MANAGEMENT GUIDE

Wah Wah Water For Wildlife

How to make biodiversity the winner in a time of change

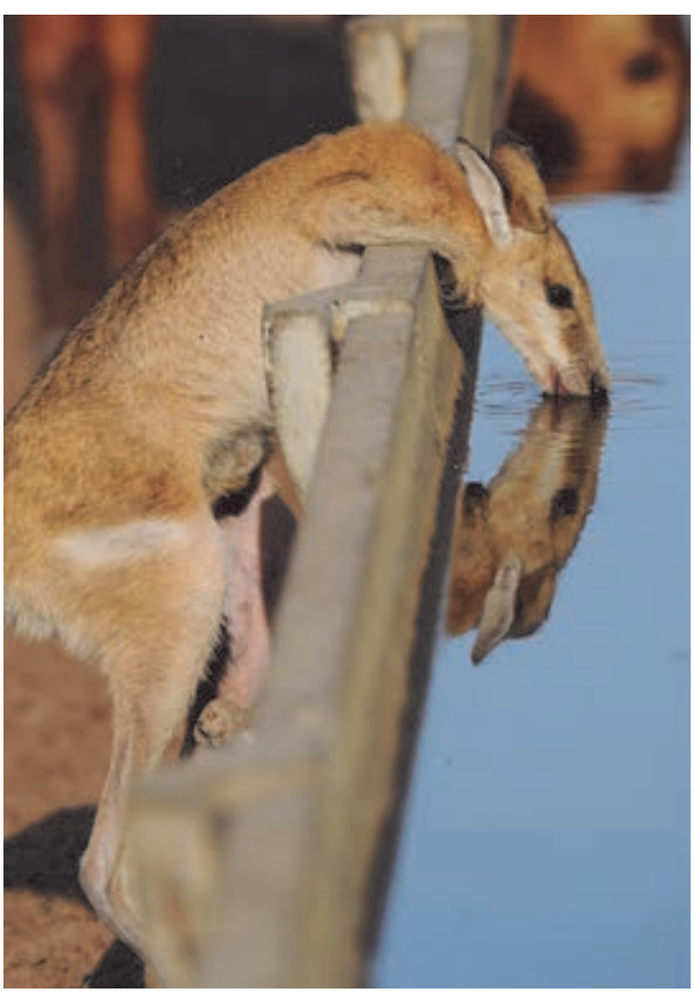
A Practical Guide for Landholders

Matthew Herring 2013

Black-tailed Native-hens (above) are among at least 40 wildlife species that use Wah Wah ground tanks regularly, but are unlikely to use troughs. More than half of these 40 species are waterbirds and most of the others are bats and frogs.

Front Cover Photo: **Swamp Harrier**

Kangaroos (below) are capable of drinking from troughs, as are many parrots, pigeons and other birds. It is the wetland dependent species that cannot use the troughs. They are the focus of the habitat mitigation efforts detailed in this booklet.

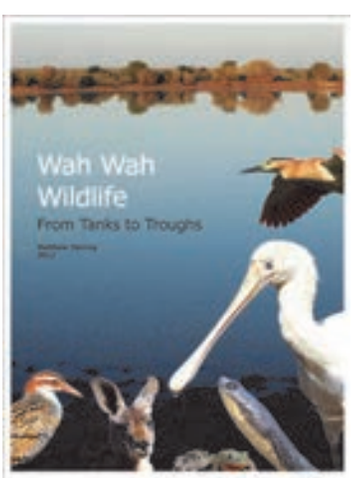


Time of Change in Wah Wah

In the Wah Wah district north of Hay, New South Wales, a new pipeline is set to boost water use efficiency. It will save an estimated 9000 megalitres for the environment each year.

Currently, an extensive channel system feeds ground tanks twice a year, and incorporates about 50 large properties across the district. There are more than 600 ground tanks, supporting sheep and cattle grazing on this part of the Hay Plain.

The Australian Government has earmarked $44 million to upgrade the old channels and ground tanks by replacing them with a state of the art pipeline and trough system. Since the 1930s, many wildlife species have come to depend on Wah Wah's ground tanks, which look much like any farm dams. For wildlife, the landscape and their habitat is being transformed once again.



From Tanks to Troughs

The Wah Wah Water for Wildlife project follows an initial study in 2011 and 2012 that assessed the biodiversity value of Wah Wah's ground tanks and explored potential options to mitigate the future loss of habitat when the pipeline replaces the old system. A total of 51 different bird, mammal, reptile and frog species were recorded directly using the ground tanks. Most ground tanks only supported common species and were found to be poor compared to natural wetlands, but a small proportion had good habitat and hence good wildlife diversity. A booklet summarising this initial study, pictured above, is available from Murrumbidgee Landcare. For a digital copy, see the Murrumbidgee Landcare website.

Wah Wah Water for Wildlife Project

With funding from the Australian Government's *Caring for Our Country* program, the Wah Wah Water for Wildlife project is trialling options to compensate for the lost habitat associated with the conversion to a pipeline and trough system.

Through Landcare, landholders of the Wah Wah district are proactively conserving their local wildlife and saving water at the same time. It is a multi-partner project including Murrumbidgee Landcare, Hay Trees on Plains Landcare, the Wah Wah Stock and Domestic Water Users Association, the Murrumbidgee CMA, and Murrumbidgee Irrigation.

Australian Shelduck pair with chicks

Great Egret

This Booklet

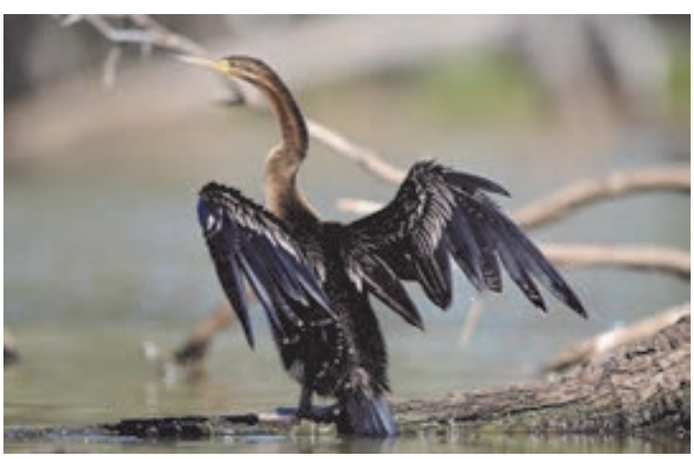
The purpose of this booklet is to provide landholders with a guide to improving wetland habitats on their farms, particularly in the Wah Wah district. It's all about helping wildlife and making agriculture more ecologically sustainable.

Some of the trials undertaken as part of the Wah Wah Water for Wildlife project are used as case studies. At the time of writing, several other trial sites are still being developed. Updates will be available through the key project partners, such as Murrumbidgee Landcare (www.murrumbidgeelandcare.com.asn.au) and the Wah Wah Stock and Domestic Water Users Association. At least one of the sites will be public, where interested people can visit at any time.

The focus is on constructed wetlands - the ground tanks. Like farm dams around Australia, they have enormous potential to support more biodiversity, helping to make agriculture more ecologically sustainable.

Table of Contents

Shingleback or Stumpy-tail Lizard



The Darter, a fish-eating waterbird similar to a cormorant.

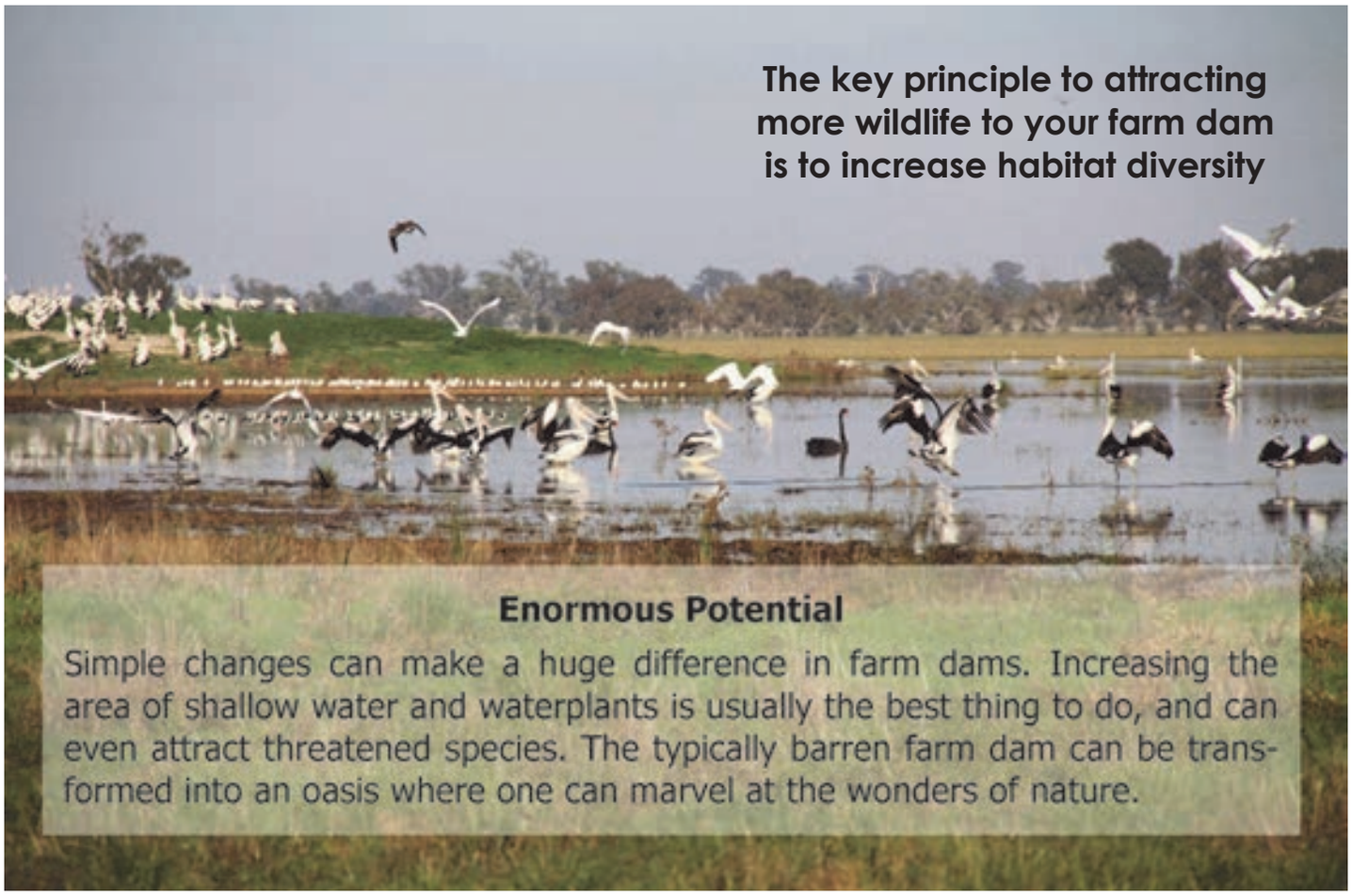
The Large-footed Myotis, a fishing bat.

Learning from Natural Wetlands

Natural wetlands and an understanding of their ecology can help guide our management of farm dams. We can learn how to enrich the biodiversity in wetland areas we've created. For example, compared to farm dams, natural wetlands tend to have larger, more complex shorelines that contain variable shallows and diverse waterplant communities.

Inland Australian wetlands in particular are highly variable and dynamic, with ephemeral water regimes. The 'boom and bust' cycle of ephemeral wetlands can be applied to farm dams, greatly benefiting biodiversity. Within minutes of filling, a wetland that has been dry for months or years starts to spring to life. After only a few days or weeks there is a hive of activity. Waterplant seeds and spores have germinated, and are growing rapidly, invertebrates and frogs are busy breeding, and waterbirds have arrived in great numbers.

Wetlands are hotspots for biodiversity - the variety of life. Many wetlands have been lost, especially shallow wetlands that are easily drained and replaced with crops, towns or other developments.



The ecology of wetlands and the biodiversity they support are strongly influenced by water regimes, such as the depth, duration, timing and frequency of flooding. The typically deep (two metres plus), largely permanent water regimes of many farm dams tend to prevent the development of diverse waterplant communities, which are so important for other biodiversity. Constant grazing pressure also means waterplants have little chance of establishing.


Australian Pelican

Waterbirds - Spreading Life

Fascinating research on Australian waterbirds by Andy Green from the Doñana Biological Station in Spain has confirmed that waterbirds can disperse viable propagules (e.g. seeds, spores, tubers, eggs) of a wide range of waterplants and aquatic invertebrates.

In the first ever detailed study on this subject in Australia, propagules from 14 of 19 waterplant species found in collected bird faeces were viable and germinated back in the laboratory. Aquatic invertebrates like seed-shrimp found in faecal samples emerged from the hatching experiments, and live adults were also found in the faeces. Different species of waterbird contained distinct suites of aquatic plant and invertebrate species, reflecting their different diets and unique roles as dispersers. In creating new wetland habitats, waterbirds seem to do much of the hard work for us.

Interestingly, Pelican faeces contained the highest diversity of propagules because of the fish they eat. Propagules ingested by fish and dispersed indirectly by fish-eating waterbirds may be particularly important for ¨stocking¨ isolated wetlands when they fill.

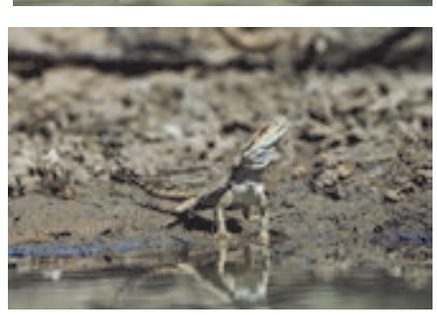
Pros and Cons of Grazing

As a general rule for improving biodiversity, it is best not to graze wetlands, especially when they contain water or mud. Sometimes grazing can be used to maintain habitat diversity and manage vegetation structure (e.g. crash-grazing stands of Cumbungi or Phragmites to prevent domination), or help control exotic weeds and other undesirable, invasive plants. It is worth remembering though that grazing is just one of many methods available to achieve such aims.

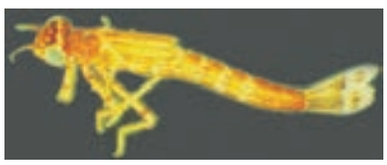
Stock, especially cattle, can have a detrimental affect on the biodiversity values of farm dams through trampling and eating wetland plants, disturbing sediment and muddying the water, compacting the soil, increasing nutrient levels and promoting weeds, as well as disturbing waterbirds and other wildlife. Grazing patterns tend to be concentrated around watering points like farm dams and the typical denuded, barren farm dam is often a product of a heavy and continuous grazing regime.

Fencing to exclude stock or at least managing grazing regimes so that the area can be rested for long periods, especially when wet, can make an enormous difference to biodiversity.

To ensure stock still have access to water, it can be pumped to a stock trough using a simple system like a ball and float valve. Stock exclusion has the added benefit of reducing the risk of Liver Fluke, Johnes disease and other threats to stock health associated with self-contaminated water.



Pictured here is a **Bearded Dragon**, taking a drink. It's not just waterbirds, frogs, turtles and kangaroos that benefit from surface water.



Side Swimmer (left) and **Damselfly nymph** (below left), just two of hundreds of invertebrate species potentially found in farm dams. Like waterbirds, frogs and the other groups that this booklet focuses on, invertebrates thrive in healthy, diverse habitats.

Logs and Other Additions

Shallow water and waterplants are generally the most important habitats to improve in farm dams but there are others worth considering too.

A study of constructed wetlands in the USA by Amy Alsfeld from the University of Delaware, and her colleagues, has highlighted the positive impact that adding logs can have.

Logs were added to Delaware wetlands in an attempt to increase biodiversity. Excitingly, they found the diversity of insect species was much greater in wetlands where logs had been deployed. Aquatic insects and other invertebrates provide waterbirds, frogs and other wildlife with food, and are an integral part of wetland ecosystems. Logs were added at rates of around 4 cubic metres per hectare.

This study and others around the world have revealed that a wide range of additions can improve the biodiversity in constructed wetlands. Some of these include deploying organic material (e.g. straw), waterfowl nest boxes, rocks and pontoons, and increasing microtopography (ridges and furrows).

The **Black Swan** (below) breeds in ephemeral wetlands of the Hay Plain when they are flooded, providing there is sufficient vegetation to build a nest and supply food.

Black-shouldered Kite

Catering for Threatened Frogs

The beautiful Southern Bell Frog is a nationally threatened species. It has declined dramatically. The good news is that it readily colonises new habitat, including constructed wetlands like farm dams. These frogs love waterplants, such as floating and submerged species, as well as Cumbungi and Spike-rushes. The Riverina is a stronghold for this frog and with increased wetland conservation, it is hoped their numbers will rise.

Southern Bell Frog

Ten Things You Can Do To

1. Identify all of the natural wetland areas on your property. These should always be the conservation priority. They tend to be much larger and have much better habitat than farm dams. Begin to think about which ones might benefit from action and how you can improve their health to increase wildlife.

2. Identify all of the farm dams on your property. Which ones are already most significant for wildlife or would benefit most from action? How can you improve their health, increase habitat diversity and promote wildlife?

3. What are the specific objectives at your chosen sites? What do you want to achieve through your actions?

4. Look at the inflow and the water regimes in context of your objectives. For example, is it flooded too often or not enough? Is the water too deep or not ephemeral enough?

5. How much will your actions cost? Where will you get the biggest biodiversity return for your investment?

o Benefit Wetland Wildlife

6. How can you reduce grazing pressure and avoid the damage that stock can do to wetlands? Can you avoid grazing when the wetland is full or is it possible to fence off all or part of the wetland so grazing can be managed independently of the rest of the paddock? For ground tanks being maintained, water will be available at troughs once the pipeline is up and running. For sites not associated with the pipeline, water can be pumped to a trough so stock can still drink.

7. For farm dams, consider earthworks to increase the extent of ephemeral shallows, with mudflats and areas for water plants to develop.

8. Consider adding additional habitat, such as logs.

9. Control feral animals and weeds.

10. Spend time at your wetlands. Get to know them and the creatures they support. This will inform your actions and help evaluate their success.

CASE STUDY 1: "Sunrise"

OBJECTIVE: To capitalise on existing habitat values; extending and enhancing the ephemeral spike-rush shallows.

METHOD: Earthworks adjacent to existing spike-rush shallows. Fence to manage grazing independently.

COST: Earthworks = approximately $1400
Fencing (labour and materials) = approximately $1000

TOTAL = approximately $2400

The **Baillon's Crake** (left) is a tiny quail-like waterbird that is dependent on the cover provided by waterplants. One of these poorly-known birds was seen at the "Sunrise" ground tank in December 2012. It will be one of many waterbirds to benefit from the expansion of the ephemeral spike-rush shallows.

The **Spotted Marsh Frog** (right), a species that proliferates when there are waterplants for it to lays its eggs near. This species already uses the spike-rush shallows on the Sunrise ground tank and will also benefit from their expansion.

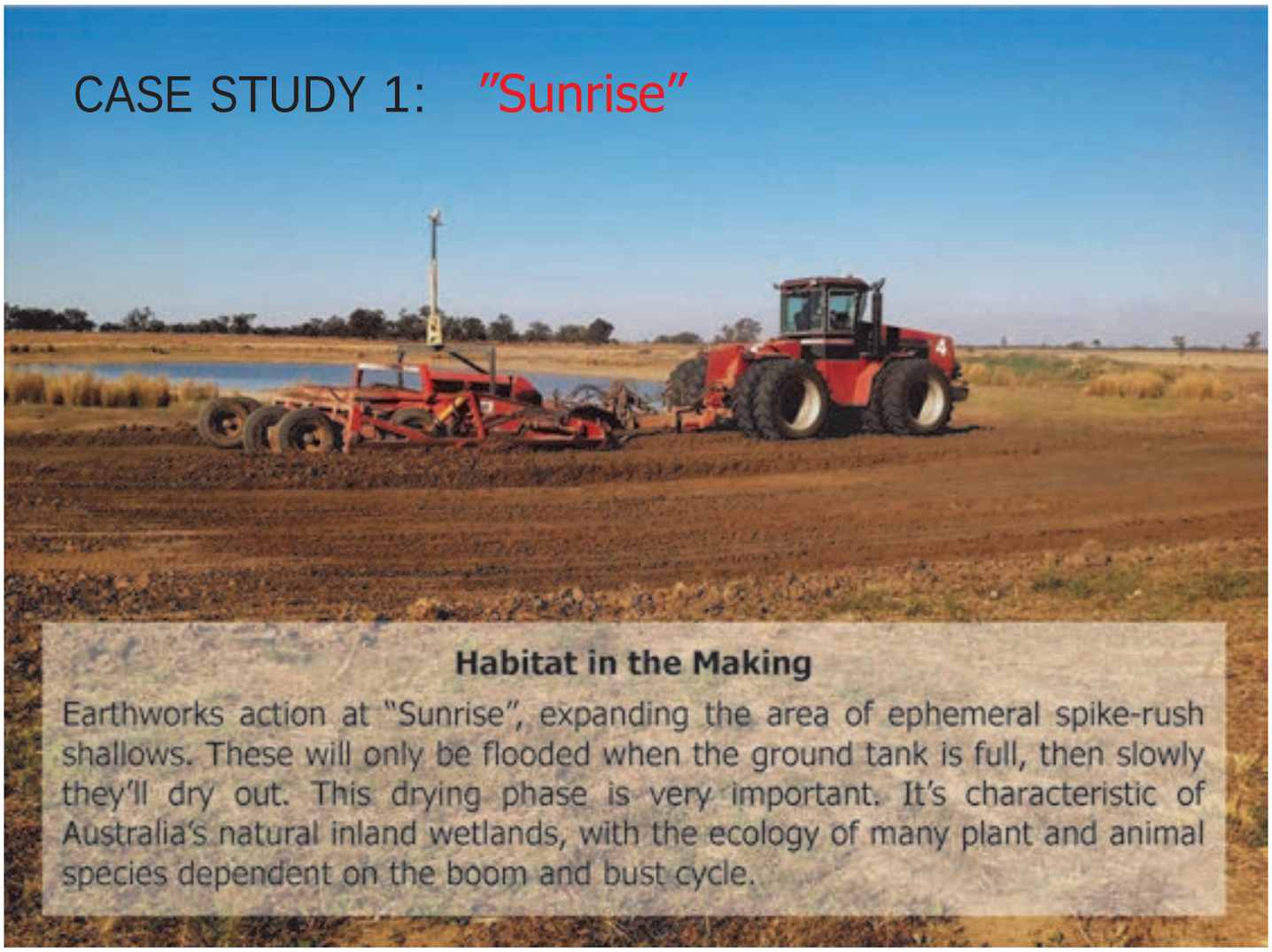
This case study demonstrates simple, low cost, small scale habitat improvements, building on the existing significance of wildlife habitat values.

In the foreground of the ground tank, pictured left, you can see the ephemeral spike-rush shallows that are flooded and then allowed to dry. The spike-rushes, also called pin-rushes, are *Eleocharis* species (see below) and will be increased in area by approximately 200%.

The **Australian Painted Snipe** (below), a nationally endangered waterbird that became so rare at the end of the millennium drought that only 11 individuals were found across Australia during the peak reporting period of summer. It appears that the drought broke just in time.

The ephemeral spike-rush habitat at this ground tank is ideal for this near-mythical waterbird, so the expansion of these shallows will increase the likelihood of attracting one of Australia's most endangered species, not to be confused with the Latham's Snipe that breeds in Japan.

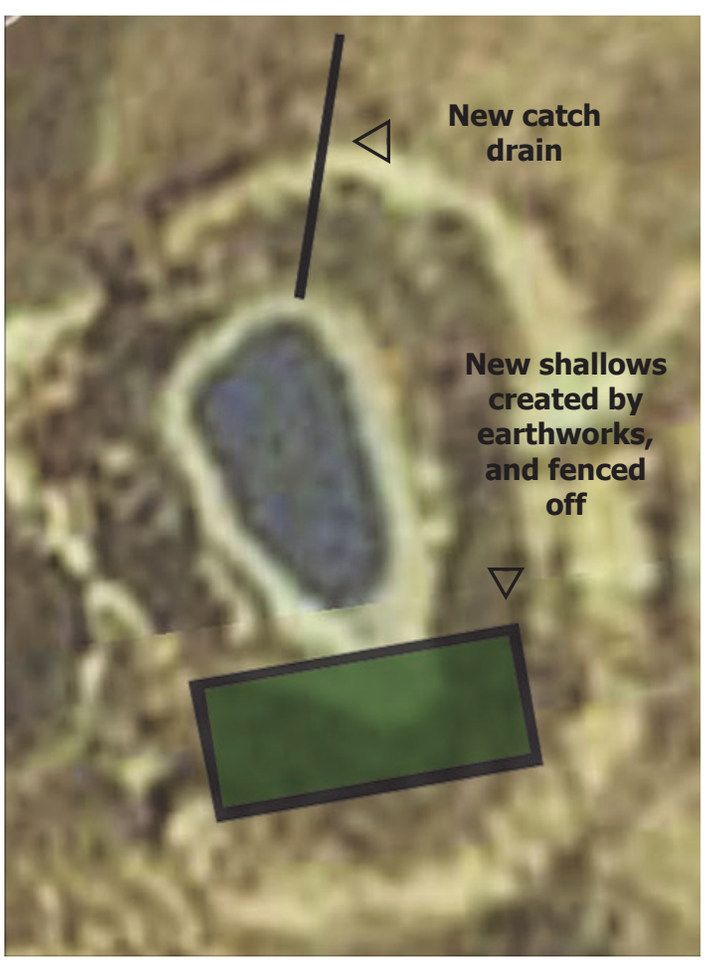
CASE STUDY 1: "Sunrise"



Habitat in the Making

Earthworks action at "Sunrise", expanding the area of ephemeral spike-rush shallows. These will only be flooded when the ground tank is full, then slowly they'll dry out. This drying phase is very important. It's characteristic of Australia's natural inland wetlands, with the ecology of many plant and animal species dependent on the boom and bust cycle.

It is anticipated that environmental water will be available for delivery through the pipeline to sites like this. However, to ensure we're not dependent on such water, catch drains offer an increased means to see dedicated habitat areas flooded. As part of the earthworks at "Sunrise", a new catch drain was constructed. It will draw water during heavy downpours and help fill the ephemeral shallows.

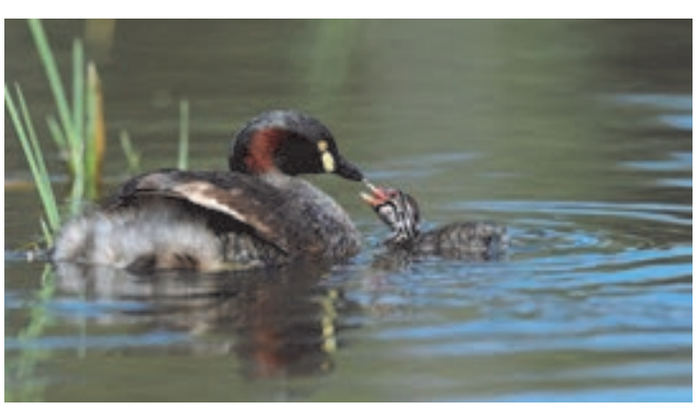


Earthworks Complete

The new shallows flooded for the first time (left and below left). Here, over time, the spike-rushes will develop and boost the wildlife carrying capacity substantially. Below, Pat Flanagan with some of his family (three generations) on the ephemeral shallows prior to their expansion.

The typical results from a 20-minute survey at this ground tank are expected to improve, with more individuals and more species. Monitoring wildlife in your wetland is a great way to evaluate habitat improvements. It's also the wonderful reward of the simple changes you've made. For birds, all you need is a pair of binoculars and a field guide, and the time to enjoy the presence of your new tenants.

Pictured above and below is the Australasian Grebe, also known as a Dabchick or Little Grebe. They often dive when approached. They build a floating nest and can only breed in wetlands that have waterplants.



CASE STUDY 2: "Yurdyilla"

OBJECTIVE:

To increase habitat diversity, catering for the Australasian Bittern and migratory shorebirds; constructing a reed bed pit and a mudflat island, while improving existing habitat.

METHOD:

Earthworks to construct reed bed pit, using part of fill to create mudflat island.

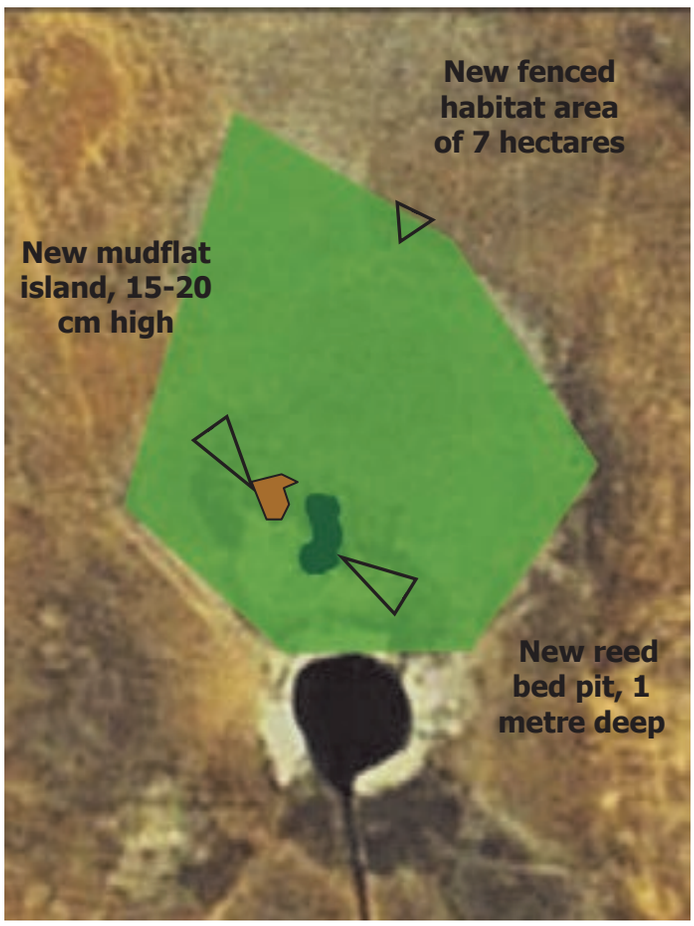
Fence entire 7 hectare habitat area to manage grazing independently.

COST:

Earthworks = approximately $3000

Fencing (labour and materials) = approximately $5000

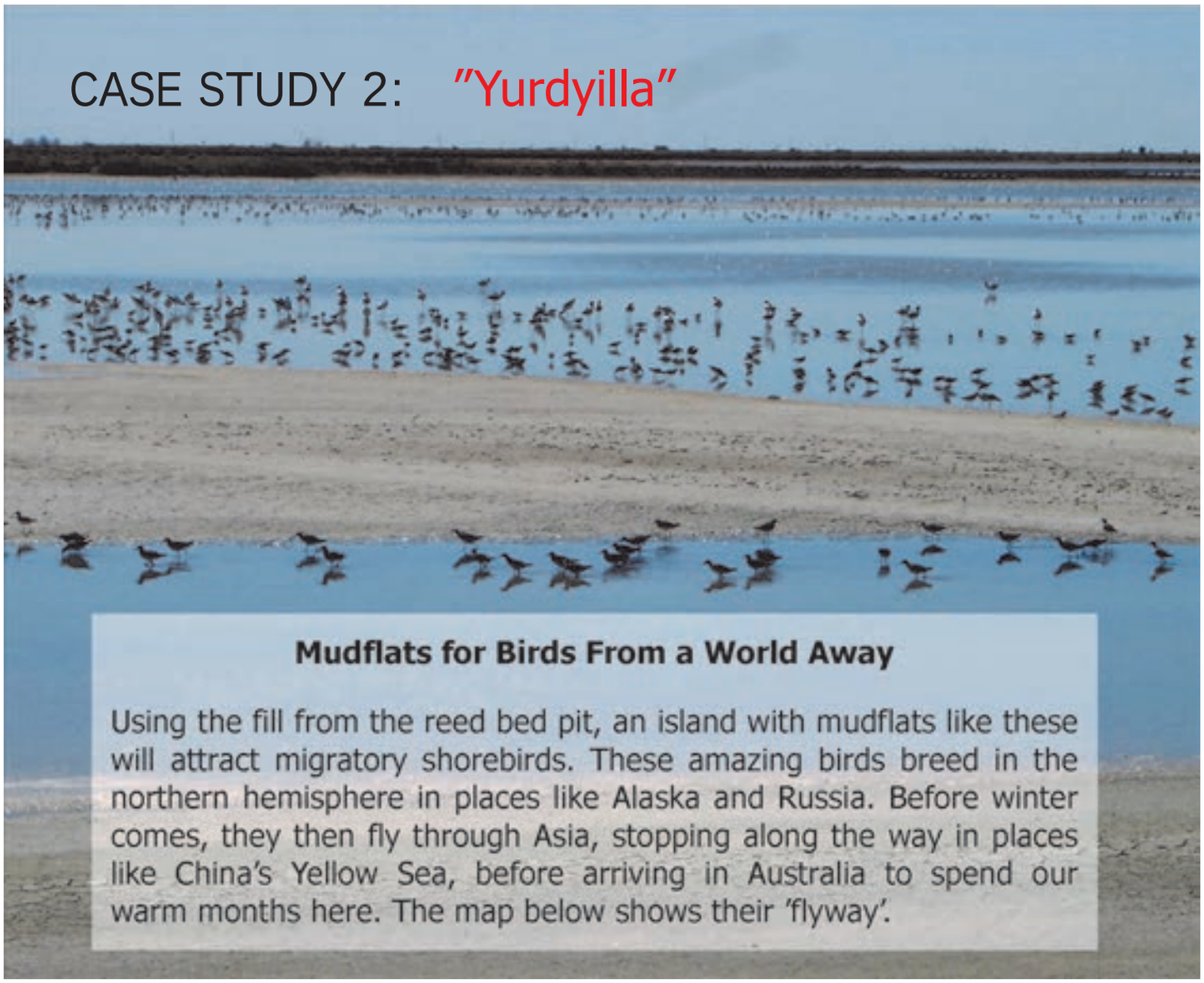
TOTAL = approximately $8000



Below the "Yurdyilla" site showing the existing spike-rush and Canegrass shallows, north of the ground tank.

Pictured above are stands of Cumbungi growing in the deeper water surrounding a rice crop**.** The new reed bed at "Yurdyilla" will eventually look similar. It is specifically intended to provide roosting and nesting opportunities for the **endangered Australasian Bittern**, pictured below. This cover dependent waterbird will be able to forage in the existing Canegrass and spike-rush shallows, but now have areas with taller waterplants to roost and breed. It remains one of Australia's most poorly known bird species. We're not even sure if they breed in pairs or if they're polygynous, where males have multiple female partners. One thing is certain: if we provide habitat, our chances of attracting them increase greatly.

CASE STUDY 2: "Yurdyilla"



Sharp-tailed Sandpipers (below), are summer migrants from the Arctic. In September 2012, they were found on a Wah Wah property in large numbers after having just arrived. They were using a large natural wetland with extensive mudflats. The new mudflats at the "Yurdyilla" site will be ideal for these and other migratory shorebird species, not to mention the shorebirds that are resident in Australia.

The **Murray Turtle** (above), which has a short neck, is found in the Mirrool Creek during flooding. These lesser known turtles should benefit from habitat improvements to Wah Wah's wetlands, especially those along the creek.

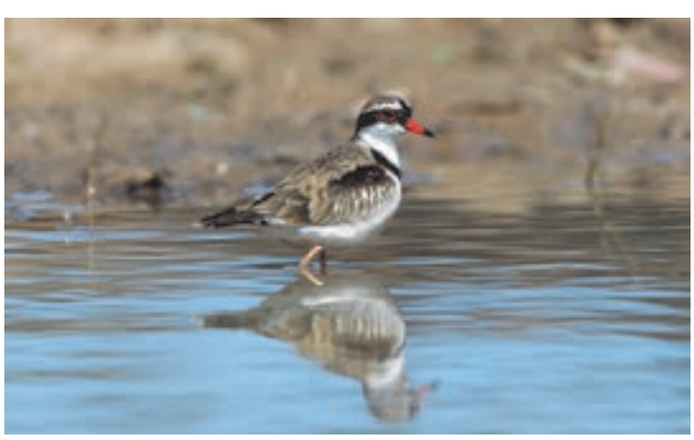
Red Kangaroos (above), Australia's iconic large 'Roo'. Their numbers may be effected by the loss of ground tanks, as the extent to which they'll drink from troughs is unknown.

This case study demonstrates larger scale, more complex habitat improvements targeting certain species. The relatively high cost is because the site itself is much larger at about 7 hectares. It is also builds on the existing significance of wildlife habitat values.

Pictured below, the reed bed pit has been marked out ready for excavation. It will be approximately 1 metre deep, providing water-plants like Cumbungi with more permanent and deeper water where they can flourish.

Environmental water could be delivered to the site through the pipeline, into the ground tank, flooding the habitat area via an overflow drain. It is anticipated that the water and pumping costs will be publicly funded. Catch drains will also be constructed to ensure the site isn't dependent on the pipeline for water.

Our migratory shorebirds, like the **Marsh Sandpiper** (below left), fly up to 25 000 kilometres per year along the East Asian-Australasian flyway. Sadly, there has been a global decline in these amazing birds, Farm dams that have mudflats and very shallow water will benefit them, as well as resident species, like the **Black-fronted Plover** (below right). Their great mobility means they are very responsive to the creation of new habitats.



CASE STUDY 3: "Te Aro"

OBJECTIVE:

To facilitate the delivery of environmental water to a natural wetland with very high existing habitat values for wildlife.

METHOD:

Earthworks to construct an inflow channel to deliver water.

COST:

Earthworks = approximately $800

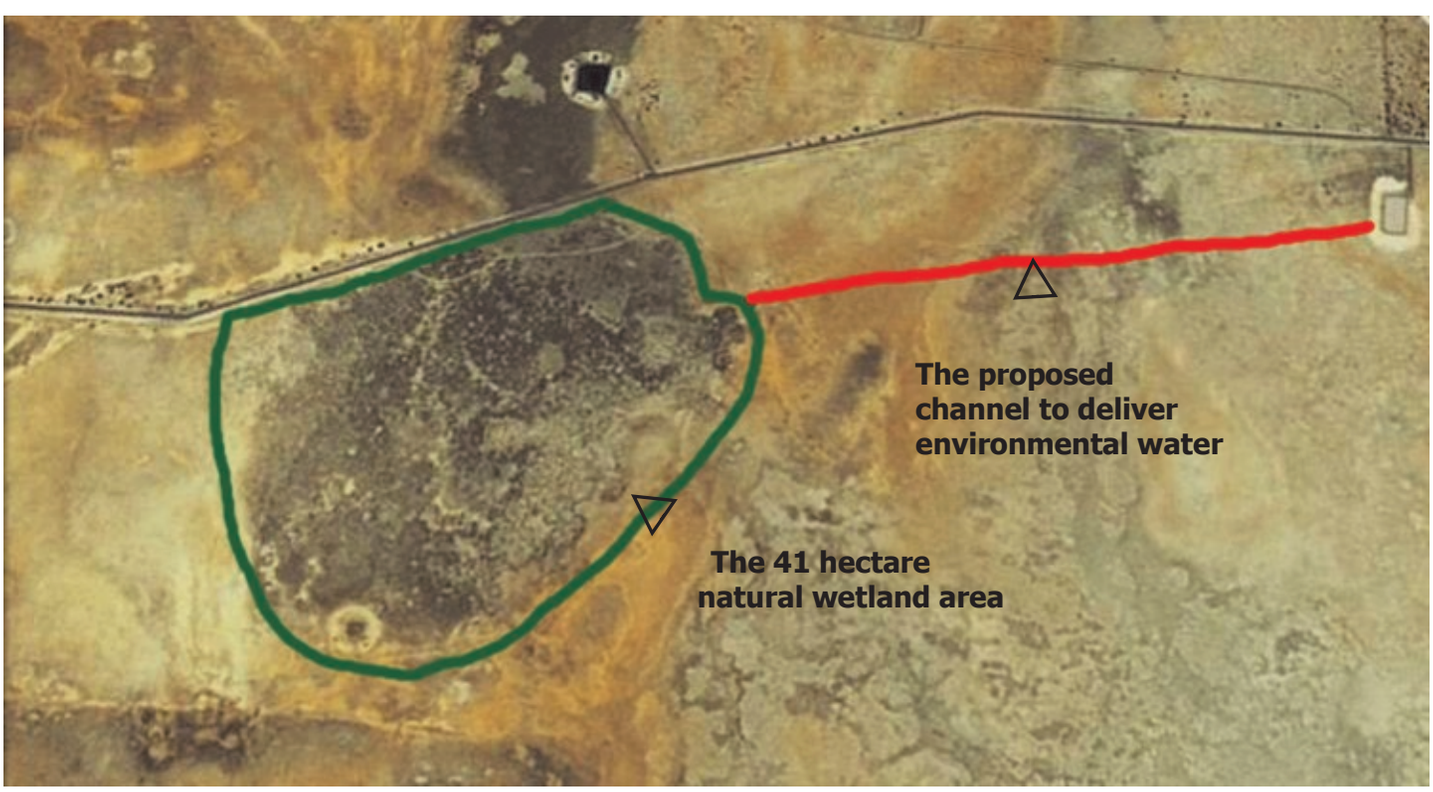
TOTAL = approximately $800

Note: If fencing is considered necessary to manage grazing, this would substantially increase costs.

This case study demonstrates the low cost facilitation of environmental water delivery to a large natural wetland by providing the necessary infrastructure. It builds on the existing significance of wildlife habitat at the site.

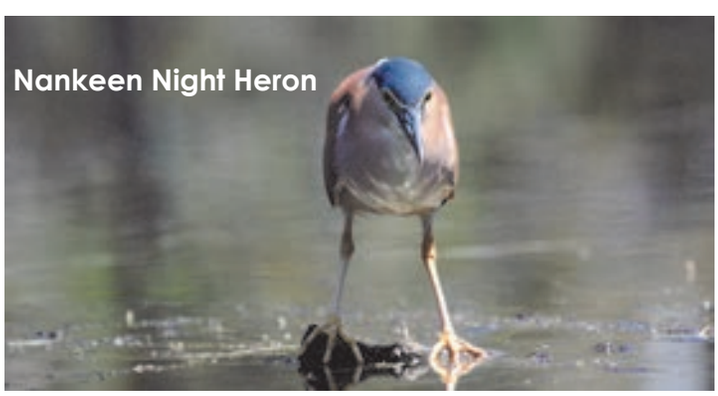
This Canegrass, Nitre Goosfoot, Lignum and Spike-rush wetland was one of the reference sites during the initial study to assess the biodiversity values of ground tanks (see page 3).

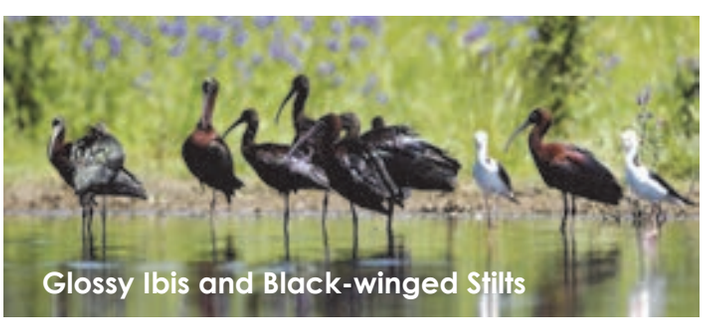
White-faced Heron



Small Ponds

Inspired by the Wimmera-Mallee pipeline in Victoria, dozens of these small, low cost, highly aesthetic ponds could provide bush birds with the water to drink they've come to rely on. They're particularly attractive around the house where people can benefit greatly from their presence. As part of the Wah Wah Water for Wildlife project, they're also being trialled.


Nankeen Night Heron


Glossy Ibis and Black-winged Stilts


Farm dams are important but their wildlife value is dwarfed by natural wetlands

Acknowledgements

Funding for the Wah Wah Water for Wildlife project was provided by the Australian Government's Caring for Our Country program through a grant to Murrumbidgee Landcare Inc. The project committee consisted of Ian Auldist (Hay Landcare), Don Low (Wah Wah Stock & Domestic Water Users Association), Marion Benjamin and Kimberley Beattie (Murrumbidgee Landcare Inc.), Allie Hendy (Murrumbidgee CMA), Chris Green (Murrumbidgee Irrigation) and Matt Herring (Murray Wildlife). This booklet was written and designed by Matt Herring.

Many thanks to all of the Wah Wah landholders for their support of the project. All landscape/habitat photos by Matt Herring and all wildlife photos by Peter Merritt, with the following exceptions: P. 3 shingleback, P. 4 bat, P.16 sandpipers by M. Herring; P. 5 wetland by Charlie Webb; P. 7 invertebrates by MDFRC, P.7 & 11 Frogs by David Webb; P. 12 earthworks photos by Allan Perkins; P. 19 pond by Birchip Cropping Group.

Enormous Potential

Simple changes can make a huge difference in farm dams. Increasing the area of shallow water and waterplants is usually the best thing to do, and can even attract endangered species. The typically barren farm dam can be transformed into an oasis where one can marvel at the wonders of nature.