Australian Government

Land & Water Australia

report

*knowledge for managing Australian landscapes*

# Murrumbidgee Wetland Seedbank Research Project

Emma Clifton

Published by: Land & Water Australia

Product Code: PN30289

Postal address: GPO Box 2182, Canberra ACT 2601

Office Location: Level 1, The Phoenix
86-88 Northbourne Ave, Braddon ACT

Telephone: 02 6263 6000

Facsimile: 02 6263 6099

Email Land&WaterAustralia@lwa.gov.au

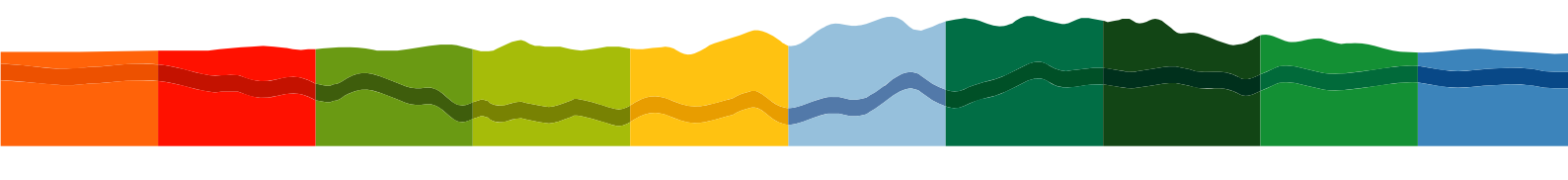
Internet: lwa.gov.au



**Disclaimer**

The information contained in this publication is intended for general use, to assist public knowledge and discussion and to help improve the sustainable management of land, water and vegetation. It includes general statements based on scientific research. Readers are advised and need to be aware that this information may be incomplete or unsuitable for use in specific situations. Before taking any action or decision based on the information in this publication, readers should seek expert professional, scientific and technical advice and form their own view of the applicability and correctness of the information.

To the extent permitted by law, the Commonwealth of Australia, Land & Water Australia (including its employees and consultants), and the authors of this publication do not assume liability of any kind whatsoever resulting from any person's use or reliance upon the content of this publication.



# Murrumbidgee Wetland Seedbank Research Project
# Preliminary Report

By
Emma Clifton

February 2004

## Part of:

Land & Water Project No. NDW32 Improving the management of wetlands on the Murrumbidgee River floodplain

# Table of Contents

## Summary

The majority of wetlands along the Murrumbidgee are owned privately, yet little is known about these wetlands and there is evidence they are in poor ecological condition (Spencer *et. al.* 1998). This project was aimed at discovering the nature of the plant communities within wetlands on private land on the Murrumbidgee River. At the commencement of the project the region was in the midst of a drought, meaning vegetation surveys would not have been fruitful. A soil seedbank study was conducted instead. Wetlands with different commence to fill levels, profiles (shallow and deep) and managements were studied to discover how these factors would influence the species present. Species distribution was also compared between wetlands, within wetlands and within treatments.

Soil was collected from low and high water mark, and paddock plots within 11 wetlands along the Murrumbidgee River between Gundagai and just downstream of Hay. It was propagated in either moist or submerged treatments. Species and their quantities were recorded over a 6-week period.

In total 67 species were recorded however only 49% have been identified. Of those identified down to genus level 78% were native. Half were potential weed species, however most of these were minor native agricultural weeds. There was a greater diversity of species in shallow wetlands compared to deep wetlands. Most species were found in moist treatment compared to submerged treatments. Further data analysis that has yet to be completed.

## Introduction

Wetlands have a great diversity of values, which vary significantly between different groups and individuals. These include their role as functioning ecosystems performing functions such as nutrient trapping and water cleansing and providing habitat for important native flora and fauna. Whitten and Bennett (2000) surveyed landholders in the Murrumbidgee catchment concerning their opinions on wetlands on their properties. It was found that over 90% of farmers grazed their wetlands and 83% had varied their wetlands water regime. Furthermore 37% of farmers considered wetlands to be a major weed source, with a further 40% considering it to be a minor problem. So of all the farmers surveyed the majority saw weeds as a problem in the management of wetlands.

Considering the drought conditions at the commencement of the project in early 2003 a vegetation survey to determine species distribution within and between wetlands would not have been practical. It was decided that an assessment of the seedbank within the soil could serve the same purpose as a vegetation survey. Determining the seedbank through propagation of the soil has previously been used to determine the potential species present in a wetland (Brock *et. al.* 1993).

There has been very little research conducted into the health and effective management of wetlands on private land along the Murrumbidgee River. Spencer *et. al.* (1998) found that wetlands along the Murrumbidgee between Gundagai and Hay were generally in poor condition. Jansen and Robertson (2001) found that the condition of the riparian habitat significantly declined with an increase in grazing.

## Aim

The aim of the experiment was to conduct a pilot study to examine the plant species present within the Murrumbidgee River floodplain wetlands. Wetlands were chosen with different:

- Flood level to inundation
- Management (grazing, cropping, fenced or unfenced); and
- Profiles (ie shallow or deep)

As these are known to influence the species present.

Species distribution can vary with scale and this was examined:

- Between wetlands
- Within the wetland site; and
- Within inundation treatment

Of particular interest was how many environmental and agricultural weed species were present in the wetlands, both native and introduced.

## Methods

### Study Area

The Murrumbidgee River is located within the Murray-Darling Basin in southern New South Wales. It is the 3$^{rd}$ largest river in the basin. It is a highly regulated river, with two major reservoirs in its upper catchment and numerous other dams and weirs within the catchment which support extensive irrigation industries downstream.

11 wetlands were studied along the Murrumbidgee River, on private land, between Gundagai and just downstream of Hay (Figure 1, Appendix 1)

Figure 1.
Location of wetlands studied on the Murrumbidgee River

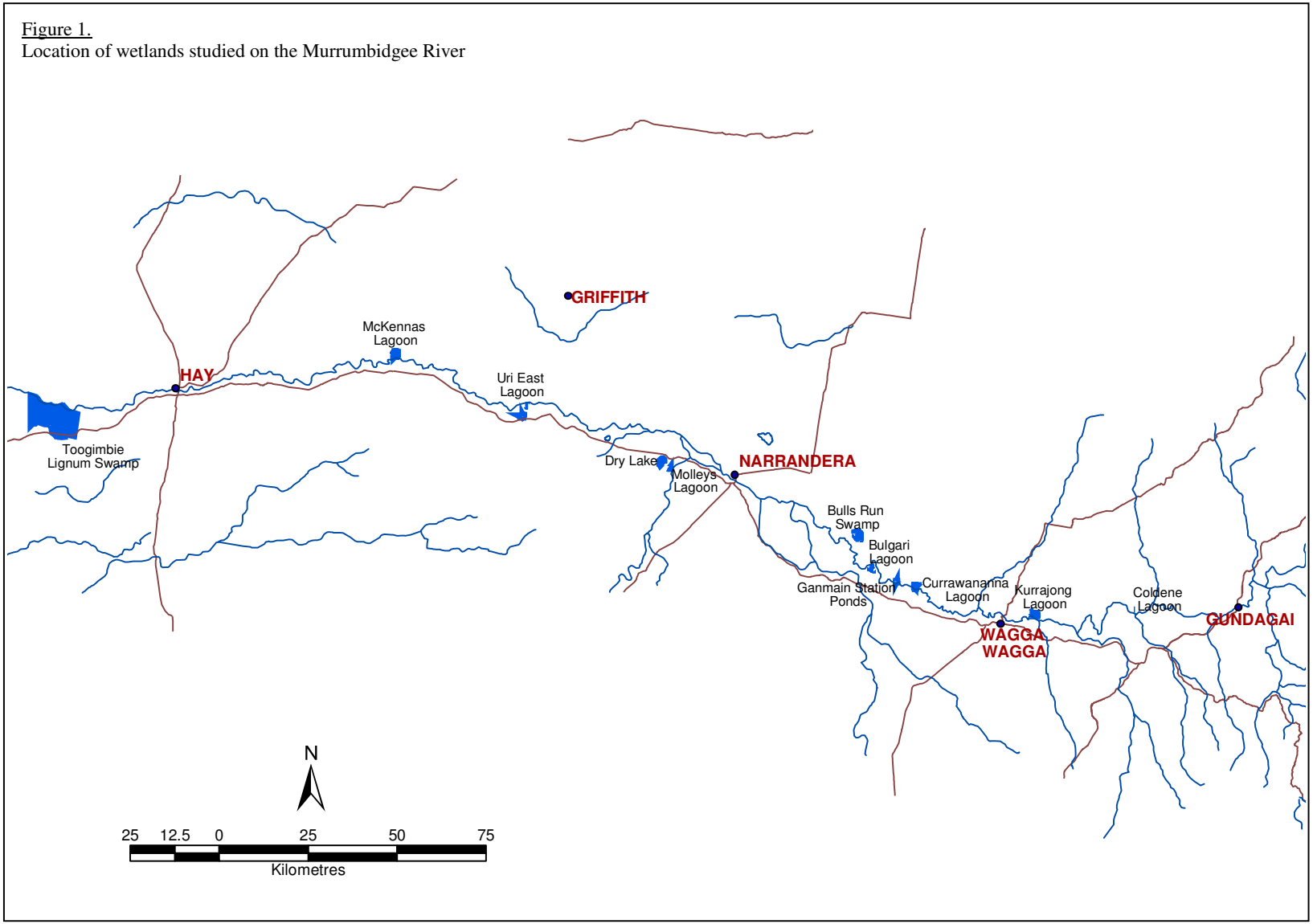


Table 1 - Summary of the management, commence to fill level and profile type of each wetland.

Profile: deep = >1 to 3 m deep; shallow = less than or equal to 1 m (Paterson *et al,* 2002)

| **Wetland Name** | **Wetland grazed** | **Regeneration** | **Commence to fill (ML/day) and gauge location** | **Profile (shallow/deep)** |
|---|---|---|---|---|
| Bulgari Lagoon | Yes | River Red Gum | 58,000 Wagga Wagga | deep |
| Bulls Run Swamp | Yes | River Red Gum | 61,000 Wagga Wagga | shallow |
| Coldene Lagoon | Yes | River Red Gum | 29,000 Gundagai | deep |
| Currawanna Lagoon | Yes | River Red Gum | | deep |
| Dry Lake | Yes | River Red Gum | 23,000 Narrandera | shallow |
| Ganmain Station | Yes | River Red Gum | 31,000 Wagga Wagga | deep |
| Kurrajong | Yes | River Red Gum | 43,000 Wagga Wagga | deep |
| McKennas Lagoon | No - since 1996 | River Red Gum & Black Box | 13,000 Darlington Point | shallow |
| Molleys Lagoon | Yes | River Red Gum & Black Box | 23,000 Narrandera | deep |
| Toogambie | Yes | Lignum | 30,000 Hay | shallow |
| Uri East | Yes | River Red Gum & Black Box | 21,017 Darlington Point | shallow |

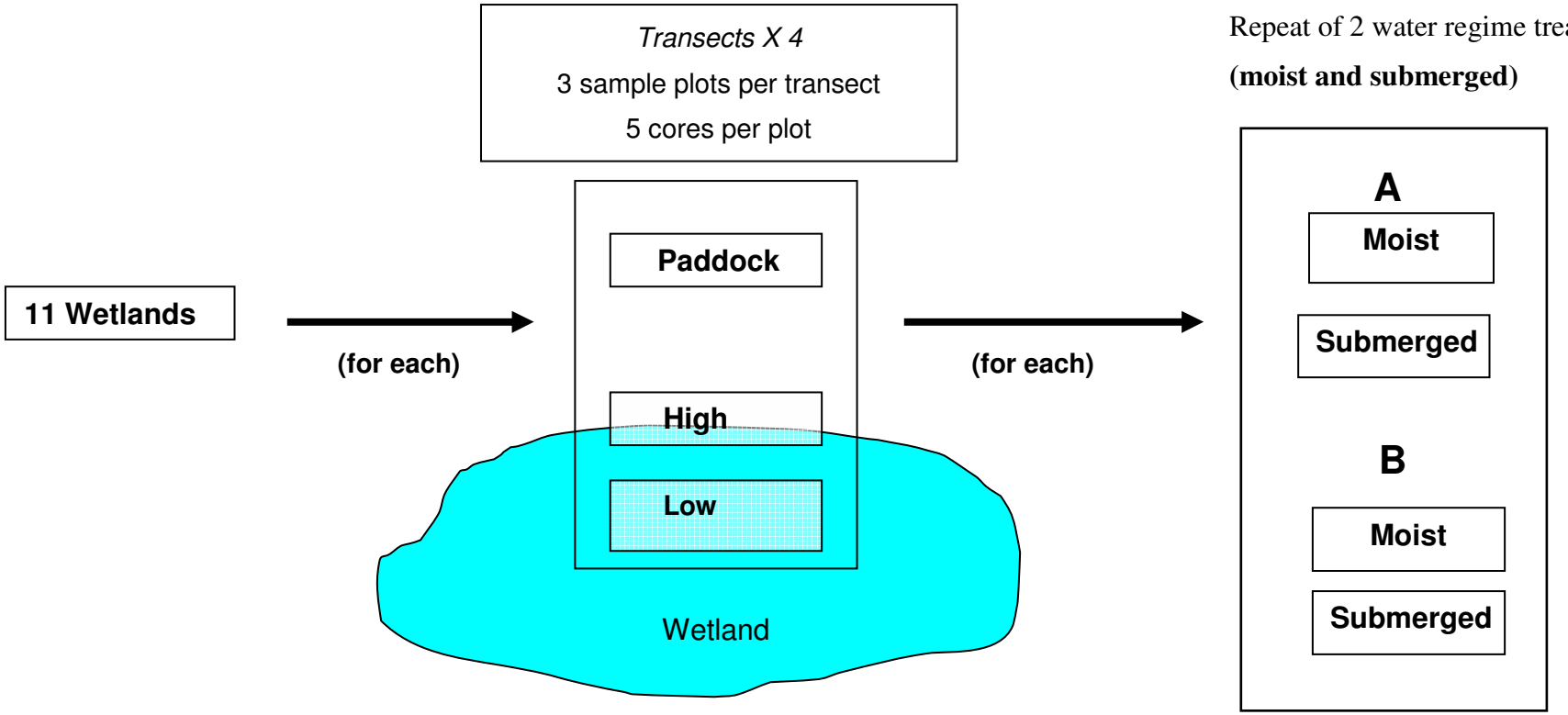
## Criteria for selection of wetlands

Eleven wetlands were selected from the Mid-Murrumbidgee River Floodplain based on their:

- commence to fill levels based on river heights at the closest river gauge
- known grazing history (grazed and not currently grazed)
- shallow (≤ 1m deep) or deep (> 1m deep) profile based on Parkinson et al ( 2002)
- location on private land.

The landholders consent to access and study the wetlands was also vital in the selection of wetlands.

Figure 2 – Sampling and Experimental Design




4 samples from each plot type were combined to form one sample for each plot type per wetland

**(11 wetlands X 3 plot samples per wetland X 2 treatments x 2 repeats) + 4 controls = 132 pots**

## Collection of soil from wetlands

Soil was collected from the 11 wetlands. At each wetland four transects, at least 50m apart, were set up. They extended 20m into the surrounding paddocks and to the deepest part of the wetland. Along each transect three $4m^2$ plots (2 x 2m) were set up, one each representing the paddock (located 20m from the wetland edge), high water mark (littoral zone) and low point of the wetland (deepest point within the wetland). Five random core samples were taken from each plot using a PVC (diameter 55mm, height 30mm) pipe with a sharpened end. The random core samples from the four transect were combined according to plot type (paddock, high and low) to form a mixed sample. These combined plot samples were stored in a plastic bucket with a tight fitting lid and transported back to the laboratory. The soil from each bucket was air dried separately by spreading out on a tray and allowing to dry at the ambient temperature. Once dry the soil was stored in cloth bags for 4 months until the commencement of the experiment.

## Soils

EC, pH and soil texture tests were carried out on all the soil samples prior to propagation. Soil pH was determined on a 1-5 solution using an ion specific pH meter. Electrical conductivity (EC) was determines on a 1-5 solution using a Radiometer Mark 1 conductivity meter with a specific ion meter for EC. Field texture tests were determined on the combined soil samples.

## Propagation of soils

The propagation trial lasted 6 weeks from wetting of the soil to counting and removal of species.

The dry soil samples were mixed well and divided into 5 parts by weight. One part was set aside as a spare sample and the other four were bagged and labelled ready for wetting. The four samples from each soil bag were subject to two different water treatments; moist and submerged. The submerged soils were kept totally submerged for the duration of the experiment. The moist soils had the bases of their containers sitting in 1-2cm of water. Figure 2 sets out the sampling and experimental design of the project.

The divided soils were placed in 2L ice-cream containers with holes drilled in the bottom. The containers were half-filled with a 50% washed sand (<2mm) and 50% vermiculite mixture on which the soil was placed on top. The sand was treated in an autoclave at 120°C for 2 hours to destroy the seeds present. Four moist controls were filled with the sand/vermiculite mixture only. Each pair of water regimes (A or B) was placed in Styrofoam coolers. Submerged treatments were placed on the bottom of the cooler, while the moist was raised above the bottom using an inverted ice-cream container. A newspaper wick was used to ensure the moist treatment never became dry. One end of the wick was placed between the inverted ice-cream container and the bottom of the ‘moist’ treatment container, while the other end dangled into the water. The boxes were filled so the water just covered the base of the moist container, while the submerged was covered by approximately 2cm of water (Figure 2) The coolers were

randomly placed on the ground. Some of the coolers did not receive full sun until midday due to their positioning. All the coolers were rotated once weekly so the samples were not being compromised by environmental effects such as shading. The boxes were rotated once weekly so each box was not in a shaded position for more than one out of three weeks. Water in the boxes was topped up daily and changed once weekly to prevent the built-up of algae. Daily maximum and minimum water temperatures were recorded.

### Counting and harvesting species

The number of species present was recorded each week. The first two weeks the species were noted as Monocotyledon or Dicotyledon. From the 3rd week onwards species were given code names and were tracked using coloured pins and matchsticks. Species were named either Monocot *n*, Dicot *n,* Milfoil *n* or the species common name if it could be identified. Photos were taken of all the species at different growth stages. Plants were removed if they were getting too big for their containers. All plants beyond cotyledon stage were either potted-up as representative specimens or discarded after counting. All the containers containing the soil were placed on benches in a shade house to observe any germination of new species.

### Identifying plant species

Species were identified using literature such as Flora of New South Wales (1990) and Plants of Western New South Wales (1992). Assistance was also obtained from the Gillis Horner, a botanist at the Centre for Natural Resources, Wagga Wagga. Many photos at the macro and micro scales were taken for future reference and identification of seedling plant species.

## Results

### Soils

The EC ranges from 11 to 625 µm/cm, with an average of 152 µm/cm, which is well below saline. pH ranges from 5.25 to 6.69, the average being 6. These are normal results for wetland soils. The textures vary considerable, however it is difficult to determine how this could effect plant germination (Appendix 2).

### Species

So far a total of 67 species have been recorded, 33 (49%) of which have been identified to at least genus level. Of these identified species 78% were native, 50% were weeds or potential

agricultural weeds and 18% (6) were introduced weeds. Appendix 3 outlines all the species found and their code names prior to being positively identified.

## Diversity of species within wetlands including prolific species.

Table 4 compares wetland type (shallow or deep), management (grazed or ungrazed), prolific species and weed species present. Prolific species were those where more than 10 plants were recorded from the soil from that wetland.

Both of the wetlands, which currently experience no grazing, have a high number of species present. Grazed wetlands have both high and low numbers of species present. All wetlands contained potential weed species, although not all wetlands contained introduced weed species such as Bathurst Burr and Thistle species.

## Species found in shallow and deep wetlands

Most species were found in both shallow and deep wetlands, however shallow wetlands contained more species overall compared to deep wetlands.

Table 2 – Distribution of species between shallow and deep wetlands

| | **Shallow only** | **Deep only** | **Both** |
|---|---|---|---|
| **Number of Species** | 22(33%) | 15(22%) | 30 (45%) |

## Species in submerged and moist

Ten species (15%) occurred only in submerged, while 49 species (73%) occurred only in the moist. Eight species (12%) occurred in both most and submerged treatments.

Slightly more species were found in the moist treatment occurred in the paddock and high plots compared to the low plots. Species that preferred submerged conditions were far more likely to be found in high and low plots.

Table 3 – Distribution of species in moist and submerged treatments of the paddock, high and low plots

| | **Both** | **Submerged** | **Moist** |
|---|---|---|---|
| **Paddock** | 2 | 2 | 30 |
| **High** | 9 | 9 | 31 |
| **Low** | 9 | 6 | 26 |

Table 4 – Comparison of wetland profile, management, number of species, prolific species and potential weed species

| Wetland | Profile | Wetland Grazed? | Number of Species Present | Prolific Species | Potential weed species |
|---|---|---|---|---|---|
| Bulgari Lagoon | deep | yes | 15 | Hairy Carpet Weed, Red water milfoil | Bathurst Burr, Dirty Dora, Toad Rush, Red Water Milfoil, Dock, Small Crumb Weed, |
| Bulls Run Swamp | shallow | yes | 17 | Spike Rush, Fine Spike Rush, Waterwort, Milfoil 1 | Dirty Dora, Toad Rush |
| Coldene Lagoon | deep | yes | 13 | Monocot 1, Dirty Dora, Hairy Persicaria, Small knotweed, small crumb weed | Thistle, Paterson's Curse, Bathurst Burr, Dirty Dora, Hairy Knotweed, Small Knotweed, Small Crumb Weed. |
| Currawanna Lagoon | deep | yes | 7 | 0 | Dirty Dora, Hairy Knotweed, Small Crumb Weed. |
| Dry Lake | shallow | yes | 12 | Monocot 3, Common Sneezeweed, Waterwort | Dirty Dora, Red Water Milfoil, Lesser Joy Weed |
| Ganmain Station Ponds | deep | yes | 17 | Rye grass B – Droopy love grass? | Small Knotweed, Small Crumb Weed, Lesser Joyweed, Dock |
| Kurrajong Lagoon | deep | yes | 13 | Rye grass B, Spike rush, Common, Sneezeweed, Dicot 2 | Paterson's curse, Hairy Knotweed, Lesser Joyweed |
| McKennas Lagoon | shallow | no - none since 1996 | 19 | Couch, Spike Rush, Fine Spike Rush, Milfoil 1, Daisy – Bindi-eye? Sneezeweed, Dicot 2, Small Knotweed, Small Crumb Weed. | Dirty Dora, Small Knotweed, Small Crumbweed, Lesser Joyweed |
| Molleys Lagoon | deep | no – stopped recently | 20 | Ryegrass B, Running Spikerush, Spikerush, Common Sneezeweed, Dicot 25 | Dirty Dora, Small Crumbweed, Dock |
| Toogambie | shallow | yes | 19 | Ryegrass B, Running Spikerush, Spikerush, Dicot 10, Dicot 18, | Thistle, Dirty Dora, Lesser Joyweed |
| Uri East | shallow | yes | 15 | Dicot 23 – Hairy carpet weed, Spikerush, Fine Spikerush. | Dirty Dora, Small Crumbweed, Lesser Joyweed, Raspwort |

## Weed and potential weed species

The main environmental and agricultural weed species identified were Patterson's Curse, Bathurst Burr, a thistle species and Dirty Dora. Dirty Dora was the most widespread introduced weed. The rest of the introduced weed species were not common.

Minor Agricultural weeds such as Small Crumbweed and Hairy Knotweed were also prolific and found in many wetlands.

Red Water Milfoil, a major weed in irrigation channels, was abundant in a few wetlands

Table 5 - Native and introduced weed and potential weed species that have been identified to date.

| **Native weed species** | **Introduced Weed Species** |
|---|---|
| Toad Rush | Bathurst Burr |
| Red Water Milfoil | Dirty Dora |
| Small Crumbweed | Dock |
| Hairy Knotweed | Patterson's Curse |
| Small Knotweed | Thistle |
| Lesser Joyweed | |
| Raspwort | |

# Conclusions

This study suggests that shallow wetlands support a greater diversity of species (52), compared to deep wetlands (45). However, analysis has not yet been carried out on the composition of these different species groups.

Each type of wetland supports unique species. Most species were found in one or two wetlands only. Only a few species were prolific across most wetlands.

This study suggests that moist conditions are more favourable for the majority of species (85%).

The majority of submerged species occurred in the high and low plot sample within the wetlands. This was to be expected, as it was unlikely that submerged plants would distribute seeds into the surrounding paddocks.

Overall the majority of identified species were native (78%). This result is encouraging, perhaps suggesting many of the wetlands have the potential to establish healthy plant communities if given the right conditions.

Potential weed species made up a significant proportion of identified species (50%) although most of these were minor native agricultural weeds. There doesn't seem to be a large seed resource of many of the more serious agricultural and environmental weeds such as Thistle species, Paterson's Curse and Bathurst Burr, which is surprising especially in the paddock

soils. Dirty Dora is the most prolific of all the introduced weed species, occurring in most of the wetlands in significant numbers.

Concern has to be raised about the lack of introduced weed species germinating in the trial, particularly in paddock plots when these species were found during soil collection(Pers. Comm. Patricia Murray, 2004). It may be that their seeds were not present in the seed bank, or if they were present then the experimental conditions were not right for there germination. The soil may have been kept too moist or they may be winter germinating species. More research needs to be conducted into the methods used in this experiment

This is a preliminary report because many issues need to be resolved. Firstly all the species need to be identified and further data analysis conduced on species distribution in moist and submerged treatments; within wetlands and; between wetlands. Distribution of species also needs to be compared with commencement to fill levels (frequency of inundation) and frequency of grazing.

## Acknowledgments

National River Consortium for providing the funding for the project; Patricia Murray for being a very patient and supportive supervisor; James Maguire for technical assistance and providing value information about the wetlands; Janet Wild for her assistance with soils; Gillis Horner for his willingness to share his vast knowledge of plants; Sandy Grant for helping produce the map and; staff at the Centre for Natural Resources for providing technical support and space to conduct the experiment.

## References

Brock, M.A, Theodore K. and O'Donnell, L. 1993. Seed-bank Methods for Australian Wetlands**.** *Australian Journal of Marine and Freshwater Research*. 45: 483-93.

Cunningham, G.M., Mulham, W.E., Milthorpe, P.L. and Leigh, J.H. 1992. *Plants of Western New South Wales*. Inkata Press, Australia

Harden, G.J. (Ed.) 1990. *Flora of New South Wales*, Volumes 1-4. University of NSW Press, Sydney, Australia.

Jansen, A. and Robertson, A.I. 2001. Relationships between livestock management and the ecological condition of riparian habitats along an Australian floodplain river. *Journal of Applied Ecology*, 38: 63-75

Murray, Patricia. 2004. Personal Communication. Project Officer

Spencer, C., Robertson, A.I. and Curtis, A. 1998. Development and testing of a rapid appraisal wetland condition index in south-eastern Australia. *Journal of Environmental Management*, 54: 143-159

Whitten, S.M. and Bennett, J.W. 2000. *Farmer perceptions of wetlands and wetland management on the Murrumbidgee river between Wagga Wagga and Hay including Mirool Creek*. Research report No.5.

# Appendices

## Appendix 1. – Wetland location

| Wetland | Map | Grid Ref |
|---|---|---|
| Bulgari Lagoon | Berembed | 968289 |
| Bulls Run Swamp | Berembed | 930384 |
| Coldene Lagoon | Wantabadgery | 640197 |
| Currawanna Lagoon | Collingullie | 093243 |
| Dry Lake | Gogeldrie | 375590 |
| Ganmain Station Ponds | Collingullie | 040253 |
| Kurrajong Lagoon | Wagga Wagga | 425165 |
| McKennas Lagoon | Benerembah | 630890 |
| Molleys Lagoon | Gogeldrie | 400573 |
| Toogambie | Toogambie | 7366 |
| Uri East | Darlington Point | 029715 |

## Appendix 2 – Soil pH, EC and texture test results

| Wetland | Low/ High/ Paddock | pH | EC(µm/cm) | Texture |
|---|---|---|---|---|
| Bulgari Lagoon | L | 6.69 | 216 | Light sandy clay loam |
| | H | 6.17 | 95 | Sandy clay loam |
| | P | 5.92 | 180 | Loam, fine sandy |
| Bulls Run Swamp | L | 5.40 | 215 | Loam, fine sandy |
| | H | 5.51 | 145 | Silty clay |
| | P | 6.11 | 115 | Silty clay loam |
| Coldene Lagoon | L | 6.05 | 625 | Loam |
| | H | 6.43 | 95 | Silty clay |
| | P | 6.39 | 200 | Silty clay loam |
| Currawanna Lagoon | L | 5.45 | 170 | Silty loam |
| | H | 6.35 | 55 | Silty clay loam |
| | P | 6.23 | 77 | Silty clay |
| Dry Lake | L | 6.06 | 92 | Loam, sandy |
| | H | 5.69 | 95 | Loam, sandy |
| | P | 6.05 | 160 | Silty clay loam |
| Ganmain Station | L | 5.81 | 380 | Loam |
| | H | 6.44 | 220 | Silty Loam |
| | P | 5.91 | 250 | Medium clay |
| Kurrajong Lagoon | L | 5.79 | 103 | Loam, fine sandy |
| | H | 5.47 | 136 | Loam fine sandy |
| | P | 5.91 | 85 | Silty clay loam |
| McKennas Lagoon | L | 5.68 | 315 | Silty clay loam |
| | H | 5.25 | 210 | Loam |
| | P | 6.64 | 140 | Clayey loam |
| Molleys Lagoon | L | 5.64 | 140 | Fine sandy loam |
| | H | 6.22 | 37 | Light clay |
| | P | 6.02 | 145 | Medium clay |
| Toogambie | L | 6.45 | 85 | Light clay |
| | H | 6.56 | 82 | Light clay |

| Wetland | Low/ High/ Paddock | pH | EC(µm/cm) | Texture |
|---|---|---|---|---|
| | P | 6.49 | 92 | Clay loam |
| Uri East | L | 5.70 | 135 | Clay loam |
| | H | 6.25 | 65 | Light clay |
| | P | 5.95 | 135 | Light clay |
| Sand | | 6.30 | 11 | sand |
| Vermiculite | | 6.39 | 11.2 | n/a |

## Appendix 3 – Species List

| Species ID | Species Name | Weed Species? |
|---|---|---|
| Monocot 1 | Couch? | Potential ecological and agricultural weed |
| Monocot 2 | Potamogeton Sp.? | No |
| Monocot 3 | Some Couch - *Sporobolus mitchelli*? and Some Perennial Rye Grass – *Lolium perenne*? | Potential ecological weed (couch) |
| Monocot 4 | | |
| Monocot 5 | Dirty Dora – *Cyperus difformis* | Agricultural weed – major rice weed. |
| Couch | Couch (*Sporobolus mitchelli*?) | |
| Rye Grass | Some Juncus *Bufonius or Kookanus*? and Some couch? | *Bufonius minor* agricultural weed |
| Rye Grass B | *Eragrostis Sp* - . Drooping Love Grass? | no |
| Spike rush | Pale Spike Rush – *Eleocharis pallens* | no |
| Fine Spike Rush | Small Spike Rush – *Eleocharis pusilla* | no |
| Running Spike Rush | Small Spike Rush – *Eleocharis pusilla* | no |
| Big Spike Rush | Tall Spike Rush - *Eleocharis sphacelata* | no |
| Juncus | Toad Rush -*Juncus bufonius* | *bufonius* minor agricultural weed |
| Mud Grass | Windmill Grass – *Chloris truncata*? | Coloniser in disturbed areas |
| Wild Oats | Some Hairy Panic – *Panicum effusum*? and Some Cupgrass – *Eriochoa Sp.*? | no |
| Medic 1 | Tripholium Sp.? | potential ecological and agricultural |
| Medic 2 | | potential ecological and agricultural |
| Milfoil 1 | | |
| Milfoil 2 | Red Water Milfoil – *Myriophyllum verrucosum* | Agricultural weed in farm dams and irrigation channels |

| Species ID | Species Name | Weed Species? |
|---|---|---|
| Milfoil 3 | | |
| Milfoil 4 | Swamp Stonecrop - *Crassula helmsii* | |
| Milfoil 5 | | |
| Milfoil 6 | Nitella (algae) | |
| Daisy | Bindy eye? | |
| Salt bush 1 | | |
| Salt bush 2 | | |
| Oxalis | Oxalis | Potential Ecological and agricultural |
| Bathurst Burr | Bathurst Burr – *Xanthium spinosum* | Serious ecological and agricultural weed. |
| Patterson's Curse | *Echium plantagineum* | Serious ecological and agricultural weed. |
| Thistle | | Ecological and agricultural weed. |
| Nardoo | | Minor agricultural weed in rice crops |
| Sneezeweed – Dicot 1 | Common Sneezeweed – *Centepedia cunninghamii* | No |
| Dicot 2 | Lesser Joyweed – *Alternanthera denticulata* | Minor pasture weed and potential ecological weed in wet places. |
| Dicot 3 | Dock | Agricultural weed |
| Dicot 4 | Speedwell – *Veronica Sp.?* | no |
| Dicot 5 | | |
| Dicot 6 | *Rumex Sp.* - Dock | Agricultural weed |
| Dicot 7 | | |
| Dicot 8 | Hairy knotweed – *Persicaria Sp.*? | Minor pasture weed, may block irrigation channels |
| Dicot 9 | | |
| Dicot 10 | | |
| Dicot 11 | | |
| Dicot 12 | Slender Carpet weed – *Glinus oppositifolia*? | |
| Dicot 13 | Small knotweed – *Polygonum plebeium* | Minor pasture weed, may block irrigation channels |
| Dicot 14 | Same as 13? | |
| Dicot 16 | Small Crumb Weed – *Chenopodium pumilio* | Minor agricultural weed |
| Dicot 18 | | |
| Dicot 19 | | |
| Dicot 20 | Saltbush | |
| Dicot 21 | Bathurst Burr | Serious ecological and agricultural weed. |
| Dicot 22 | | |
| Dicot 23 | Hairy Carpet Weed – *Glinis lotoides*? | |
| Dicot 24 | Died | |
| Dicot 25 | | |
| Dicot 26 | | |
| Dicot 27 | | |
| Dicot 28 | Waterwort – *Elatine grantioloides* ? | no |
| Dicot 29 | | |
| Dicot 30 | | |

| Species ID | Species Name | Weed Species? |
|---|---|---|
| Dicot 31 | | |
| Dicot 33 | | |
| Dicot 34 | | |
| Dicot 35 | | |
| Dicot 36 | Tar Vine – *Boerhavia diffusa* | No |
| Dicot 37 | | |
| Dicot 40 | | |
| Dicot 41 | | |
| Dicot 42 | Rough or Grey Raspwort – *Haloragis aspera* or *glauca* | agricultural weed (cultivation) |