeks and a number of ephemeral streams. Its geography means that the groundwater is largely captured and contained in the valley basin, and this traditionally provided a reliable groundwater supply for both rural landholders and the village.

However, the record-breaking drought at the turn of the century and the 2015-2019 dry changed that:

“The village borefield went dry in the early 2000s and a number of groundwater sources showed they are not as reliable as they once were in the drought just finished. For many landholders, it was the first time ever



they had had groundwater concerns inside this particular valley. They would say that the groundwater used to run more than it does now, we've always had gravel beds and now we don't.” says George Macdonald – the chair of the Landcare group – while we sit in the café that serves as an informal community centre. “What really pushed this along for me was my wife, who came from Sydney, said that she missed seeing water. That made us look at the creek near our house. As it was called Water Gully, we figured that it must have originally had water in it that we could see from the house. We thought about building a little dam, but then we decided that bringing the creek back to what it once was – part of a chain of little ponds – would be a better idea. That got me started on the creek and the Wallabadah catchment.”

Observations like this, and the loss of groundwater in the 2015-19 drought, catalysed the valley community to form their own group to address the reliability of the groundwater supply. Though other longer-established Landcare groups often have more diverse aims, for WCCC it didn't make sense to talk about regenerative agriculture or strategic grazing, or carbon farming. The community wanted to maintain its focus on water security, its pivotal economic and environmental issue.

WCCC was formed as a subcommittee of Tamworth Regional Landcare in 2019. Reflecting their commitment to an evidence-based approach they got advice from technical experts, including DPI – Water. This overturned some beliefs that distracted people from the real (local) causes of declining water reliability, and addressing those causes. The WCCC membership in general identified that water and water security was essentially a local problem, which could be addressed by landholders taking responsibility and acting both individually and collectively.

One action is the rebuilding of drainages across the catchment. “What we did is exemplified by our work on Water Gully, using the advice of Brad Davies (from adaptiv hydrological consultants). We used instream structures to slow and direct the water flow, to re-establish a more natural enviroment. This is all low tech and low cost, using available resources and manpower.”

“We developed a close collaboration with local earth moving contractors, building their capacity to work with local landholders while demonstrating localised practices. This provided a great example of good rehabilitation practice that our landholders can adopt, and they have seen its effectiveness. In the creek bed we now have up to a metre and a half depth of sediment deposit, and this is beginning to rebuild the condition of the drainage. This is also leading to a rapid improvement in plant biodiversity. Anyone can see the difference between the treated and untreated portions.”

“The physical works have been coupled with management changes to assist revegetation, and this has had a demonstrable effect on the landscape and the creeks, which is what we wanted”. (for details see <https://www.lls.nsw.gov.au/news-and-events/news/nw-news/2020/wallabadah-water-gully-rehabilitation>)

The successes in Water Gully gave the community confidence that they could recreate that success across the valley, and re-establish the natural functions of the creek system to strengthen the groundwater resource and make water more reliable. They have also seen that this could bring biodiversity back into the creeks, bringing them back to life. Alongside this has been a greater realisation of how important it is to manage grazing to maintain vegetation cover, to prevent erosion and assist water infiltration into the soil. The adoption of management changes including the use more distributed watering points, and other stock management approaches, has accelerated.

Resourcing efficiencies

The work since 2018 to date is funded by landholders assisted by some \$200000 in grant funding sourced through the LLS. This has assisted 9 projects by 10 landholders addressing water, vegetation, grazing, alternative income and indigenous issues.

The WCCC has particularly benefited from a fruitful collaboration with the North West LLS staff, but the LLS and the broader community have also benefited. George estimates that the community commits about \$3 for every \$1 of government investment for direct works, but this is only the tip of the iceberg in terms of value delivered.

Their work so far has built landholder capacity and motivation, through direct experience and observation. It has started to create the broad community awareness that what landholders do can determine how reliable their rural and village water supplies will be. The WCCC has also emphasised developing the understanding and capacity of local earthworks contractors, which is proving to be an effective strategy for change across the catchment, and more widely.

As George explains: “ we can do our work in a way to also transfer knowledge to the blokes who run heavy equipment like 32 tonne diggers and bulldozers. These guys now know how to use their equipment to help other landholders improve management of in their drainages. The lessons we have learned are being transferred, without seminars or courses.”

"The operators also have a sense of ownership of the landscape , and imparting the knowledge to them allows them to do a lot more than operating a digger and a truck – they are part of the community and they can help with knowledge transfer. It's very much a collaboration - build the skills, work together and together we come up with something that works“

Like most rural communities, the Wallabadah community is expert at doing a lot with little money. As has also been the case with the Upper Mooki, the serious economic impact of the drought made this an even stronger imperative. George points out that landholders lost thousands of stock, and spent thousands of dollars trying to save what they had, through the drought. Despite this many have “dug deep” to contribute to the works needed to protect and restore their catchment water security.

George agrees that the financial and the emotional capacity of rural communities, particularly in the bad times, is an important concern. He suggests people's desire to look after the environment waxes and wanes. Consistent stewardship can require “mining an emotional resource” when the farmer experiences a devastating loss of animals or crops or finances. He points out that “you are looking at it every day – and it is nothing but sunshine with no chance of rain, and the dust starts to blow. It is no wonder that there is such a high suicide rate” and admires the fact that people remain willing to do the right thing even when the conditions are so adverse.

“We will never have enough money to do enormously engineered projects. Even if we could raise this capital, I am not sure that this would be the right approach. We are always trying to work out what we don't need to do, where we can rely on nature's recovery processes and where the outcome improves or is at least neutral on productivity”.

The community has focused on leveraging what is available. This not only includes engaging and training local contractors, and learning from experience. It also includes voluntary labour and equipment and using local materials imaginatively, to re-create in-creek barrages and snags. The sustainability of the work has been tackled with a focus on knowledge remaining in the community, to leverage the project investment into permanent human capital.

George has some thoughts about what policy or other changes are needed so that groups like the WCCC can maximise their contribution to environmental stewardship. He suggests that groups would benefit from having a broad and flexible resourcing strategy, rather than detailed investment plans because conditions and needs change, and the priorities of investors change. Clear investment priorities and principles enable community groups to pursue whatever opportunities become available. The WCCC has used small opportunities to pursue larger goals. This does require creativity, administrative flair and entrepreneurship. Some community groups may lack people with the experience, confidence and training to do this well, which puts them at a disadvantage.

George points out that pursuing funds can also be practically and emotionally challenging. “The group is constantly asking itself: where's our next feed going from? How can we retain the resource we built with the last project, in order to carry out the next project? That just becomes exhausting.” Though carbon markets and biodiversity credits are possible ways to fund better stewardship, these are not yet viable for most landholders. Transaction complexities, inflexible rules, the lack of liquidity, and the low value of likely payments, limit the usefulness of these approaches. Should these markets improve then they might partly fund environmental stewardship, but for now they are not seen as feasible tools.

George suggests that better structures for continuous learning from each other, or sharing resources could provide real benefits. Community groups could share post-project evaluations, equipment, or lessons from practical experiments that could inform other groups. A “library” of

1. lessons from experience, and/or
2. specialised equipment, and/or
3. fundamental agricultural and hydrological research

might enable economies of scale or learning for community groups.

What these case studies tell us?

Both case studies illustrate how voluntary community action can overcome “the tyranny of private tenure” to enable the landscape scale restoration of the environmental systems, which science tells us is essential to sustainable production and biodiversity. The social capital of human relationships and trust is being used by both groups to build the natural capital that society needs, for environmental and economic purposes. Both groups are converting abstract concepts of stewardship, duties of care, and shared responsibilities into practical reality on the ground. The way the good stewardship message is communicated to landholders is critical – focus on productivity and water security, rather than any vogue management framework.

In each case, limited government funding is being leveraged at 2 levels, and in many ways. The immediate level is project specific. The case studies show many specific projects where the community at least doubles the public investment resources. However, the actual private leverage is far larger than is reported in the bureaucratic documents. The uncounted project benefits delivered by the private land stewards in these case studies include:

- avoiding the transaction costs that are often involved with government work on private land. These costs can include delay, negotiation, supervision, disputation, and sometimes compensation;

- Economies from existing relationships, which allow informal coordination and trade-offs that could not be readily achieved through formal mechanisms;
- Informal supervision within the community to ensure adherence to the social agreements that are the basis of efficient projects;
- Avoided coordination costs, by using a social network that has proven communication and organisational arrangements already in place;
- Efficiencies from local site knowledge, and knowledge of personalities and capabilities that may be available;
- Cost savings from the voluntary contribution of resources or capital.

The case studies demonstrate that strategic leverage is more than what is counted in project documentation.

- Both projects demonstrate the power of successful works, carried out by local people, on local land, to stimulate community participation.
- They demonstrate how the combination of project work, relationships and funded expertise can catalyse short term change, and also can create local expertise that can be applied across the landscape well into the future.

Finally, the cases suggest that great stewardship value can be delivered through community action, but support is needed to maximise that value. As well as needing money (which will probably always be in short supply) the leaders of both groups highlight the significant challenge of maintaining community motivation and community capacity to invest under adverse market or environmental conditions.