

APPENDIX 6. WETLAND MANAGEMENT STORIES

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IAN McCOLL - 'HILLCREST'

Where	30km south-west of Cowra, NSW
Enterprise	Mixed cropping & livestock production
Size	640 hectares
Wetland area	0.8 hectares (2 acres)

What they did

- Built a 'constructed wetland' on a small drainage line that runs through the property
- Fenced out the new wetland and carried out initial revegetation works.

Why they did it

- Primarily to increase property biodiversity through the creation of new habitat.

Cost

- \$ 12,000 for the earthworks (plus fencing and re-vegetation costs).

Assistance

- \$ 5,000 of funding was provided through the Federal Government's Natural Heritage Trust.

Benefits

- Property biodiversity has been increased e.g. water birds regularly use the wetland.
- The wetland is an attractive part of the property that Ian enjoys visiting.

Monitoring & evaluation

- Regular observations (no formal assessment).

His story

The McColl family have been farming in the Koorawatha-Greenethorpe district south-west of Cowra for over a hundred years and Ian has been at 'Hillcrest' for forty-eight. The great advantage of this long family association with the property is the accumulation of a detailed natural history. Hillcrest has an occasional watercourse that runs through the property and Ian, recalling the history of the farm, remembers that; *'by the early 1960s a gully system had developed'*.

This is a common problem with this type of watercourse. Sometimes referred to as 'first and second order streams', these drainage lines are found near the head of catchments with low rolling hills and are, in their intact state, characterised by swampy sedge-dominated wetlands sometimes connected with short sections of open channel. It was common practice for early settlers to try and drain these areas, usually by the simple method of running a plough line down-slope through the wetland. At Hillcrest these areas were also cultivated by ploughing in summer when they dried out.

Unfortunately, these practices both expose the soil to erosion and, in the case of deliberate drain construction, tend to focus the flow energy. If the underlying soil is at all erosion prone a large gully system can soon develop as the flowing water cuts down into the soil profile (this process is sometimes referred to as 'incision').

'Over a five or six year period in the late '60s the gullies were filled in and a system of dams and contour banks installed to fix up this erosion problem', Ian remembers his father telling him. However, even with these structures installed, the watercourse remained wet most of the time. Ian feels that the local geology and soil types lead to this phenomena, *'before 2000 there was always sub-surface flow in this area because the trickle pipe on one of the small dams would always run, but during the more recent drought years it has sometimes stopped for a few months over summer'*.

By the time Ian took over control of the property tree cover had dropped to less than 2% mainly as a consequence of over-clearing in the 1800s. As more information became available on the problems caused by over-clearing, Ian felt that something needed to be done to redress this situation. With salinity a problem both on-farm and in the general area Ian has been active in re-establishing patches of native vegetation for many years.

Planting for salinity control was not Ian's only motivation; the general loss of biodiversity in the district was also a concern. *'Landscape health is improved by increased biodiversity'* is how Ian summarises his attitude today. The idea of installing a 'constructed' wetland in the old gully line stemmed from Ian's general concerns regarding the loss of biodiversity and a desire to do something more than just re-establishing areas of native trees and shrubs.

1. Earthworks

With a budget of approximately \$10,000 (including a \$5,000 grant) Ian approached the NSW Government's Soil Conservation Service (SCS) for advice. A property inspection followed during which a site was selected at which a reasonable sized wetland could be constructed within the available budget.

The design brief was a simple one; the wetland was to be constructed in a similar manner to a normal farm dam, but with an island and benches installed. The latter were included so that once the dam filled there would be areas of shallow and medium depth water, as well as deeper areas near the centre. The island was built to create a predator-free refuge for water birds, while the differing water levels were included to provide variation in habitat types, both for aquatic plants and birds. Ian recalls that coming up with the design was not that easy because most of the available designs for constructed wetlands were complex, large scale and would have been very expensive to install. In addition to this, finding a local contractor with experience in farm-scale wetland construction proved very difficult. *'There was a bit of a communication breakdown at the beginning'* Ian recalls, with the eventual alignment being slightly different to what he felt had been initially agreed. Once completed however, Ian was happy with the result.



Image 37: Work commences on Ian McColl's constructed wetland (February 2003). Essentially a modified farm dam, the wetland incorporates an island and was built to provide areas with differing water depths. A 100mm spillway by-pass pipe was also installed through the dam wall which carries the base flows, keeping the spillway dry.

2. Fencing and off-wetland stock watering

The wetland was completely fenced off the year after the earthworks were completed. The fencing established a generous buffer zone around the wetland giving a total project area of about three hectares. Ian doesn't feel that this represents any great economic loss, as the country around the wetland was wet, typically dominated by native sedges, and consequently of little productive value.

In recent times there have been big changes in the way land and water resources are managed at Hillcrest. In the early 1990s a heavy downpour soon after sowing led to significant soil erosion and Ian vowed never to let this happen again. Since then the soil conservation practice of no-till farming has been adopted, including full stubble retention and the direct drilling of seed. By maintaining groundcover Ian has found that this has enabled him to remove most of the old contour banks which were an encumbrance to general pasture work.

Additionally, all of the smaller dams have been in-filled. This was done for two reasons; firstly, the no-till farming practices had led to an increase in soil porosity so the dams were not filling, and secondly, their removal provided extra useable paddock area. Water for stock is now provided by troughs connected to a reticulated supply of bore water. With this system installed, Ian feels that the water in the wetland would only be required for stock as an option of last resort.

3. Revegetation

Re-vegetation work has commenced within the wide buffer that has been established around the wetland. About 150 trees have been planted so far with a further hectare of planting planned for next year.

Within the wetland itself no direct planting has been tried as yet. One difficulty is the tendency for the sub-surface base flow to be saline so that any re-planting of native wetland plants will have to take this into account. An additional problem is that cumbungi (*Typha* spp.) is already starting to colonise the wetland. Although a native plant and tolerant of brackish conditions, this species does tend to out-compete other wetland plants. While it does provide some habitat for native birds, it is generally felt that dense stands of this one species is less desirable than a mixture of other native wetland plants that would provide a greater range of habitat types.



Image 38: Ian McColl with his constructed wetland. Built primarily to improve property biodiversity through the creation of new habitat, the wetland complements the more traditional re-vegetation works that have been carried out on the property over the years.

Challenges

The greatest challenge faced at Hillcrest in developing an on-farm constructed wetland was the lack of advice available, especially at the local level. While constructed wetlands to treat urban runoff have been very popular in recent years, the designs used are often very expensive and are installed with the benefit of all the resources available to local and state governments. In rural areas, designs for the sub-\$20,000 farm constructed wetland are few and contactors experienced in installing them are very rare. This lack of experience can often lead to cost over-runs as contactors find it difficult to quote for this sort of 'unusual' work.

Accessing good advice with regard to the possibility of introducing fish to the wetland has also been an issue. Similarly, finding out what native wetland plants to re-establish given the saline base flow in the area has also been difficult – as has finding local nurseries that can supply native rushes, sedges etc.

Summary

Ian's objective in installing a constructed wetland on his property was to improve biodiversity through the creation of new habitat. This work complements, rather than replaces, the more traditional on-farm re-vegetation projects. Not only has this work met its goals in terms of biodiversity improvement, but it has created an aesthetically pleasing area in a part of the property that forty years ago was little more than an eroding gully system. Ian feels that this is an asset not just for him, but for future generations to enjoy as well.