Flows for the Future Newsletter

Issue 6 | AUG 2023

Our Sixth Edition

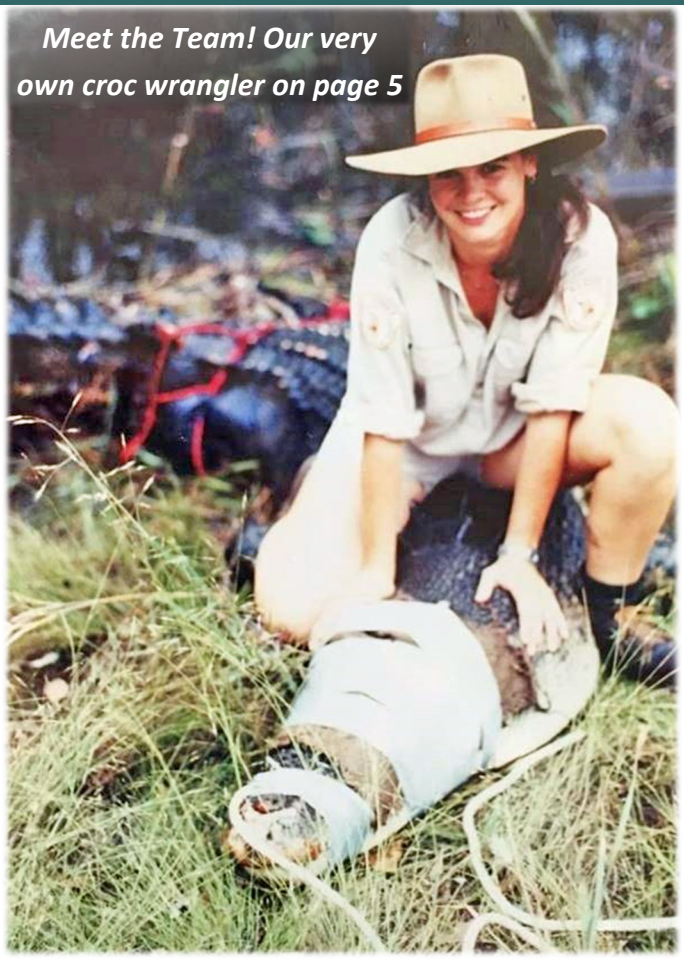
Welcome to this edition of the Flows for the Future newsletter. You are receiving this newsletter as a valued member of our low flows community, and you are important to the success of the program. We hope that you enjoy these updates and find them useful and informative.

Overview

Did you know that more than 400 sites in the Eastern Mount Lofty Ranges and Marne Saunders catchments pass low flows using a variety of solutions? We recently revisited one of the first gravity devices built in 2005 – it is still delivering low flows in the Marne and is in good working order. Read more about it on page 2.

In staffing, Tricia Williams joined the Flows program as Program Leader in May 2023. Tricia brings extensive knowledge to the program, owing to her studies and work in hydrology, water policy and teaching.

First up in this edition, Barry Hewlett from Meadows shares his experience of land management in the Upper Finniss catchment and joining the Flows for the Future Program. Thank you, Barry, for sharing your story!



Meet the Team! Our very own croc wrangler on page 5

Barry Hewlett, life on the land

My farm property at Meadows was purchased some 23 years ago from the Thomas family, who had a long association with it, running a large dairy operation. This was their home property, and a significant investment was made into accessing water via dams and bores.

Since taking over ownership, the property has been used for grazing cattle and hay production. My history with the land started as a child, growing up in my parents' orchard/market garden in Lenswood, where I helped until I graduated from university and left for an interstate job. 20 years later, I returned to the Adelaide Hills to live; as they say, you can take the boy out of the country but you can't take the country out of the boy.

I am a fifth-generation Australian, with my parents' families having a significant history and contribution to the Adelaide Hills farming scene – the Piccadilly/Summertown/Cherryville

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areas with the Gore, Collin, Bungey and Hann family names on my mother's side, and the Williamstown/Kenton Valley/ Lenswood area on my father's side, with Hewlett, Murfitt, Clarke, Coad to name some of my 32 lines of heritage.

There is a creek running through the property and 2 large dams. Installing the low flow device involved significant trenching and civil works as it had to bypass the 2 dams. Still I was keen for it to go ahead for a healthier water course. The work that the Flows for the Future field officers undertook, and the construction works led by Tony was first class. Before Tony left the site, he ensured the area of disturbance was completely compacted and levelled.

Although some improvements have been made, my working commitments have meant that I have had limited opportunity to dedicate time and resources to the property, but I plan to address this soon. My goal is to rehabilitate the creek, remove weeds, plant native trees, and leave the property in a better, healthier state so that future generations can enjoy it as much as I have.

Image: the device installation work is no longer noticeable on Barry's property, aside from the device delivering low flows to the creek. *Image supplied by landholder.*

Gravity low flow devices, passing environmental flows into the future

In April 2023, Flows for the Future field officers visited a unique gravity device at the Marne River headwaters, following the first significant flows to this catchment since 2017. The device was built in 2005 for research commissioned by the River Murray Catchment Water Management Board, and undertaken by then PhD student Dr Susan Lee. Combined with other research, this project laid the groundwork for the Flows for the Future program.

Susan's PhD investigated whether reinstating low flows via a bypass device could restore stream health without unduly impacting landholders' water security. The study showed that after device installation, the period of 'zero flow' downstream of the treated dams was reduced. Plant cover at these sites improved, and the abundance and diversity of waterbugs, in particular those that prefer flowing water, increased. The results were instrumental in guiding future low flows policies and projects in the Marne and other catchments.

The team took a flow testing rig to test the device and confirm the calibrated threshold flow rate, and are pleased to report that the device is functioning well and passing the flows it was designed for, after 18 years in the field. Since this device was built, the construction team has progressively improved device design to ensure long-term durability and functionality.

Gravity low flow devices passively pass flows and require only basic maintenance to remain operational. They remain the preferred program option to return low flows, due to their long-term functionality and the natural timing of flows. To date, 143 gravity low flow devices have been constructed in the Eastern Mount Lofty catchments.

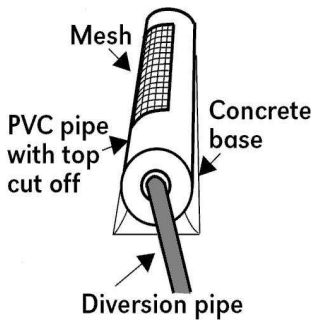
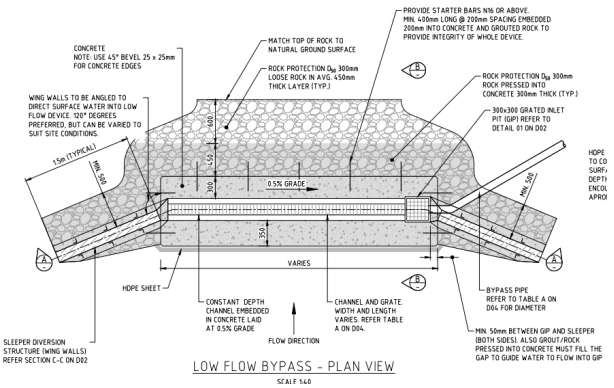


Diagram left: the original device concept was above-ground. This was modified for the study due to livestock access. The design has continued to change to utilise more readily available materials and with on-site learnings (right).



Flows monitoring program

How can we demonstrate that returning or bypassing flow at selected dams can improve the health of ecosystems?

The construction of dams changes the flow regime in a catchment and shortens the flow season. Ecosystems that have evolved with flow-related triggers for breeding, seeding, migration or dormancy are then subsequently at risk from the changed flow patterns. However, demonstrating cause and effect and showing that installation of devices can mitigate such changes, while challenging, can be done.

To do this, we find two very similar sites, noting or measuring various attributes of the ecosystem at both, then install device infrastructure at one site only. The same attributes are then re-measured over time to compare the treated and untreated sites.

A key component of the Flows for the Future monitoring program is the measurement of flow characteristics at established monitoring sites below dams with and without devices. Water depth measurements are recorded by a data logger, then translated via a hydrological model into ecologically meaningful information such as the number of consecutive days a catchment has no flow. The data can also be used to tell us more about the pool size (and available habitat) below the dams. This data will be collected throughout the life of the program.

Ecological data comes from F4F, Landscapes SA annual fish monitoring surveys and Bioblitzes. The hydrological data combined with this data builds a bigger picture of ecosystem health over time.

Top image: Damian collects velocity data across a number of transects in a pool. Collecting data from numerous points helps build a complete picture of the flow profile. Inset: an eastern striped skink cools off in the flow coming through a notched-weir.

Species Spotlight – brown tree frog

The brown tree frog (*Litoria ewingii*) will be familiar to many readers as it is the most commonly-encountered tree frog in the Eastern Mount Lofty Ranges. Its padded toes can often be seen hanging around the house, climbing window panes and basking in gardens. It is a slender, graceful frog, with a subtle brown body colour that suggests an unassuming nature… until it starts jumping around, flashing its striking orange, yellow and black thighs.

Passing flows around barriers such as dams sustains riparian vegetation that is critical to brown tree frog breeding cycles, as clumps of eggs are attached to the stems of sedges and other aquatic plants. Great care is taken during device installation to ensure that impacts to frog habitat are minimised through strict assessment and construction procedures. Keep on climbing little frogs!

Be a frog researcher!
Frog ID is a national citizen science program that allows you to upload frog calls to a free app. This provides scientists with valuable data to aid in frog conservation. Find out more at www.frogid.net.au

Aquasave vs *Azolla*, blackfish protection in Rodwell Creek

***Azolla* forms a dense mat on the water's surface**

You may remember, from Newsletter 1 that Rodwell Creek (a tributary of the Bremer River) is home to one of only 6 remaining River Blackfish (*Gadopsis marmoratus*) populations in South Australia. This population was only rediscovered in 2004 after being unrecorded in the catchment for 50 years. The landowner of the precious pool that contains this population keeps a watchful eye on the pool's condition.

Twice this year, the non-profit organisation Aquasave responded quickly to a drop in fish numbers in this vulnerable population. On both occasions, reduced oxygen concentrations from excess growth of *Azolla* (also known as mosquito fern) was the likely culprit.

The team responded by adding rainwater to the pool and removing the *Azolla*. *Azolla* is a native water-plant that spreads rapidly under certain conditions. Vigilant monitoring is needed to keep it at bay and give the blackfish the best chance of continued survival.

Such active management requires communication, collaboration, and funding, and all project participants deserve a pat on the back for their efforts to prevent this species' local extinction.

Images: Cory from Aquasave manually clears Azolla from the pool to improve oxygenation and preserve the local blackfish population. Photos from Beryl Belford.

Climbing galaxias in Currency Creek

The Hills and Fleurieu Landscapes' annual fish monitoring survey was held in April and discovered multiple native climbing galaxias (*Galaxias brevipinnis*) in the Currency Creek Catchment for the first time. This robust galaxiid grows up to 28cm long, and like frogs, feeds on waterbugs such as mayfly and caddis fly larvae.

This unusual fish can wiggle up to 10 metres across vertical rock-faces to find a mate to breed. They rely on flowing or permanent pools to spawn- so contributing low flows to the catchment directly increases the population's chance of survival.

Climbing galaxias have only been found in the Eastern Mount Lofty Ranges 3 times throughout the past 20 years.

Phragmites australis, ecosystem engineer

Phragmites australis (pronounced Frag-mite-eez), or the common reed, is a widespread grass species found in and around rivers, creeks, wetlands and dams. Sometimes confused with bamboo, it can grow up to 6 metres tall and forms dense thickets that are challenging to walk through. The Flows for the Future team regularly comes across *Phragmites* when visiting dams and watercourses in the Eastern Mount Lofty Ranges.

During winter, *Phragmites* enters a state of hibernation where the tall stems die off, but underground the rhizome of the grass holds an energy store that quickly fires the plant back to life in spring, providing lush growth. Because most of the plant growth is via rhizomes, many of the individual plants we see above the ground are clones.

Phragmites is known as an ecosystem engineer. This means it creates physical changes to an area for its benefit. When establishing, *Phragmites* will drop vast amounts of leaf litter in the system, which slows water down, traps sediment, and increases nutrient loads in its vicinity. This increases nutrients received from pastures and ensures *Phragmites* prospers. This ability to slow down and filter water improves overall water quality in a catchment area. By stabilising water flow, reducing rapid fluctuations in water levels, and hoarding nutrients *Phragmites* create a perfect system in which to thrive. It isn't all good news though, as its high evapotranspiration rate reduces water available in wetland systems and reduces competition from vegetation that require a wetter environment.

Locally, the expansion of *Phragmites* into small isolated Fleurieu Peninsula swamps has seen a reduction in available habitat for nationally listed flora, and the endangered Mt Lofty Ranges Southern Emu-wren. A number of control methods have been trialled to see if there was a viable way of reducing the dominance of *Phragmites* in environmentally sensitive areas, including the 2014 prescribed burn in a small section of Black Swamp in the Finniss catchment which was undertaken by the Department of Environment and Water and the Conservation Council of South Australia.

Nature Glenelg Trust has trialled stream flow manipulations in an attempt to flood *Phragmites* in Stipiturus Conservation Park. Various groups have trialled removing small areas of *Phragmites* within larger patches to encourage preferred vegetation to grow. These methods require a constant input of resources and are only considered worthwhile in instances where a particular species or ecosystem is under threat from *Phragmites* expansion.

In most agricultural settings *Phragmite*s is a beneficial plant around the edges of a dam or creek. It reduces erosion risk and helps keep sediment out of dams, improving water quality.

Phragmites is one of the most widespread grasses in the world, found on every continent except Antarctica

Meet the team– Rebecca Freshwater

My workmates are amused by my croc-catching days, nearly as much as landholders are amused by my last name. I'm fortunate to have led a life full of adventure and wild experiences - pursuing my passion for the natural world.

I grew up in the Dandenong Ranges, Victoria, where I fell in love with the natural landscape before moving to Albury, NSW, to start my adventures at university, learning how to work hard, party and survive! Soon after, I headed off to the Northern Territory, beginning a 24 year love affair with living and working in the outback. I have many wild and fond memories from my time researching threatened species in the Tanami Desert and working in remote National Parks with Indigenous Rangers. To name a few, we fought wildfires, surveyed crocodile infested waters from helicopters (and on occasion a tinny), caught and relocated crocodiles, mustered feral buffalo, and travelled via airboat spraying Mimosa (natural mosquito repellent) on the floodplains. Quad bikes were our primary vehicle for travel, and open space and exposure to the elements were the daily norm.

At one stage, I jumped the fence to live and work on a 38,000 hectare cattle station, 115 kilometres from Darwin, mustering Brahman cattle by horseback and helicopter, working in the cattle yard, carting hay and driving heavy machinery. With good debates, I converted many a cowboy to the green pastures of caring for the environment. It was a rewarding experience to see a remote cattle station evolving to embrace

new land management techniques with enormous environmental outcomes.

Above all else, my relationships with traditional owners taught me more about life and the environment than I've ever learnt in my work or studies. Camping out bush for extended periods with people from the land was a humbling time. It reminded me that nurturing the environment is nurturing community. These times will stay with me forever and remind me how simple caring for the land really can and should be.

My journey in SA began with our first property in Hartley, where we revegetated a significant area of land to establish corridors of connecting remnant vegetation over 180 acres in the Bremer River Catchment. These days my passion is sharing and engaging with communities in South Australia.

The F4F program allows me to get to know a new part of the world, and a different way of living. I'm constantly learning from those around me and have been welcomed into this beautiful landscape by amazing people.

I am making many new fond memories. On one occasion I spotted a 'Don't swim, crocodiles in this water' sign at a local dam, from no other than the Litchfield National Park – where it was once my job to replace stolen signs. I feel very thankful to the wonderful landholders who have allowed me to visit their properties, get to know them and share their F4F story.

What is Mimosa? Native to tropical America, *Mimosa pigra* is a Weed of National Significance which, in suitable conditions, form vast monocultures. It was deliberately introduced to the Northern Territory in the late 1890s as an ornamental curiosity. Since then, it has spread across 15 catchments and onto 3 islands.

Left image: Rebecca spent time working on the Water Allocation Plan for the River Murray before her current position engaging with landholders in Flows for the Future.
Right image: Mustering cattle in the Northern Territory. The Australian ecosystem evolved without any ungulates (large hooved mammals) and their presence in the environment diminishes the diversity of flora and fauna.

Do you have a story about how low flows have replenished the environment on your property? We would love to hear from you. Call the F4F team on (08)8391 2109.

The Flows for the Future Program is delivered under the Murray–Darling Basin Plan, jointly funded through the Australian Government Department of Climate Change, Energy, the Environment and Water and the South Australian Department for Environment and Water.