

# Planning for river restoration

Across Australia there is growing enthusiasm for restoring and rehabilitating rivers and streams. Unfortunately such projects often fail to produce the dramatic improvements in stream health that the enthusiastic participants hope for. The main reason for this failure is a lack of planning, resulting in poorly defined project objectives and restoration strategies. Often the project did not solve the correct problem. In addition, social and political factors rather than a lack of technical skills were often the major factor influencing the success of river restoration projects.

By planning your project carefully and setting clear, measurable objectives that are shared by all those involved in the project, you can greatly improve the chances of achieving your river restoration goals. This Fact Sheet is based on the 'Rehabilitating Australian Streams' CD-Rom and Manual that set out a planning process for river restoration projects. It provides an introduction to why planning is important, outlines the key steps to be followed in any planning process, and provides information about where to go for further assistance.



This Fact Sheet is the ninth in a series dealing with the management of rivers and riparian land.

# River Landscapes



## Where to start? Protect first, restore and rehabilitate second

It is almost always more cost effective and sensible to protect rivers or river reaches that remain in good condition, rather than undertaking expensive rehabilitation works. Funding in the past has seldom been allocated to rivers in good condition because it was felt that they would look after themselves, and that priorities should lie elsewhere, where damage is most visible. However, we now have ample evidence that healthy rivers, or healthy river reaches within a larger river system, require active management to ensure they remain in good condition. River scientists and others are now calling for a re-think on our priorities for river management, with a stronger emphasis being placed on the lower-cost option of protecting rivers before they deteriorate.

The principle of ‘protect first, restore second’, should be the first consideration before undertaking restoration planning. It is sensible to prevent rivers within the catchment, or other river reaches, from becoming degraded to the same extent as those requiring restoration.

**Part of the Cooper Creek floodplain, an area that needs to be protected in its unregulated state.**

Photo Aridflo Project.

‘The first rule of rehabilitation is to avoid the damage in the first place! It is easy, quick and cheap to damage natural streams. It is hard, slow and expensive to return them to their original state. Usually we are not capable of returning anything approaching the subtlety and complexity of the natural system. For this reason, the highest priority for stream rehabilitators is to avoid further damage to streams, especially streams that remain in good condition.’ (Rutherford et al. 1999.)

# River restoration, rehabilitation and remediation — what is the difference?

The words river ‘restoration’, ‘rehabilitation’ and ‘remediation’ are often used interchangeably. There are, however, important differences between them:

## Restoration

The ideal restoration project will restore the degraded river to its original condition. This includes restoring the natural range of water quality, sediment and flow regime, channel geometry, native aquatic plants and animals, and adjoining riparian lands. The goal of restoration is an admirable one, but it is important to acknowledge that it is often something to be aspired to, as it will seldom be possible to achieve. This is because it is often impossible to establish what the ‘original’ condition was and, secondly, such restoration would mean replicating pre-European inputs and outputs into the system (e.g. water quality and quantity, animals and plants) from upstream, downstream and the riparian zone. The connections between streams and the broader catchment mean that in most cases this would only be possible if the entire stream network and most of the catchment surface were also restored. Clearly this will almost never be possible, and it is for this reason that groups choose to rehabilitate rather than restore.

**An example of a project attempting to recreate original in-stream conditions.**

Photos Andrew Brooks.

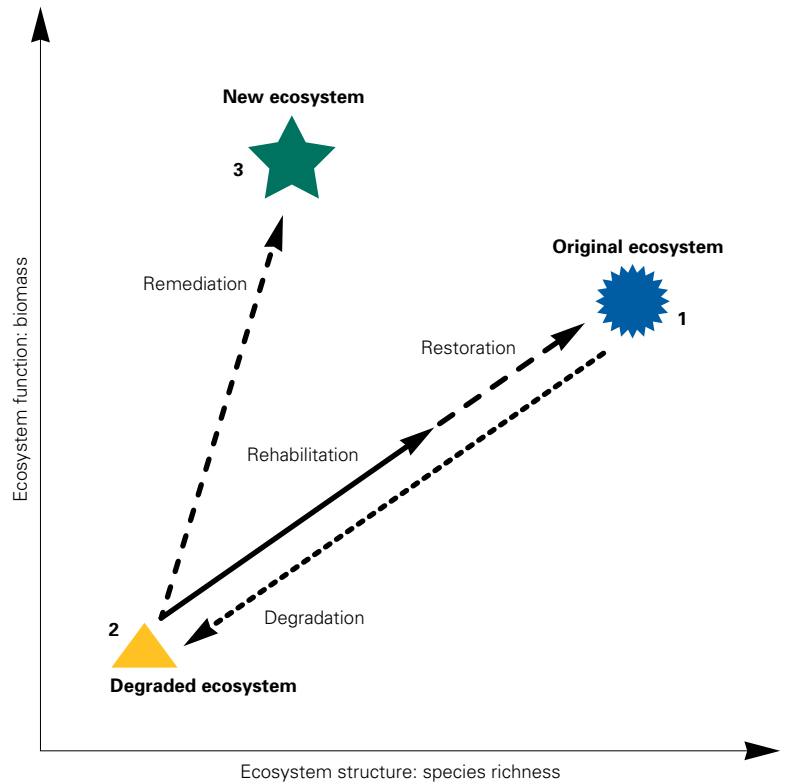


**Rehabilitation**

Although restoration may be impossible, this does not leave a degraded system without hope. By improving the most important aspects of the stream environment, you may create a stream that, although only resembling its original condition, is nevertheless an improvement on the degraded system and often a valuable environment in its own right. Since restoration is usually impossible, rehabilitation is the more common goal for individuals and groups undertaking projects along our rivers.

**Remediation**

In some cases, even rehabilitation is not possible because of irretrievable changes to the stream. In such a situation, we can often say that the original state is no longer an appropriate aim for the stream because inputs from the catchment will never support that condition. The aim of remediation is to improve the ecological condition of the stream, but the endpoint of that improvement will not necessarily resemble the original state of the stream. In fact, it may not be possible to predict what that endpoint will be like.



**Above: The differences between restoration, rehabilitation and remediation. Restoration involves returning the stream to the original pre-European condition. Rehabilitation involves fixing only some aspects of the stream, but generally making the degraded stream closer to the original condition. Remediation recognises the stream has changed so much that the original condition is no longer relevant and aims for an entirely new condition.**

(Source: Breen & Walsh 1996 in Rutherford et al. 1999.)

**Right: Rehabilitation project in the Bega River.**

Photos Phil Price.

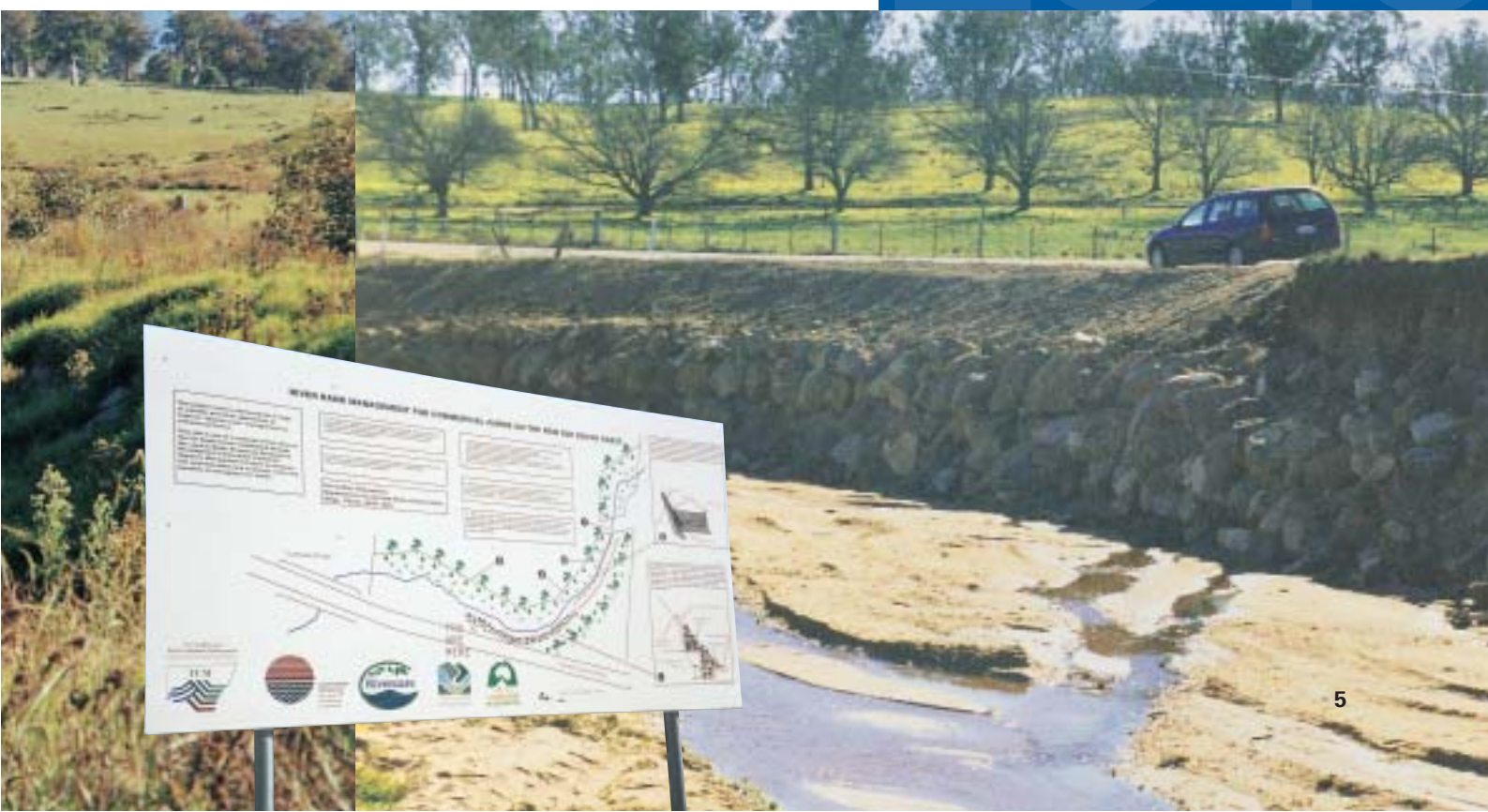


## Why plan?

Some problems are simple, and some solutions obvious, but more often the problem is not simple and the solutions are far from obvious. A good plan is just as crucial to good stream rehabilitation as having the skills to build in-stream structures, or having knowledge about how streams work. Stream rehabilitation is an expensive business, costing several thousand dollars. Major rehabilitation projects can easily cost millions of dollars, so it is not unreasonable to spend around 5% to 10% of the cost of a job on planning. Although the twelve-step planning process suggested in the following pages looks time consuming, it is worth remembering that it takes many years to rehabilitate a stream, and this makes it sensible to spend time at the beginning of the project to make sure your planning is right.

### There are five reasons for carefully planning your river restoration project.

- Planning provides public accountability for the project, and enables you to justify why you did what you did, this is important if you are spending taxpayer dollars.
- Setting clear measurable objectives allows the project to be evaluated.
- Planning makes you distance yourself from the obvious/visible management issue and enables you to think about the catchment context of problems.
- Setting priorities avoids working on symptoms rather than causes — this means you can work on the most important issues instead of the ones that appear superficially important.
- Planning avoids inefficiency in the management of the project, so that you do things in the right order.



## Successful planning relies on people working together

One of the most important aspects of planning your stream rehabilitation project is the links that the activities forge between people. A group that has a shared goal for stream rehabilitation brings together individuals from a wide range of backgrounds, interests and areas of expertise. This diversity adds strength to your stream rehabilitation project, as people with different skills can apply them to tasks and activities that others may not have the knowledge to address.

Spending time building your stream rehabilitation team is important, as it is this core group of people that will provide the leadership, continuity and focus for your project to see it through to completion. At times throughout the stream rehabilitation project, you may need to buy in particular expertise so that your group has the information it needs to achieve a step in the planning process. This means that members will join and leave the team according to the skills needed for each step.



Photo Jan Snape.

### Recommended team members

#### Local project manager

- catchment management authority or equivalent

#### Community representatives

- Member of a cultural group
- Farmer/landholder
- Industry representative
- Angler

#### Scientist/expert representative

- Hydrologist
- Sociologist
- Freshwater ecologist
- Geomorphologist
- Community development worker

#### Government representatives

- Relevant State agency
- Local shire
- Catchment management authority
- River operator

(Source: Koehn, Brierley, Cant & Lucas 2001)

Work in multi-disciplinary teams to rehabilitate streams. It takes only one person with a bulldozer to damage a stream, but it can take a landholder, engineer, biologist, geomorphologist, botanist and public-relations officer to fix it again (Rutherford 1999).

## Accessing extra assistance

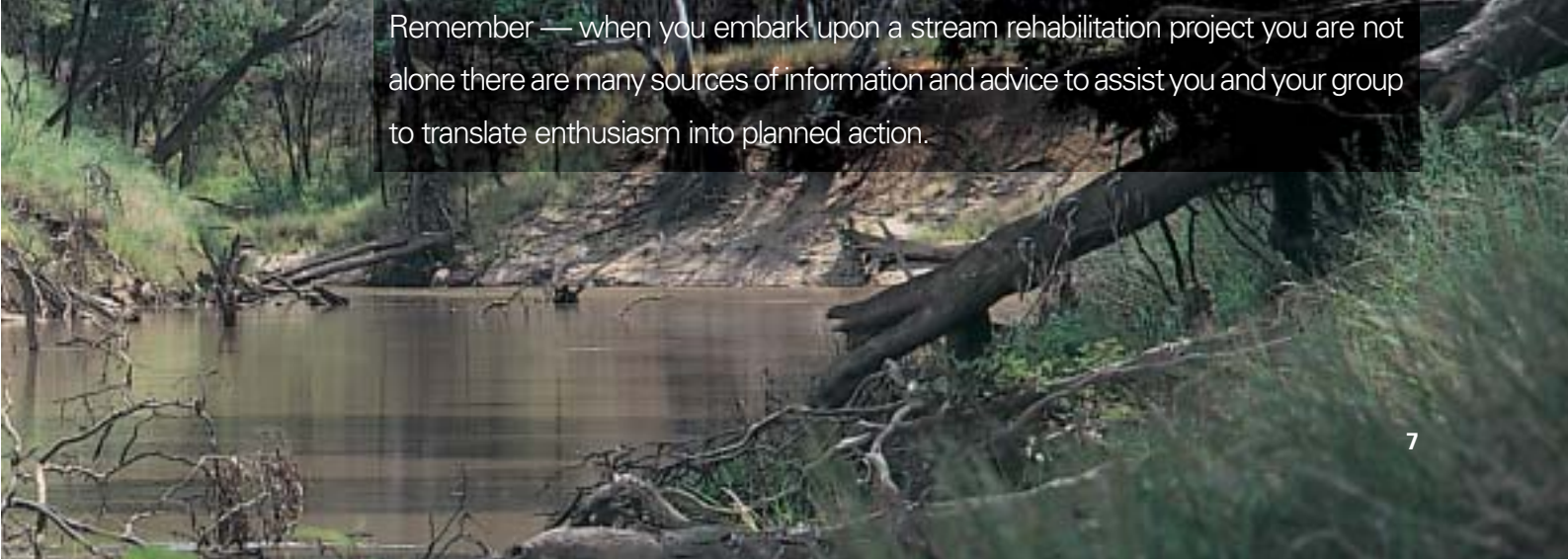
The twelve-step planning process provides you with a tool developed by river managers and scientists, and trialed by catchment management groups, to use when undertaking stream rehabilitation projects. As you work your way through each step, you will see how the process loops back on itself, forcing you and your group to critically analyse all the components of your stream rehabilitation project. Each step is easy to follow, and when the steps are combined, they provide a rigour to your stream rehabilitation project that will enable you to justify your project's objectives and increase the likelihood of success.

This Fact Sheet has highlighted the importance of planning and the key steps in a planning process, but there is plenty more information available to assist you. The Rehabilitating Australian Streams CD-Rom, upon which this Fact Sheet is based, goes through each of the twelve steps in detail and uses case studies to show real life examples of how the process can be practically applied.

**For your copy of the CD and publications, contact CanPrint Communications on 1800 776 616 or visit the [www.rivers.gov.au](http://www.rivers.gov.au) website that has them available for you to download for free!**

For each step there are many different tools and techniques that can assist your decision making. These are outlined in publications such as the *Rehabilitating Australian Streams Manual, Volumes One and Two* (Rutherford, Jerie & Marsh 1999), and the *River Restoration Framework* (Koehn, Brierley, Cant and Lucas 2001).

Your State or Territory natural resources agency or catchment management authority will also be able to assist you, as these organisations are undertaking planning activities at local, regional, and Statewide scales all the time. Different States and Territories in Australia tend to use different stream rehabilitation tools. These are often developed specifically to meet the environmental, social and policy conditions that characterise particular regions. The websites of these organisations are often a good place to start looking for more information, as well as those organisations that fund river research like Land & Water Australia and the Murray-Darling Basin Commission.



Remember — when you embark upon a stream rehabilitation project you are not alone there are many sources of information and advice to assist you and your group to translate enthusiasm into planned action.

# A stream rehabilitation planning process

**Vision and goals**

**1**

Narrowing

**Setting measurable objectives**

**7**

**Feasibility**

**Are your objectives feasible?**  
 Many of the things that you would like to do in your stream rehabilitation plan are not feasible because of cost, legislative or administrative constraints on the side-effects of your work. By examining each of your objectives to check whether or not they are feasible, you will arrive at a final list of problems to treat.

**8**

**Detailed design**

**What is the detailed design of your project?**  
 In this step you move from the general methods that you would use to treat problems to a detailed design for your stream. What specific things do you need to do to achieve your objectives? These can range from doing nothing, to planning controls, flow manipulation, or complete channel reconstruction.

**9**

**Evaluation**

**How will you evaluate your project?**  
 Every stream rehabilitation project should have some form of evaluation as without it, you will never know if your project was worth the bother. The measurable objectives worked out in Step 7 become the basis for evaluating the project. Practical evaluation procedures emphasise that not all evaluation needs to be detailed and expensive.

**10**

Doing it

**How will you plan and implement your project?**  
 The plan needs to be implemented by developing a time line, allocating responsibilities, finalising funding, doing the works, and organising the evaluation schedule.

**Implementation**

**11**

**Maintenance**

**12**

**Has your project worked?**  
 The final step of the planning process is to maintain the work that has been done, and to set a point in the future at which the project will be formally assessed using the information gathered by the evaluation plan.



**What are your goals for rehabilitating the stream?**

Describe a broad goal or 'vision' of what you, and others involved, want your stream to be like when you have finished the rehabilitation. This shared 'vision' will keep you on track as you develop your rehabilitation plan.



**Gain support**

**Who shares your goals for the stream?**

Stream rehabilitation projects are as much about people as they are about science and construction. From the very beginning of a project you need to identify the important people and groups who support or oppose your goals for the stream. There are a variety of techniques that you can use to increase the number of allies and to resist or convert the opponents.



**Assess stream conditions**

**How has your stream changed since European settlement?**

To know your stream you need to describe its pre-disturbance condition, present condition and rate of change. Look for independent evidence, anecdotal and historical information. As well as describing the present condition, estimate the potential for recovery or deterioration of the stream.



**Identify problems and assets**

**What are your stream's main natural assets and problems?**

Rehabilitation is about protecting natural stream assets and improving or creating other assets. An asset is any aspect of the stream already in good enough condition to meet your goal. Many stream assets are threatened or have already been degraded. In this step, you identify the main assets, degraded assets and problems impacting on your stream.



**Priorities**

**Setting priorities: which reaches and problems should you work on first?**

Do not automatically start rehabilitation at the most damaged reaches. In terms of stream health, it is usually more effective to protect reaches of stream that remain in good condition, than to spend large amounts of money trying to rehabilitate reaches that are already damaged. When the major assets of the stream have been protected, then you can begin to improve the stream condition.



**Strategies**

**What are the strategies to protect assets and improve your stream?**

A strategy is the approach you will take to protect and improve assets. Identify and list the things that you can do to protect and improve the important assets in the reaches that you identified as a high priority. Most strategies will also involve changing the behaviour of people who use the stream.

**What are your specific and measurable objectives?**

Your general strategy for rehabilitation has to be turned into clear, measurable objectives that specify what you want to achieve in your rehabilitation project. These objectives will become the core of your stream rehabilitation plan.

What needs doing?

it down

# FACT SHEET 9 BACK PAGE

These **Fact Sheets** are grouped according to whether they deal with riparian land, in-stream issues, river contaminants or other matters. They aim to set out the general principles and practices for sound management. Other information that focuses on local conditions and management issues is available from state government agencies, local governments, catchment management authorities, rural industry bodies and community organisations. Together, this information should assist users to understand the key issues in river and riparian management, and enable them to adapt general management principles to their particular situation, and to know where to go for advice specific to local conditions.

## Other relevant Fact Sheets

- 1 Managing riparian land
- 2 Streambank stability
- 3 Improving water quality
- 4 Maintaining in-stream life
- 5 Riparian habitat for wildlife
- 6 Managing stock
- 7 Managing woody debris in rivers
- 8 Inland rivers and floodplains
- 10 River flows and blue-green algae
- 11 Managing phosphorus in catchments
- 12 Riparian ecosystem services
- 13 Managing riparian widths

Fact Sheet Nine is largely based upon Rutherford, Jerie and Marsh, *A Rehabilitation Manual for Australian Streams* (1999), published by the CRC for Catchment Hydrology. Material from Koehn, Brierley, Cant & Lucas, *A River Restoration Framework* (2001) is also used. Both publications are produced by Land & Water Australia.

Further information on river and riparian management can also be found at the Land & Water Australia 'River Landscapes' website.

# www.rivers.gov.au

This website provides access to projects, fact sheets, guidelines and other information designed to assist people to better manage river and riparian areas across Australia.

# River Landscapes



Produced by Land & Water Australia's National Riparian Lands Research and Development Program.



**Australian Government**

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