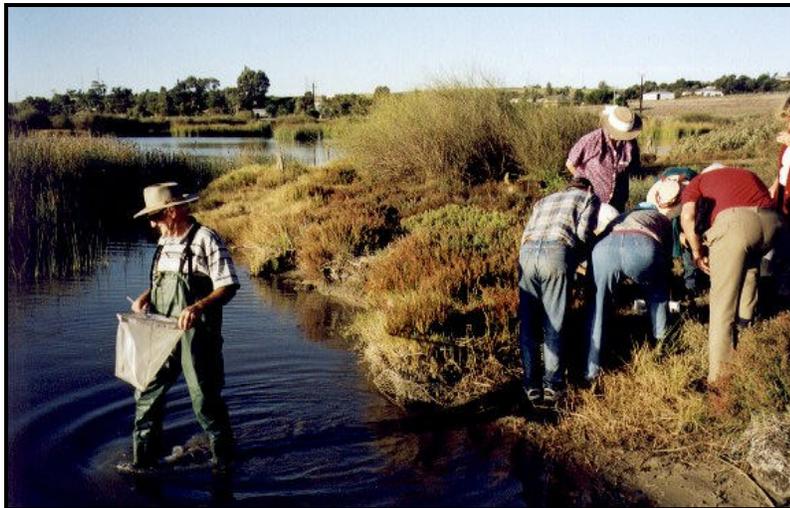

Wetland rehabilitation: getting started

A step-by-step guide for people who want to make a difference



Christina Collins
2000



STATE WETLAND ACTION GROUP



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Cover photo: A community group assessing their local wetland on the Murray River. (WCA)

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Wetland Care Australia is a community-based, non-profit organisation, headed by volunteer board members, that works with community groups and landowners to rehabilitate wetlands. Wetland Care Australia's vision is "Healthy wetlands for healthy rivers; special forever".

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Ocean Watch is a non-profit organisation funded by the commercial seafood industry of NSW. Ocean Watch lobbies government and educates the public about environmental problems affecting waterways in NSW.

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The NSW State Wetland Action Group is a government organisation which encourages the partnership between government and community in rehabilitating and managing wetlands. The Group does this through assisting with the implementation of the NSW State Wetlands Management Policy 1996 and promoting community-based wetland projects and government activities.

Thank you for your interest in rehabilitating wetlands. Wetlands are vulnerable ecosystems which often bear the brunt of human progress. This guide is designed to give people practical help in managing wetland rehabilitation projects. Through rehabilitating wetlands you can contribute to real and positive environmental change.

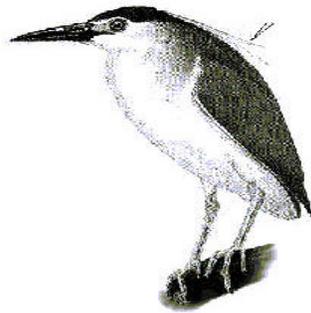
The guide has drawn together information from landowners and community groups around Australia. Each chapter covers, in logical order, the activities you need to undertake to develop a successful management plan to restore wetlands. While the detailed information is for New South Wales, the general information applies anywhere in Australia.

We hope that this guide encourages and inspires you to restore wetlands on your land or in your district.

All the best with your wetland project.

Bill Hardy

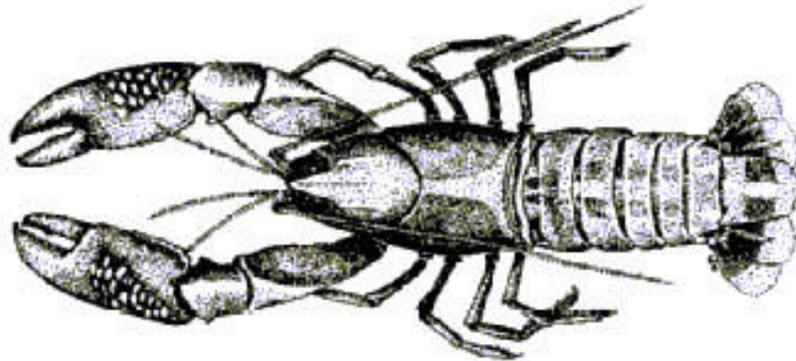
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This guide is designed to help you develop a management plan to rehabilitate a wetland. Each chapter covers one aspect of developing a rehabilitation project. If you work through each chapter you will have developed a wetland management plan.



Why rehabilitate wetlands?

All wetlands share a common feature - they are inundated with water, either temporarily or permanently. They differ from rivers and creeks in that they are shallow and the water is usually slow moving or stationary. Areas flooded artificially for agricultural production (eg rice paddies) or other purposes are not classed as wetlands.

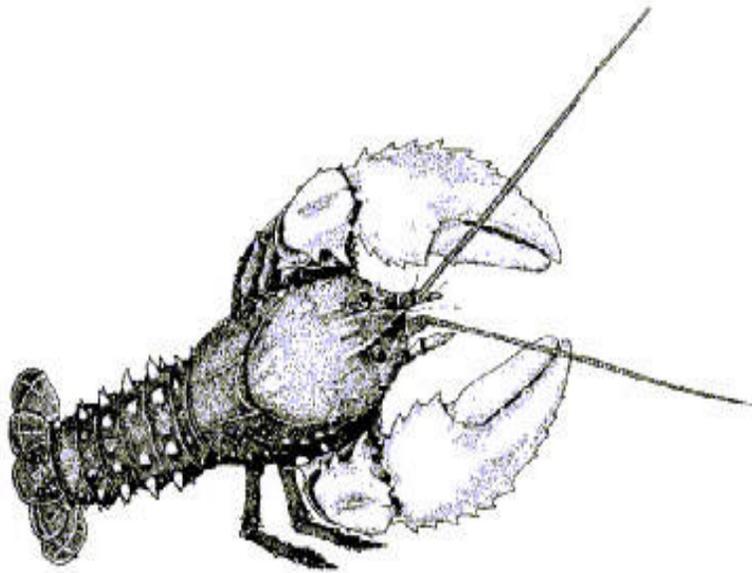
There are many different wetlands - floodplain wetlands where water cannot escape to the sea; natural rock basins where water cannot soak into the soil; estuarine wetlands close to the sea. Some wetlands are permanently wet; others are ephemeral, holding water for only a few months in wet times.

Once regarded as wastelands, wetlands are now regarded as ecological heartlands. They provide habitat for fish, birds and other animals, mitigate the effect of flooding and improve water quality.

Wetlands are of a particular benefit to landowners - forested wetlands may act as shelter belts, decreasing soil moisture loss from paddocks; the presence of waterbirds can have significant benefits for insect control; the re-flooding of wetlands can provide drought relief pasture and water for livestock.

Due to our neglect over the past decades, many wetlands have been altered from their natural state. It is estimated that since European arrival approximately 50% of all Australia's wetlands have been converted to other uses, this rises to 90% in closely settled areas. (ANCA, 1996)

- *Approximately 70% of the fish caught by NSW professional fishers depend on wetlands in estuaries for part of their lifecycle. It has been estimated that this part of the fish catch contributes over \$200 million per annum to the NSW economy. (Copeland, 1996)*
- *Wetlands provide feeding, breeding and roosting areas for wildlife, including birds like egrets and ibis which eat large numbers of grasshoppers and other insects in the surrounding district.*



We do not know exactly how many wetlands there are in NSW, nor how many existed before European settlement. What we do know is that wetlands are one of the least represented ecosystems within national parks and nature reserves; that most wetlands occur on private lands; and that degraded wetlands outnumber natural, untouched wetlands. The rehabilitation of wetlands, especially on private land, is vital for the overall conservation of wetlands and our ecosystems.

Rehabilitation programs aim to return wetlands to a more natural state through activities such as restoring the natural water regime, encouraging the return of native flora and fauna and controlling stock access.

1. Deciding priorities for rehabilitation

These general priorities for wetland rehabilitation in NSW will help you determine whether it is beneficial to rehabilitate a particular wetland.

The basic principles for rehabilitation priority are;

- rehabilitate wetlands that support valuable organisms or communities
- rehabilitate wetlands that are in a better condition before those in worse condition
- rehabilitate wetlands that are improving by themselves rather than those that are deteriorating
- rehabilitate wetlands that are going to take minimal effort to get back to a more natural state rather than those that will take a substantial amount of work.

(based on Rutherford et al , 1999)

Other aspects which will help you determine priorities are landowners support,

surrounding landuse, accessibility and habitat value.

Some of the more common reasons to rehabilitate wetlands are to:

- restore habitat
- restore natural water regimes
- restore natural vegetation.

Rehabilitating wetlands for aesthetic reasons (ie to look prettier) is a low environmental priority

Put your rehabilitation efforts where you will get the best returns.

and is unlikely to receive funding. The questionnaire will help you determine which wetland in your local area has the highest priority for rehabilitation.



Deciding priorities - a questionnaire

Work through the questionnaire, selecting the answer that best suits the site you are assessing. Once finished, total the score and read the priority rating the site received.

1. Who owns the wetland?

- | | |
|--|---|
| a the government (gazetted reserve or public land) | 4 |
| b 1 private landowner | 3 |
| c 2 to 5 private landowners | 2 |
| d more than 5 private landowners | 1 |

2. If the wetland is privately owned, are the landowners supportive of rehabilitation?

- | | |
|---|---|
| a They are very supportive. | 4 |
| b They are supportive, but they need more information before making a decision. | 3 |
| c They are doubtful about change. | 2 |
| d They are not supportive. | 1 |

3. How is the wetland used? (choose the most dominant use if more than one applies)

- | | |
|---|---|
| a It is in a natural state. | 4 |
| b It is grazed. | 3 |
| c It is cultivated. | 2 |
| d It is being used for other non-wetland purposes eg landfill site, liquid or solid waste disposal. | 1 |

4. How big is the wetland?

- | | |
|-------------------|---|
| a more than 25 ha | 4 |
| b 1 to 25 ha | 3 |
| c less than 1 ha | 1 |

5. Is or could the wetland be readily accessible to the public (eg for tours)?

- | | |
|-----------------------------------|---|
| a yes | 4 |
| b probably (after further action) | 3 |
| c no | 2 |

6. How representative is the wetland of your area?

- | | |
|--|---|
| a It is an intact* representative of wetlands characteristic of the area. | 4 |
| b It is an intact* representative of a wetland rare in the area. | 4 |
| c It is an area which is neither rare nor representative, but important habitat for fish and wildlife. | 3 |
| d It is characteristic or rare to the area but not intact*. | 2 |
| e none of the above | 1 |

7. *Is the wetland a habitat for endemic* or threatened* species?*
- a yes 4
b no 1
8. *Is the wetland vital to the existence of the native flora and fauna of your area?*
- a highly 4
b maybe 2
c probably not 1
9. *Are there established wildlife corridors* to the wetland?*
- a yes 4
b possibly, after further action 2
c no 1
10. *Is the wetland used by wildlife for certain parts of their life cycle, (eg as a breeding rookery or as a drought refuge)?*
- a frequently 4
b sometimes 2
c hardly ever 1
11. *Is the wetland significant culturally, recreationally or for Indigenous reasons?*
- a highly significant 4
b moderately significant 2
c low significance 1

Now add up your scores

- 37-44 high priority site
27-36 priority site but some issues may need to be resolved
17-26 medium priority, so better left as there are probably too many issues to be resolved
12-17 low priority in terms of achievable change

- *Endemic - a species restricted to an area
*Intact - a wetland that is in relatively good shape, ie has no pollution, has lots of trees and animals, and no interference to water regime
*Threatened - a species that is listed under the Threatened Species Conservation Act, and is classed as either endangered or vulnerable in NSW
*Wildlife Corridors - areas of continuous habitat that link other 'island of habitat' to each other including aquatic environments such as streams

2. Assessing your site

Once you have selected the wetland you want to rehabilitate, you need to find out as much information about it as possible. This information will help you decide your aims, objectives and actions to develop a practical management plan.

Following are several different assessments that you can include in your wetland inventory. Don't be daunted by the number of assessments as not everything will apply to your specific wetland.

Location

- **Name of the wetland**
- **Describe wetland location**

A topographic map of the area is essential. These are available from local newsagents. Aerial photographs of the area are also useful.

- **Size**

Size can be determined by using aerial photos, topographic maps or worked out in the field. Write down.

width, during drought and flooding
length, during drought and flooding
depth, during drought and flooding

Determining the precise depth of a wetland may not be required. Assume where there is no vegetation in the water, the water is at least 2 metres deep. Tidal wetlands will vary in size depending on the tidal range.

- **Longitude and latitude**

Longitude and latitude are geographic coordinates which measure, in degrees, a location from the equator and the Greenwich Meridian. These coordinates can be found on most topographic maps.

Tenure and legal matters

- Is the wetland fenced off from surrounding land?
- Who owns the wetland? (Draw a map showing property boundaries in and around the wetland)

Before any rehabilitation can be undertaken, it is important to identify landowners who will have an interest in the management of the area.

- What are the landowners' interests towards the wetland? How would they like to see it managed?

In which Local Government Area does the wetland occur ?

- What is the landuse zoning?

Zoning will identify whether the land is classified as an agricultural, industrial, residential or native vegetation area.

- Is the site covered under any state, regional or local environmental plans? If yes what are the restrictions applicable to the wetland?

If the wetland is listed under a state, regional or local environmental plan (see section 6), there are special conditions placed over the area.

- Is the wetland in an area where native title may exist?

To determine whether native title exists over the wetland contact the Native Title Tribunal, see section 8.

Water regime

A water regime includes the amount of water in a wetland, how often the wetland fills, and how long the water stays. A regime covers the full range of conditions from floods to droughts. Understanding the water regime of a wetland is a crucial aspect in rehabilitation. Where possible the natural regime should be compared to the current regime.

- Where does the water in the wetland come from
- (eg streams, springs, drainage lines, tides)?
- Where does this water go? Does it stay and evaporate, flow out in flood events or flow out in a stream or river?
- When does most of the water come into the wetland (summer, autumn, winter, spring) ?
- Does the wetland have a cycle of different water levels (ie full, half full, dry)? if yes how long is the cycle?
(annual, every three years, every five years, every ten years, other)

- If the wetland is permanently dry or permanently flooded, what is stopping the natural flows in or out?

A common cause of degradation is the regulation of river flows, so that a near constant water level is established.

What are the barriers to flow (number, position, type and extent of effect)? (obtain a map to show locations)

The following question is a benchmarking question. Your answer provides you with a benchmark against which you can compare results after rehabilitation. These benchmarking questions are located throughout this section. For more information on monitoring see section 4.

What is your overall rating of how altered the water regime is from its natural state?
highly / partially / slightly

Native wildlife

This is an example how to set out a table to record and assess the native wildlife of a freshwater wetland. When assessing wildlife, things to take into consideration are; the number of different types, the number of each type and whether any wildlife breeds at your site. Waterbirds should be assessed separately, (see next page). Threatened species are important to record. They make your wetland a priority site for rehabilitation.

Indicator species are animals whose presence indicates something about the wetland. For instance a family of kites indicates that the wetland supports its food source, small marsupials. The presence of native fish, particularly small species, is a good indication of biodiversity. Frogs are also a good indicator species and can be identified by their calls in spring.

Type	Present (Yes/No)	Species	Population numbers <i>(abundant, common, rare)</i>	Location most commonly found <i>(reeds, trees, deep water, rocky areas, grass)</i>
Fish	yes	<i>Murray Cod (during floods, to breed)</i>	rare	deep water
Frogs	no			
Waterbugs (eg snails, shrimps)	yes	<i>snails, dragonfly larvae, mosquito rigglers</i>	<i>abundant in spring, rare at other times</i>	shallow water
Reptiles (eg snakes, lizards)	yes	<i>Water Dragons, Black Snakes, Blue Tongue Lizard</i>	common	rocky areas, for sunning themselves
Mammals (eg platypus, bandicoots)	yes	<i>Squirrel Gliders (threatened species)</i>	common	trees

- Are there important species (indicator or threatened) present?

***What is your overall rating of the fauna within the wetland?
good / fair / poor***

Feral wildlife

- What feral or introduced wildlife (eg cane toads, carp, foxes, rabbits) are present around/nearby the wetland ?

The presence of introduced species in a wetland are an indication of how degraded the area is.

- Are any of these species a problem in the wetland? If yes, explain why.

What is your overall rating of the impact of introduced species on the wetland?
high / medium / low

Waterbirds

This is an example of how to set out a table to record and assess the waterbirds of an estuarine wetland. Waterbirds are a key indicator species so the different species present and number of individuals should be recorded regularly. Any evidence of breeding should be noted, as well as the habitat which is used in critical stages of their life cycle (roosting, feeding).

Species	Population numbers <i>(abundant, common, rare)</i>	Do they breed in the wetland? Yes/No	Location most commonly found <i>(mud or sand flats, trees, deep water, rocky areas, mangroves)</i>
<i>Australian White Ibis</i>	<i>abundant</i>	<i>yes</i>	<i>mud or sand flats, roosts in trees</i>
<i>Banded Stilt</i>	<i>rare, visits coincide with droughts in the north</i>	<i>no</i>	<i>mud or sand flats</i>
<i>Intermediate Egret</i>	<i>common</i>	<i>yes</i>	<i>mud or sand flats, mangroves</i>
<i>Pied Cormorant</i>	<i>abundant</i>	<i>yes</i>	<i>feeds in deep water, roost and breed in trees</i>
<i>Osprey</i>	<i>rare, threatened species</i>	<i>yes</i>	<i>feeds in deep water, nest in highest trees</i>

- Are there any important species (indicator or threatened species) present?

What is your overall rating of the waterbirds of the wetland? **good / fair / poor**

Vegetation

This is an example of how to set out a table to record and assess the vegetation of a wetland. The species will vary depending on location (eg estuarine or freshwater). As shown in the example below, each 'zone' of the wetland should be investigated.

Zones	Native	% of total vegetation cover	Weeds	% of total vegetation cover
higher ground	Blue Gum Spotted Gum	45% 30%	Lantana Parramatta Grass	10% 15%
banks	Cumbungi Common Reed	30% 20%	Lantana Parramatta Grass	40% 10%
shallow water	Blue Lily Hornwort	25% 15%	Water Hyacinth Salvinia	50% 10%
deep water	no veg		no veg	

- Is fire used as a management tool in the wetland? If so, how often?
- Overall are native or weed species the more dominant plants in the wetland?
To determine how severe weed invasion is at your site, weeds should comprise less than 40% of the total overall cover, in a healthy wetland. (H-NCMT, 1996)
- Do any of the weed species cause problems within the wetland? If so, why?
- Overall, what is the health of wetland vegetation? excellent/ good/ fair/ poor?
Signs of a healthy plant are intact, bright leaves that are not heavily grazed or diseased. Crowns of trees are complete and dense when healthy, but thin and patchy when stressed. Submerged plants should not be covered in a excessive furry brown covering, which are epiphytes; algae, bacteria and invertebrates. Epiphytes are a sign of high levels of nutrients in the system.
- Are there important species (indicator or threatened)?

What is your overall rating of the wetland vegetation ?

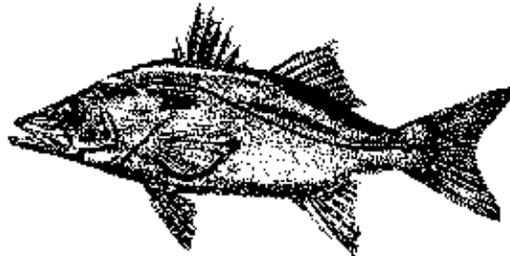
good / fair / poor

Social factors

For rehabilitation to be effective, a project must aim to improve both the environmental condition of a wetland and the level of public awareness about it. This includes involving local schools and universities as well as the general public, in both the rehabilitation process and recreational use.

- Does the wetland have any value because of its past European or Indigenous use?
- Does the wetland have the potential for environmental education?
- Does the wetland contribute a significant amount of income to the local economy?

***What is your overall rating of the social value of the wetland?
good / fair / poor***



3. Deciding your aims, objectives & actions

Having done the site assessment, you will have an idea of the issues facing the wetland. These could include:

- loss or increase in water flow
- degradation of vegetation
- disappearance of wildlife
- over drainage
- soil erosion
- over grazing
- acidity
- salinity.

From your list of issues you need to decide:

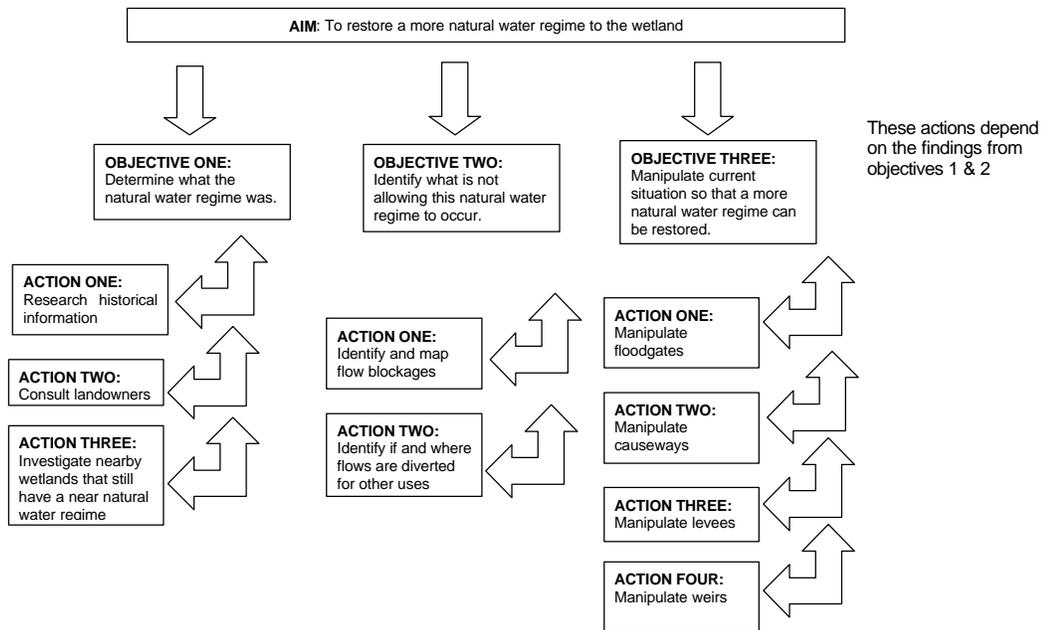
- which issue you or your group want to address
- the change you want to achieve or your vision for the future (the aim)
- the broad tasks that need to be done to achieve the aim (the objective)
- the specific activities within each objective (actions)
- when you want to achieve it (the timeframe).

The flow diagram on the next page shows how aims, objectives and actions relate to each other.

Setting aims gives a clear idea of what you are working towards and why, and gives groups a common goal.

Aims need to :

- *be achievable.* It is no good setting an aim that will take more than a lifetime to achieve.
- *be realistic.* Writing wish lists of what you would like to see for your wetland is an excellent way to get the creative juices flowing, but out of that list you need to choose aims that are realistic for your situation. For instance you may want the wetland restored to its original condition, but given the changes in water flows, this is unlikely to occur. A more realistic aim may be to restore enough water flow to have a cycle of water levels.
- *be measurable.* If you don't have measurements you will not be able to tell whether you have achieved your goal.
- *address causes of degradation not symptoms.* Symptoms include; weed invasion, the presence of carp and turbid water. Causes include; large scale vegetation clearing around the wetland, regulation of water regime and erosion.



Once you decide your aim, you need to work out objectives to achieve the aim. Actions are then identified to complete the objectives. The table below gives some examples of common aims and possible objectives to achieve them. You will need to refer to a range of sources, including organisations and books (see sections 8) to identify the most appropriate actions for your objectives and your area.

Aim	Objectives
to increase water-bird habitat	introduce snags, add an irregular edge to the wetland, add low islands and embankments
to reduce impact of surrounding land-uses	leave a buffer zone of vegetation around the wetland to help reduce the impact (the suggested width is at least 20 meters wide)
to reduce the impact of stock in the wetland	run water into troughs around the wetland, fence the wetland and control grazing
to increase fish habitat	introduce snags, enhance overhanging vegetation for cover and shade, use flow control and fish screens to reduce adult carp and other introduced species
to increase native vegetation	remove or reduce stock levels, fence the wetland, add tree guards and reduce introduced species
to introduce a more natural water regime	manipulate water storage's; flood temporary wetlands and dry permanent wetlands
to increase community awareness	produce a newsletter and approach media

4. Monitoring

Monitoring allows you to assess whether your rehabilitation has achieved the change you wanted.

Below are some common aims and the monitoring required:

Aim	Measure
to restore a more natural water regime in the wetland	*the extent (including depth) of the wetland in dry times *the extent (including depth) of the wetland in times of floods * how often the wetland fully dries and floods
to increase the variety and number of waterbirds	* the variety of waterbirds *the numbers of waterbirds
to decrease the impact of acid sulfate soils on the wetland	* the pH of the water

Monitoring change requires information about three stages of rehabilitation:

- before the project starts to provide a benchmark.
- during the project to check that results are consistent with your project aims.
- after the project is finished to assess the success of the project and provide direction for future works.

Where possible, choose monitoring techniques that are simple and inexpensive. The more difficult and time consuming the technique, the less likely it is to be used.

Obviously the techniques chosen need to reflect the aims of the project. It is important that your monitoring be scientifically valid, so talk to wetland specialists about your proposed project and monitoring techniques before you set anything up.

To save on costs and obtain additional help, it may be useful to involve local schools or universities. Universities are constantly looking out for major projects for students. High school students usually need field trips as part of science classes.

5. Working with a group

Some rehabilitation projects will be too big for one person, so you may need to form a group.

If this is the case, talk to your local authorities and landowners about your project. See what they think of your idea and ask whether they are interested in being involved.

If there is interest, call for expressions of interest from the wider public. One way of doing this could be to place an advertisement in the local paper inviting people to a public meeting.

At the meeting, discuss your idea and ask for input, advice and help from the group. Don't worry if the turnout for the first meeting is low; through word of mouth more people may join.

If enough people are interested in starting a group to carry out rehabilitation work, set up a structure that suits your group members.

Most groups have a leader or manager (usually the person who knows the most about the site), who will coordinate and organise the group. Other positions are allocated according to people's skills. For instance a student studying accountancy might like to be the group's treasurer.

Ask other local community groups about their internal structure and what worked for them.



6. Legal issues

There are legal requirements tied to some of the activities you may undertake as part of your rehabilitation project. Below is a table of possible activities; the New South Wales legislation or policy that affects that activity, the agency you will have to consult, and implications for rehabilitation works.

Altering	doing any work that will significantly change the wetland eg changing river flows, clearing vegetation, draining, leveying, filling or clearing
DUAP	Department of Urban Affairs and Planning
DLWC	Department of Land and Water Conservation
NPWS	National Parks and Wildlife Service

Activity	Name	Who to consult	Implications
Altering Murray River wetlands	Murray Regional Environmental Plan 2 (MREP 2)	DUAP/DLWC offices in the Murray area	Permission may be needed.
Altering listed wetlands in the Hawkesbury-Nepean Catchment	State Regional Environmental Plan 20 (SREP 20)	DUAP	Permission may be needed.
Altering listed coastal wetlands	State Environmental Planning Policy 14 (SEPP 14)	DUAP	Permission may be needed and an Environmental Impact Statement may be required.
Altering threatened species habitat	Threatened Species Act 1995	NSW NPWS	Permission may be required and plans developed.
Altering fish habitat or passage, including harming mangroves and seagrass	Fisheries Management Act 1994	NSW Fisheries	Permission may be required and a permit may be issued.
Significant major changes to the wetland	Environmental Planning and Assessment Act 1979	DUAP and your local council	An Environmental Impact Statement may be required.
Rehabilitation an area with Native Title	Native Title Act 1993	Native Title Tribunal	Certain activities may be restricted and the permission of the owners is required.
Altering a site of cultural heritage significance	National Parks and Wildlife Act 1974	NSW NPWS	Certain activities may be restricted.
Altering a Ramsar wetland	Ramsar Agreement	Environment Australia	Permission may be required.
Clearing native vegetation	Native Vegetation Conservation Act 1998	DLWC	Permission may be required and a permit issued.
Altering a JAMBA or CAMBA shorebird site	JAMBA and CAMBA agreements	Environment Australia	Permission may be required.

7. Where to get money

Carrying out wetland rehabilitation is often costly. For instance, you may need to erect fences, buy trees or alter drainage. Funds from various sources are often available for such activities.

State and Federal governments are the main sources of funding for wetland rehabilitation, but local companies may be willing to sponsor your project. Be brave and ask!

Currently the major source of funding from the government is the Natural Heritage Trust. The trust is made up of the money that was made when the government sold Telstra. The system works through applications being submitted once a year and the most 'worthwhile' projects selected for funding. Whilst the Natural Heritage Trust is due to finish in 2002, it is anticipated that alternative funding will be available beyond that time.

To be considered 'worthwhile' for funding, projects need to show:

- approval and support from stakeholders and relevant government organisations

- how the project is positive for the whole catchment
- value for money
- number of volunteer hours required.

The NSW State Wetland Action Group (SWAG) also provides funding for community groups, mainly for projects costing less than \$20,000. If a group requires more funding, applications should go through the Natural Heritage Trust.

Another source of funding is Greening Australia. This group will help with the cost of fencing, if regeneration of the native vegetation occurs.

Taxation concessions are also available for some environmental protection works under the Income Tax Assessment Act, subdivision 387-A and 388-A.

The EPA provides Environmental Trust funding for rehabilitation. This source also requires approval and support from stakeholders.

HO-Head Office DLWC-Department of Land and Water Conservation NSW SWAG-State Wetland Action Group NSW NPWS-National Parks and Wildlife Service EPA-Environment Protection Agency
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8. Information sources

Rehabilitating wetlands is not a simple process and you will find that you need a lot of information. The table below lists information you may need and where to find it.

Information required	Information source	Contact
<i>Acid sulfate soils</i>	DLWC NSW Agriculture	District Offices HO (02) 9895 6211 www.dlwc.nsw.gov.au (02) 6626 1344 www.agric.nsw.gov.au
<i>Community group management</i>	NSW SWAG Wetland Care Australia	(02) 9895 7624 (02) 6681 6169 www.wetlandcare.com.au
<i>Cultural heritage</i>	NSW NPWS	District Offices HO 1300 361 967 www.npws.nsw.gov.au
<i>Fish habitat and passage issues</i>	NSW Fisheries Ocean Watch	Offices of Conservation HO (02) 4982 1232 www.fisheries.nsw.gov.au (02) 9660 2262
<i>Group structure and rehabilitation experiences</i>	Community groups and other wetland rehabilitators	through WetlandLink (02) 6681 6169 www.wetlandcare.com.au
<i>Local information</i>	Local Landowners Local Council, including County Councils	
<i>Native flora and fauna</i>	NSW NPWS	District Offices HO 1300 361 967 www.npws.nsw.gov.au
<i>Pollution, water runoff</i>	EPA	District Offices HO (02) 9795 5000 www.epa.nsw.gov.au
<i>Project management</i>	NSW SWAG Wetland Care Australia	(02) 9895 7624 (02) 6681 6169 www.wetlandcare.com.au
<i>Native Title</i>	Native Title Tribunal	(02) 9235 6300 www.ntt.gov.au
<i>Native vegetation</i>	DLWC NSW NPWS	District Offices HO (02) 9895 6211 www.dlwc.nsw.gov.au District Offices 361 967 www.npws.nsw.gov.au
<i>Research opportunities</i>	Local Universities and Schools	
<i>SEPP 14, MREP 2, SREP20</i>	DUAP	District Offices HO (02) 9391 3100
<i>Water regime and quality</i>	DLWC Local Council	District Offices HO (02) 9895 6211 www.dlwc.nsw.gov.au
<i>Weeds and feral animals</i>	Rural Lands Protection Board	District Offices
<i>Wetland management and rehabilitation techniques</i>	Wetland Care Australia NSW SWAG DLWC	(02) 6681 6169 www.wetlandcare.com.au (02) 9895 7624 District Offices HO (02) 9895 6211 www.dlwc.nsw.gov.au

9. Drawing up a management plan

If you have worked through each chapter of this guide, you will have developed the different sections of a management plan. The plan does not have to be too long; but it needs to incorporate all the following information:

- site assessment
- aim, objectives and actions
- people involved in carrying out each objective
- monitoring
- funding, and
- people you have consulted.

Compiling a management plan is essential to obtain funding, sponsors and publicity.



Case Study

HOW IT ALL COMES TOGETHER; THE GURRA GURRA WETLAND EXPERIENCE

1. *Deciding priorities for rehabilitation*

The Gurra Gurra wetland was identified in past studies and plans as a high priority site for rehabilitation. Local residents were also concerned with the visible deterioration of the wetland.

2. *Assessing your site*

Assessment of the wetland identified a long list of threats and impacts on the site. The major issues were found to be; altered water regimes, salinisation, grazing and introduced pests. The 32 landowners were also surveyed to determine their concerns so that these could be included in the assessment.

3. *Deciding your aims, objectives and actions*

Two aims were developed from the assessment, one focussing on environmental aspects and the other on involving the community.

Objectives were then formed to achieve these aims.

AIM 1: to improve the health of the wetland, by increasing the range and health of plants, animals and habitats.

OBJECTIVES

- remove or reduce blockages to flows in the natural channels
- control the water regime to increase frequency of flow from upstream to freshen the system and improve water quality
- manage drying cycles in the wetland to trigger breeding and regeneration of key wetland species
- promote native fish passage and recruitment in the wetlands
- protect valuable areas of habitat
- reduce the impact of exotic fish on aquatic communities
- manage the impacts of saline groundwater and irrigation drainage inflows
- control exotic plants in the wetland complex, and
- control feral animals in the areas adjacent to the wetland complex.

AIM 2: to involve the community in the management of the wetland.

OBJECTIVES

- create a strong local group committed to improving the wetland
- improve the surrounding landuse to reduce its impact on the wetland
- manage recreational activities to ensure that the wetland doesn't become over used
- collect more information about the area for ongoing monitoring and management.

4. Monitoring

The group monitored change through recording the visual changes which occurred after rehabilitation. For instance, when carp were removed, seedlings became established on the fringe of the lagoon and aquatic plants grew in the carp free section. Monitoring observed changes in salinity (water & soil), plants and animals, carp populations, the effectiveness of control structures and the impact of visitor use and recreation. The site also plays a part in wetland conservation, by providing a demonstration site to show other community groups the rapid improvements.

5 Working with a group

Wetland Care Australia and the Local Action Planning Committee formed the Gurra Wetland Care Group. People who were asked to be in the group included:

- irrigators and landowners on and around the wetland
- local council
- other local environmental groups
- local fishing groups
- environmental government departments, and
- the regional catchment board.

6. Legal issues

As this case study is located in SA, the relevant legislation differs to that of NSW, however the principles remain the same. On-ground works that will in any way significantly alter the current situation are usually subject to legislative controls. If this was a coastal NSW wetland it might involve State Environment Planning Policy 14, or if it was on the Murray River floodplain it would involve Murray Regional Environment Plan 2. If threatened species were present the NPWS Act would be involved, as would the Fisheries Management Act, if threatened aquatic species were present or if fish habitat would be damaged during the construction of such works. The Environmental Planning & Assessment Act applies to these and all other situations as well, depending on local conditions and interpretation.

7. Where to get money

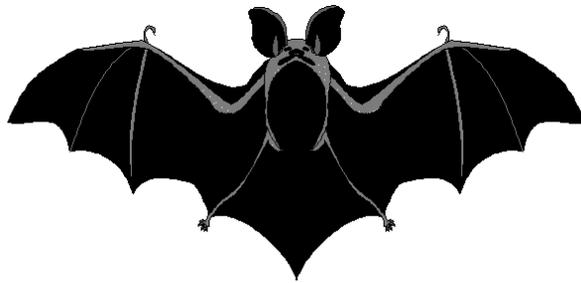
The Natural Heritage Trust's Murray-Darling 2001 program (which also applies to NSW) and the River Murray Catchment Levy funded the creation of the Gurra management plan. Other funding included sponsorship by a pipeline company that placed a natural gas line across the floodplain, (\$7,000), and a construction company which built a flow control structure, (\$20,000).

8. Information sources

Wetland Care Australia and the Local Action Planning Committee provided technical advice to the Gurra Wetland Care Group.

9. Drawing up a management plan

With the assistance of Wetland Care Australia, a management plan was produced. The plan stated the aim, objectives and proposed actions to achieve these aims. The benefits of rehabilitation and who would implement each action was recorded and once stakeholders reached consensus, the plan was presented to the wider community.



Glossary

- **Abundance** The number of individuals
- **ASS** Acid sulfate soil
- **Distribution** The spread of locations where a species is found
- **Diversity** The number of different species
- **Endangered** A species that is in danger of extinction in NSW unless the threatening factors causing its reduction in numbers cease
- **Endemic** A species restricted to an area
- **Habitat** The space where an organism or a community of organisms lives (H-NCMT, 1996)
- **Indicator species** A species whose presence or absence can be taken as a measure of changes in the ecosystem, and as a result can be an indicator of the state of the ecosystem
- **pH** A measure of acidity or alkalinity; around 7 is neutral, less than 7 is acidic and more than 7 is alkaline
- **Pugging** The chopping, hollowing and compaction of the soil by animal hooves. (Bower, 1995)
- **Rare** A species that is not at present endangered or vulnerable, but is not locally common either
- **Riparian** Referring to the banks of a watercourse
- **Salinisation** The accumulation of salts at the soil surface or in the main root-zone, due usually to capillary rise of saline moisture from a shallow water table
- **Salinity** A reading of the total dissolved salts in water
- **Threatened** A species that is listed under the *Threatened Species Conservation Act* that is classified as either endangered or vulnerable in NSW
- **Vulnerable** A species that is at present not endangered, however for reasons such as small population numbers or a reduction of habitat, is likely to become so if these processes do not cease
- **Waterbird** A bird that relies on water for habitat as part of its lifecycle
- **Wildlife Corridors** Areas of continuous habitat that link other 'islands of habitat' to each other

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