

Wetlands, Biodiversity and Salt

Benefits of the Project

May 2004

Scientists, managers and landholders are working together to protect Victoria's many non-riverine wetlands and their rich biodiversity from any adverse effects of human-induced salinity. Non-riverine wetlands are those that are not directly linked to river floodplains.

Benefits of Project

The project involves scientists, managers and landholders working together to better understand the effects of salinity resulting from human activities on Victoria's wetlands and how best to manage or prevent this problem.

The project is focusing on the many wetlands that aren't part of a river system and haven't until now been the focus of much research. Benefits of the project include:

- bringing together existing knowledge of scientists, land managers, landholders and identifying the gaps
- integrating existing knowledge with targeted collection of new data across the landscape to build foundation for better management and decision-making

- a joint approach to testing on-ground management actions through selected in-depth case studies with land and water managers and landholders. These actions will be informed by the best available science and will be monitored and adapted to maximise their benefits in protecting Victoria's wetlands from salinity problems.



Redgum regeneration at Dowdles Swamp, Goulburn-Broken CMA. Photo: Keely Ough



Photo: ARI

Photo: DSE/McCann

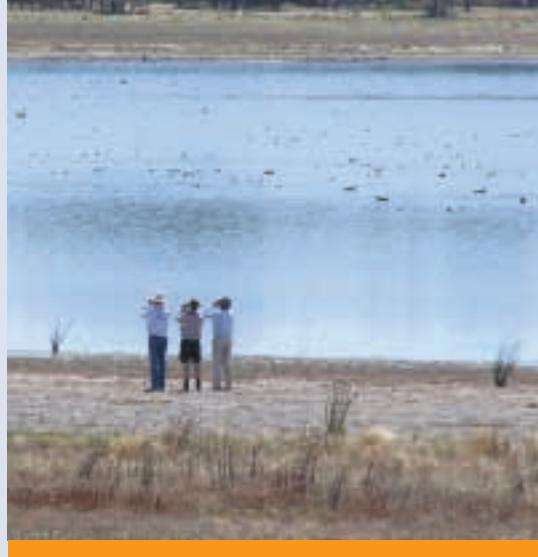
Photo: Keely Ough



Researchers measuring water quality at Lehmans Swamp, Goulburn-Broken CMA. Photo: Keely Ough

This project will help to protect the rich biodiversity of non-riverine wetlands. It anticipates that by the time this project ends in 2007, there will be:

- a better knowledge, relevant to landholders and managers, of the impacts of changing salinity on non-riverine wetlands and the animals and plants that depend upon them
- improved management methods for reducing or stopping the negative effects of human-induced salinity on the animals and plants that depend on wetlands
- improved decision-making by land and water managers based on sound science
- case studies of on-ground management benefiting from science-management partnership.



Wetlands in the West Wimmera are hotspots of biodiversity. Photo: Wimmera CMA

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Photos: Nick Cleemann

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Project Overview

May 2004

Scientists, managers and landholders are working together to protect Victoria's many non-riverine wetlands and their rich biodiversity from any adverse effects of human-induced salinity. Non-riverine wetlands are those that are not directly linked to river floodplains.

Aims

Scientists and managers working together on this project aim to:

- improve their shared knowledge about how wetlands are affected by human-induced salinity and management actions
- identify ecological impacts on wetlands from different levels of salinity
- develop and implement methods for preserving wetlands and protecting them from any adverse effects of human-induced salinity.

This research fits in with the goals of the

National Action Plan for Salinity and Water Quality, which is funding this project: 'to motivate and enable regional communities to use a coordinated and targeted action plan to:

- prevent, stabilise and reverse trends in dryland salinity affecting the sustainability of production, the conservation of biological diversity and the viability of our infrastructure
- improve water quality and secure reliable allocations for human uses, industry and the environment'.



Keely Ough, researcher with Arthur Rylah Institute surveying freshwater wetlands in North Central Victoria. Photo: Rob McClure

Biodiversity is a term that includes the variety of all life forms, extending from genes to higher plants and animals and including the ecosystems within which they live and function. Biodiversity is fundamental in maintaining healthy sustainable catchments. The benefits of conserving biological diversity include support for production systems (e.g. through pest control or pollination services), maintaining genetic diversity, and the ability for species to adapt to changing climate and environments.



Photo: Nick Clemann



Photo: Lindy Lumsden



Photo: ARI

The changing states of wetlands

The photos on the right and left represent wetlands in different conditions or 'states'; this project is looking to see how human-induced salinity might change wetlands from one state to the next and how management can prevent this



Photo: Keely Ough

Approach

This project will test whether:

- wetlands exist in a number of relatively stable conditions or 'states', but will rapidly go from one state to another with salinity impacts
- management actions can influence such changes in wetlands
- knowledge of how salinity and management actions influence wetland conditions can influence decision-making by land and water managers.

The project has five components that are linked together and dependent on each other.

1. Developing a picture of wetlands:

Scientists and managers are bringing together all the existing knowledge they have about how salinity changes caused by human actions can affect wetland ecology. This will create a picture of our current knowledge about wetlands and identify where we still need to gain extra information.

2. Surveying wetlands:

The information still required will be collected from a large number of wetlands (80-100) across several National Action Plan priority regions. Wetlands for this survey will be selected on the basis of their past salinity history, their management history and predicted future salinity and management conditions.

3. Defining issues:

Issues affecting the management of wetlands will be defined and various options for managing wetlands identified in this step. This information will be incorporated into the 'picture' being developed in step 1 to identify key decision points for managing salinity impacts on wetlands.

4. Testing management options:

Different management options will be tested on-ground in this step to determine their success at achieving the objectives of wetland managers. Where possible, these tests will link with existing or developing on-ground management plans to add value to what is currently being done or planned.

5. Communicating:

A communication strategy ensures there is ongoing excellent interaction and knowledge exchange between researchers, land and water managers, landholders and local communities.

Links to other projects

This project links with two other National Action Plan projects being conducted by DSE in Victoria:

- Developing a wetlands condition assessment method
- Assessing the risks of increasing salinity on plants and animals

This project will share information with both the projects above, but is different in that it is collecting new information and testing this directly with on-ground management actions.

Management

The project is being led by Dr Sabine Schreiber, a senior scientist with the Arthur Rylah Institute for Environmental Research (ARI). A Project Steering Committee, including water and land managers, scientific experts and representatives from the NAP office and project team will ensure project outcomes are achieved. A Science and Policy Review Panel will review the scientific methodology and ensure a rigorous process is applied throughout the project so the outcomes are transferable across Victoria to wetland managers.

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Getting Involved

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Scientists, managers and landholders are working together to protect Victoria's many non-riverine wetlands and their rich biodiversity from any adverse effects of human-induced salinity. Non-riverine wetlands are those that are not directly linked to river floodplains.

Land and water managers and landholder participation vital

An important and unique basis to this project is the partnership approach between researchers, landholders and managers. Whilst researchers are leading this project, they very much depend on the natural resource management agency representatives and landholders to further develop and implement it. It is likely that future funding needs to be sought by partnerships developed for testing future on-ground management actions.

Landholders, and land and water managers are directly important to this project and can become involved by:

- checking the relevance of the research project – give us your feedback
- sharing your knowledge about wetlands and their management – help us to fill our knowledge gaps

- evaluating existing data against what is actually happening on the ground – help us to check the information we have so far and find any gaps
- exchanging knowledge for increased understanding – join us to better understand wetlands and how salinity impacts on them and communicate this information more widely in the community
- developing and testing on-ground management actions – allow us to work with you to test management outcomes
- help us to communicate our progress and results.

Barry Hall wants to be involved as a private landholder and a Board member of the Wimmera CMA. 'The project has to focus on the ground with land managers and natural resource management groups like CMAs, DSE and local governments.'



*Johnson Swamp – a freshwater wetland in a saline landscape, North Central CMA.
Photo: Keely Ough*



Photo: DSE/McCann



Photo: Nick Cleemann



Photo: Nick Cleemann

How land and water managers can get involved

The following table lists how land and water managers can get involved in the five components of the project.

Project Component	Involvement opportunities
1. Developing a picture of wetlands	<ul style="list-style-type: none">• Providing access to existing information/data• Giving feedback about scientific framework (what's important to you?)• Checking information/data against what is actually happening on the ground and what it important to whom• Reviewing scientific relevance• Clarifying relevant / practical outcomes from research• Finding out the applicability of research to other projects and activities
2. Surveying wetlands	<ul style="list-style-type: none">• Providing information about and access to wetland sites• Identifying sites for in-depth case study research• Negotiating access to wetland sites• Collecting local data/information• Collaborating with existing/planned surveys• Identifying local priority wetland sites• Helping with local wetland surveys
3. Defining issues	<ul style="list-style-type: none">• Discussing management issues• Identifying questions to be addressed• Identifying feasibility of management options• Exploring management scenarios• Identifying key decision making opportunities and processes
4. Testing management options	<ul style="list-style-type: none">• Providing access to wetlands for case studies (limited to a few sites for in-depth study)• Supporting wetland manipulation• Collecting data about impacts of management actions (existing, previous and current)• Linking project to existing management interventions• Developing joint funding proposals for on-ground works
5. Communicating	<ul style="list-style-type: none">• Providing local knowledge/input• Engaging in joint promotional opportunities• Telling us your communication needs• Distributing information about the project• Conducting joint communication activities (field days etc)

Craig Allen, Wetlands Officer with the Corangamite Catchment Management Authority wants opportunities to input throughout the project. 'I don't want to wait until the end to find out what is useful or not. I want to be able to help tweak things along the way, so that we can be sure the project produces information that is both practical and accessible to the people on the ground.'

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Victoria's Wetlands

May 2004

Scientists, managers and landholders are working together to protect Victoria's many non-riverine wetlands and their rich biodiversity from any adverse effects of human-induced salinity. Non-riverine wetlands are those that are not directly linked to river floodplains.

Rich diversity of wetlands

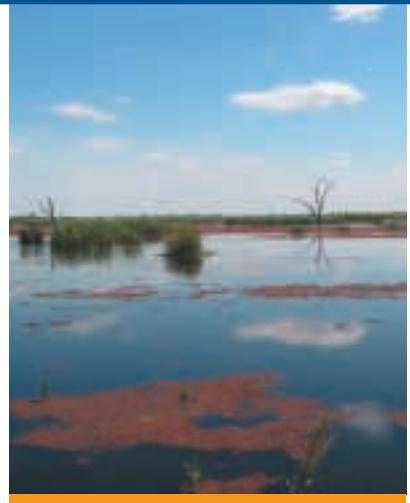
An inventory of Victoria's wetlands lists about 13,000 naturally occurring wetlands (over 1 hectare in size) covering about 635,000 hectares. About three quarters of the wetland area in Victoria is on public land and managed for biodiversity conservation, forestry, irrigation and water supply, wastewater treatment and recreation. While they cover an extensive area, these wetlands make up only 20 percent of the total number of individual wetlands. They tend to be the larger more permanent wetlands associated with rivers and flood plains.

The remaining 80 percent of wetlands are on private, often agricultural land. These wetlands are less likely to be on or linked directly to a river floodplain and are often smaller and temporary in nature, drying out in summer and then filling up again during winter rains. Such wetlands are the most critically threatened of Victoria's wetlands, but are rich in animal and plant life. Many of us are unaware of their ecological value and perceive these places to be 'swamps' rather than fragile beautiful places.

Since European settlement, about 37 percent of the wetland area has been lost, mainly due to drainage. More than 90 percent of this loss has occurred on private land. The areas most affected are in south-west Victoria and the irrigation areas around Kerang and Shepparton.

Wetlands are an important resource for all Victorians by providing us with:

- habitat for a diverse range of invertebrates, fish, reptiles, mammals and birds – biodiversity 'hotspots'
- a natural filter to cleanse water of sediments and pollutants, ensuring high quality water for human uses such as drinking, irrigation, industry, aquaculture
- a way to recycle nutrients, such as nitrogen, helping to avoid algal blooms downstream
- recreational, tourism and cultural opportunities.



Hird Swamp, a RAMSAR wetland in North Central Victoria. Photo: Keely Ough



Lehman Swamp, a shallow freshwater marsh in the Goulburn-Broken CMA. Photo: Keely Ough



Photo: Nick Cleemann



Photo: DSE/McCann

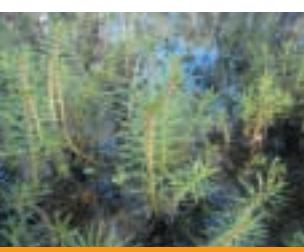


Photo: Keely Ough

South-West Wimmera wetlands

The South-West Wimmera features about 3000 wetlands that make up more than 25 percent of all of Victoria's individual wetlands. They occur in chains that form the surface water drainage system, flowing in a generally north-westerly direction. The larger and more permanent wetlands are owned publicly and are managed by Parks Victoria; but the vast majority of wetlands are smaller and largely found on private land with landholders playing a major role in their conservation.



Fish Lake, a freshwater wetland in the Wimmera CMA. Photo: Michele Kohout

Barry Hall is a landholder in the Wimmera producing wool and lambs on his 1300 acres across four different farms. Retiring recently as a school principal in the region, he has turned his full attention to his property and work as a Board member with the Wimmera Catchment Management Authority. 'This is a magnificent area,' he says. 'My wife and I love it here. When I moved here for my first teaching job I decided to stay. The wetlands are vital for this area – visually they are great and people use them for fishing, boating and as a water supply. Biologically they are very important. We have a wetland up the back and we go up and sit there and watch the birds. It is good for the soul.'

'We need to be aware of the effects of agricultural productivity on our wetlands,' says Barry Hall. 'More information is needed of the effects of salinity on wetlands. Draining of wetlands for agricultural productivity is also becoming a big factor.'

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Photos: DSE/McCann

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Salinity and Victoria's Wetlands

May 2004

Scientists, managers and landholders are working together to protect Victoria's many non-riverine wetlands and their rich biodiversity from any adverse effects of human-induced salinity. Non-riverine wetlands are those that are not directly linked to river floodplains.

The effects of human-induced salinity on our natural environment have been recognised for a long time. Wetlands are likely to be especially vulnerable to salinity given their location in the landscape. Wetlands collect water as it runs off from salt-affected soil and enters from groundwater stores that may also be saline.

Non-riverine wetlands occupy a significant place in the landscape and are often found on private land. Their relatively low position in the landscape means they are likely to be the first to show the detrimental impacts of human-induced salinity and may be useful indicators of the success or otherwise of management changes designed to control salinity across the landscape.



Lake Murphy, formerly a shallow freshwater marsh, now saline. Photo: Keely Ough

About 37 per cent of Victoria's wetland area has been lost since European settlement, mainly due to drainage, mostly on private land. Salinity presents a significant threat to wetlands where irrigation and land clearing have resulted in raised water tables. Other threats include nutrient runoff from urban and agricultural areas, sedimentation and invasion by pest animals and plants.



Photos: Keely Ough

Photo: DSE/McCann

Wetlands research has focused on flood plain wetlands connected to river systems; little has been studied about non-riverine wetlands filled through rainfall or groundwater seepage.

Research currently indicates that human-induced salinity can affect wetlands by:

- decreasing diversity of plant species through a dominance of salt-tolerant species; most larger aquatic plants cannot tolerate salinities above 4,000 mg/L meaning more saline wetlands are likely to be dominated by microscopic algae and blue green bacteria
- simplifying the habitat, making it less resilient to change (for example, a more complex wetland habitat may have several species of large fish that have different ways of responding to changes meaning that if change occurs it is more likely that at least one fish species can adapt and recover)

Researcher examining the biology of a freshwater wetland. Photo: Rob McClure

Grass Flat Swamp, Wimmera. A wetland dominated by salt-tolerant plants. Photo: Michele Kohout

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- adversely affecting the health of aquatic plants and streambank vegetation, including trees
- decreasing the number of different species present.

There are still a number of important research questions that need answering. For example:

1. Do wetlands act as indicators of salinity problems in the landscape, and if so can they also indicate the relative success of management actions to control salinity?

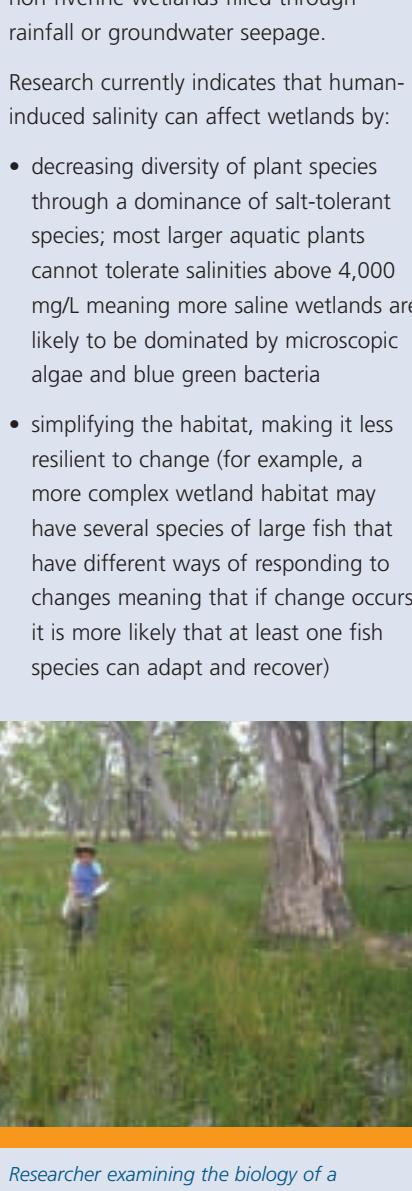
2. Does biodiversity protect wetlands?
3. How can managers assess the impacts of human-induced salinity on wetlands?
4. How can we assess the relative success of management actions designed to control the impacts of human-induced salinity on wetlands?

In the Wimmera, wetlands previously classed as permanent freshwater meadows have dried up every year for the past three years and Lake Wallace went dry in 2003 for the first time in living memory. 'We need to be aware of the effects of agricultural productivity on our wetlands.' says local landholder, Barry Hall. 'More information is needed on the effects of salinity on wetlands. The draining of wetlands for agricultural production also has implications for our wetlands.'

In Corangamite CMA Region, the key challenges for wetlands management are related to the incredible rate of change in the way the landscape is being used. 'More grazing land is being converted to cropping or improved pasture, meaning more fertilisers and pesticides are being used,' says Craig Allen. 'run-off from such land use can damage wetlands. Many landholders are working to conserve wetlands, but some are still draining wetlands on their property, especially if they have been dry for several years. Such activities can cause changes to groundwater systems leading to increased dryland, riverine and wetland salinity. It's a big concern from both production and conservation perspectives.'

The Victorian catchments currently affected by salinity, as recognised by the National Action Plan, are:

- Corangamite
- Wimmera
- Goulburn-Broken
- Avoca-Loddon-Campaspe
- Glenelg-Hopkins
- Lower Murray



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Register to get regular project updates

If you would like to receive updated information on the project, please complete the form below and fax to:
03 9450 8799 OR post to Dr Michele Kohout, ARI PO Box 137, Heidelberg Vic 3083.

Name:

Mailing Address:

Phone:

Fax:

Email:

How would you prefer to receive this information? Email Post Fax

Optional:

To help us deliver the best possible information to you and/or to best involve you in the project, we'd really appreciate it if you could complete the short survey below and return it to us as well.

1. Do you manage wetlands in your area or have wetlands on your property?

YES NO (if YES, please describe wetlands).

Would you be willing to share your knowledge of wetland management with us?

YES NO

2. What sort of information would you like to receive about wetlands, especially from this project?

Biodiversity
 Salinity
 Management
 Other (please list)

Other (please list)

3. How do you like to receive information?

(please list from 1 – highest preference to 10 – lowest preference)

Email
 Mail
 Face to face – personal
 Workshop
 Newsletter
 Newspaper article
 Radio piece
 Field day
 Other (please list)

Other (please list)

4. How would you like to be involved in the project?

(please list from 1 – highest preference to 12 – lowest preference)

- Receive information
 Provide information about wetlands and other relevant issues in my area
 Helping conduct wetlands survey
 Participating in workshops about local wetlands
 Checking data/information
 Testing management options
 Exploring various management options/scenarios
 Providing comments and feedback about information/reports
 Joint activities – e.g. field days
 Use information from project in own publications – e.g. newsletters
 Develop joint funding proposals for management activities
 Other (please list)

5. Any other comments/suggestions?

Thank You