

river restoration



WATER AND RIVERS
COMMISSION



Planning for Waterways Management

Guidelines for
Preparing a River
Action Plan

February 2001
Report No. RR 14

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PLANNING FOR WATERWAYS MANAGEMENT

Guidelines for Preparing a River Action Plan

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Jointly funded by



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Foreword

Many Western Australian rivers are becoming degraded as a result of human activity within and along waterways and through the off-site effects of catchment land uses. The erosion of foreshores and invasion of weeds and feral animals are some of the more pressing problems. Water quality in our rivers is declining with many carrying excessive loads of nutrients and sediment and in some cases contaminated with synthetic chemicals and other pollutants. Many rivers in the south-west region are also becoming increasingly saline.

The Water and Rivers Commission is responsible for coordinating the management of the State's waterways. Given that Western Australia has some 208 major rivers with a combined length of over 25 000 km, management can only be achieved through the development of partnerships between business, landowners, community groups, local governments and the Western Australian and Commonwealth Governments.

The Water and Rivers Commission is the lead agency for the Waterways WA Program, which is aimed at the protection and enhancement of Western Australia's waterways through support for on-ground action. One of these support functions is the development of river restoration literature that will assist Local Government, community groups and landholders to restore, protect and manage waterways.

This document is part of an ongoing series of river restoration literature aimed at providing a guide to the nature, rehabilitation and long-term management of waterways in Western Australia. It is intended that the series will undergo continuous development and review. As part of this process any feedback on the series is welcomed and may be directed to the Catchment and Waterways Management Branch of the Water and Rivers Commission.



Guidelines for Preparing a River Action Plan

Purpose of this document

This document is part of a series on waterways management planning in Western Australia prepared by the Water and Rivers Commission (WRC). The series includes an overview of waterways planning approaches as well as guidelines for preparing regional strategies for Natural Resource Management (NRM) and waterway management programs/catchment plans (see Water and Rivers Commission, River Restoration Reports RR 11, 12 and 13). This document is a guide to preparing a River Action Plan (RAP) and has been prepared for community groups and people who are involved in on-ground river restoration action. It is intended to assist the process of planning river restoration activities at the local level and complement the technical advice provided through other mechanisms.

What is a River Action Plan?

A River Action Plan (RAP) is a means of implementing components of an existing regional NRM strategy, catchment plan or management program by identifying particular areas or issues and detailing how these are to be addressed through ‘on-ground’ activities on a local scale. RAPs generally consist of specific and detailed actions at a tributary or river section scale (see Table 1). Rather than being a “statement of intent” for a whole catchment or region, RAPs are more typically a prioritised list or timetable of on-ground works and actions to improve the health of a particular stretch of waterway or a discrete wetland. Typically a catchment may have several RAPs developed to cover a number of individual waterways or segments of waterways.

RAPs may go by other names (e.g. Local River Action Plan, River Recovery Plan, or Site Plan). While these documents may vary in scale, it is their action-oriented approach that makes them ‘River Action Plans’.

Table 1. What is a River Action Plan?

A River Action Plan provides:	A River Action Plan is not:
A record of river condition.	A statutory plan.
An indication of problem areas.	A government policy.
Management guidance.	A government regulation.
Baseline information for future comparison.	A legal document.
A mechanism to improve local knowledge.	
A mechanism for prioritising on-ground action.	
Technical advice.	



Purpose of a River Action Plan

The purpose of a RAP is to provide an integrated and coordinated approach to on-ground waterways management on a local scale. This is achieved by:

- Developing and promoting waterways rehabilitation and conservation practices;
- Prioritising on-ground actions by addressing the causes of river degradation;
- Increasing community awareness and understanding of river issues;
- Promoting linkages to facilitate community involvement;
- Reflecting community needs and values;
- Guiding the use of limited resources available for action;
- Providing a means to seek funding for further action;
- Minimising the need for many small decisions;
- Assisting long and short term planning by recognising that things won't be solved overnight;
- Giving stakeholders a key role and ownership in riparian and foreshore management and consequently greater motivation;
- Encouraging groups to maintain and continue to improve their waterways once their specific projects have been completed; and
- Linking and assisting in the implementation of recommendations made by State strategies, regional NRM strategies and catchment management plans.

Components of a River Action Plan

A suggested list of contents that could be considered is presented in Table 2. There is no standard format to a RAP, and it is up to the RAP development team to provide innovative ways of communicating their intentions for river restoration actions.

The RAP should be succinct. Every fact collected as part of the planning process does not need to be included, only those relevant to justifying actions. It may be better to have a separate technical/background document so this information is not lost.

Developing a River Action Plan

All levels of waterways management planning have common characteristics in that they follow a

plan-act-review cycle. However, the actual planning processes for regional, catchment and local planning due to the number of issues, stakeholders and size of areas to which they are aimed. For further information on the principles of planning processes and the different levels of waterway planning, refer to the overview document (Water and Rivers Commission, River Restoration Report RR 11). Key steps in the development of a RAP are discussed in the following section and are summarised in Figure 1.

Planning

There are five key steps to the RAP planning process:

- (1) Community and stakeholder consultation,
- (2) Information collection,
- (3) Strategic outline,
- (4) Establishing management actions, and
- (5) Gaining approval.

1. Community and stakeholder consultation

When preparing a RAP it is necessary to consult widely with the community to identify issues of concern and values that need to be protected in relation to the waterway. The stakeholders are those people who have an interest in either the issue driving the project, or the outcomes of the project itself.

Involving and informing the community, including existing and potential stakeholders, is essential for their acceptance of the plan and ultimate success. RAPs can provide an appropriate forum for various local groups and agencies to voice their views, and can also provide an opportunity for conflict resolution regarding particular local management problems. Without landholder and community group support for the recommended actions, it is unlikely that the RAP will be implemented well enough to achieve its objectives.

The community has to be involved in determining the vision and objectives for waterway management as well as the management options. After all, it is they who must own the plan and implement its actions within the context of their day to day lives. It is also important that the decisions made on management priorities and trade-offs between short and long term objectives are made by the community, otherwise the long term acceptance and custodianship of the plan is not assured.

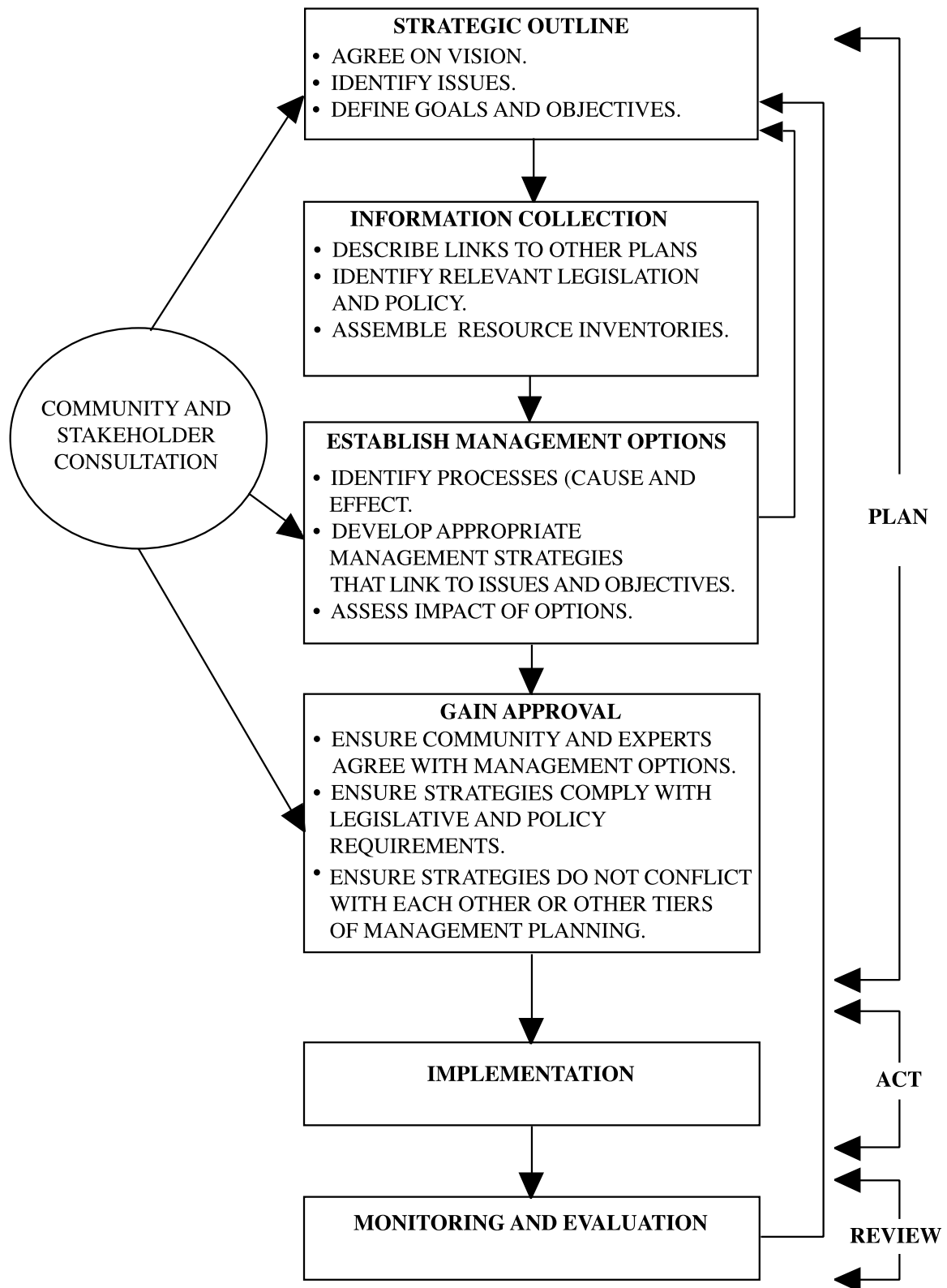


Table 2. Suggested layout and contents of a River Action Plan.

Layout	Content
Title Page	Provide the title, authors and present the sponsors logos.
Acknowledgements	It is important to acknowledge individuals, groups and organisations for any assistance, support or funding provided for the project.
Contents	A 'Table of Contents' may be followed by lists of tables, figures and maps.
Summary	A summary of the content and intent of the plan. Provide a general explanation of the document focus on the management of the river. Reference may be made here to additional documents for further detail. A brief description of related sections can be included.
Introduction	Sections likely to be included in the introduction might include: the vision and objectives; a brief description of the catchment location and area; and background to the study.
Catchment Context and Community	This section places the River Action Plan (RAP) in the context of the catchment and describes the relationship between the catchment, the community and the RAP. It should include a description of the link between the RAP and other strategies, plans and relevant legislation. The ecological, social and economic values of the river should be highlighted and discussed.
Approach	Explain the process by which the RAP was prepared. This may include a description of the methods employed for data acquisition, information collection, community consultation and flora and fauna surveys.
Description of the Catchment	Generally catchment descriptions include sections detailing: physiography; climate, vegetation, fauna, drainage and water quality.
Heritage and Land Tenure	Common features of this section are descriptions of indigenous and non-indigenous heritage. It also contains information on land tenure and zoning.
Waterway Condition	A detailed description of the current condition of the waterway in question should be provided. The extent and severity of particular forms of degradation is also included here. The waterway may be broken down into sections to make the process more manageable.
Management Issues	This section raises waterway issues that need to be addressed by the River Action Plan. These may include: access to the waterway, weeds, decreasing water quality, erosion and sedimentation, and the loss of riparian vegetation. Identify roles and responsibilities of stakeholders including cost sharing. Identify complementary activities and best management practices. The basis for prioritising actions should be explained here as well as identifying performance indicators for monitoring.
Rehabilitation Techniques	This section describes the techniques required to address the issues raised in the previous two sections. For example, a sub-section on weed management may identify major weeds and the methods used in their management and eradication as well as explain legal requirements and associated health concerns. Other rehabilitation techniques to consider include: fencing, jute matting, ensuring vegetation provenance issues are addressed etc. Describe in detail the rehabilitation needs of the waterway providing rehabilitation 'recipes' or 'prescriptions'.
Summary and Priorities	Provide a summary of the waterway condition and a list of priorities for action. Describe classification system used to prioritise actions and provide time lines for the completion of actions and review of the progress of implementing the River Action Plan.
References	Following an accepted referencing format, detail any literature, multimedia and audiovisual material used during the production of the River Action Plan.
Glossary	The Glossary should include explanations of terminology used in the plan. Lists of abbreviations and acronyms and their meanings may be added here.
Appendices	This may include species lists, community questionnaire results etc.



Figure 2. Waterways management planning should follow the plan-act-review cycle.



Answering the following questions will help identify all the possible stakeholders.

- Who do the issues identified affect?
- Who owns or manages the land adjoining the waterway?
- Who will potentially be affected in the future by the issues identified?
- Who will be affected by the actions undertaken or their outcomes?
- Who is most likely to be most receptive to the project?
- Who else is working on similar projects or locations in the area?
- Who is most likely to be able to help you?

Successfully dealing with stakeholders will require two-way communication and there is a range of consultation techniques available including:

- Personal contact – two-way exchange of ideas.
- Surveys – questioning to seek information.
- Focus group – group of people to give opinions and develop the plan.
- Printed materials – brochures etc to inform people.
- Displays – posters to highlight information.
- Information days – displays and one to one discussion with visitors.
- Public meetings – open gathering to present information and exchange views. It may be a good idea to hold one of these meeting on-site.
- Presentations to groups – seminar presentations to specific interest groups.
- Community liaison groups – advisory groups of people representing interests.
- Workshops – people gathered to generate a group product.

2. Information collection

It is important to gain an understanding of the current situation. This can be achieved by compiling information on the ecological condition of the waterway, pressures exerted on the waterway, the extent and

severity impacts resulting from the pressures, the responses to the pressures, the history of the waterway, past management practices and land uses.

Social, environmental and economic values should also be considered, as these will affect decisions on priorities and implementation actions. These issues are normally examined when preparing an overall catchment management plan, and consequently, the RAP should reflect the social, environmental and economic decisions made at this higher level. The information required for the preparation of a RAP is briefly discussed below.

Where there is an existing Regional Strategy or Catchment Plan, a database or information centre may have been established, making collection of information much easier. Check with local and State Government agencies or regional environmental groups for information. For a list of databases or sources of information refer to Table 3.

Biological and physical information

River Action Planning requires that the current state of the waterway be reviewed and documented. The type of information that is useful may include:

- Native vegetation (e.g. type, distribution, species abundance, diversity, quality/condition, % cover, and note priority or rare and endangered species).
- Exotic vegetation (e.g. abundance, diversity, % cover, distribution).
- Native fauna (e.g. abundance, diversity, distribution, and note priority or rare and endangered species).
- Introduced feral/domestic fauna (e.g. abundance, diversity, distribution, and likely occurrences).
- Fencing (e.g. type, location, condition, and distance from the watercourse).
- Erosion (e.g. type, extent, severity, causes).
- Foreshores disturbance (e.g. type, extent, severity, causes).
- Disturbance upstream and downstream of the study area (e.g. point source pollution, weed infestation, sedimentation, erosion, barriers to fish passage).
- Water quality (e.g. total phosphorus, conductivity, blue-green algal count, turbidity, macro-invertebrate community, faecal coliform concentration, and point source pollution locations).



- Flow regime (e.g. flow duration, magnitude, presence of dams or other barriers to fish passage).
- Floodplain features (e.g. billabongs and branching channels that take floodwaters away from the main channel).

Where formal data sets are not available or extensive, surveys of river foreshores are necessary. In the south west of Western Australia, the condition of the river foreshore or riparian zone in farming areas can be simply and effectively assessed (see Water and Rivers Commission, River Restoration Report RR 3 *Foreshore condition assessment in farming areas of south-west*

Western Australia (1999). The stream foreshore assessment in farming areas technique involves assessing the river condition into one of four grades, A to D, and further classifying it into one of three sub-levels. The grading covers pristine, degraded, erosion prone and eroded river reaches. The levels within each grade are easily recognised from the descriptions and diagrams. A stream assessment method for urban and semi rural waterways has been developed (Water and Rivers Commission, River Restoration Report RR 2 *Foreshore condition assessment in urban and semi-rural areas of south-west Western Australia (1999)*).

Table 3. Existing databases or sources of information which may help during the planning step of a River Action Plan.

Data	Source Agency
Macro-invertebrate surveys, wetland and stream ecology.	Ribbons of Blue – Waterwatch WA, Water and Rivers Commission, Department of Conservation and Land Management, local universities, research institutes.
Fish identification and distribution.	Western Australian Museum, local universities and Fisheries Western Australia.
Technical information on waterway restoration and management	Land and Water Resource Research and Development Corporation, Water and Rivers Commission
Property boundaries and aerial photography.	Department of Land Administration.
Declared drainage areas.	Water Corporation.
Zoning and town planning requirement.	Local Government Authority.
Remnant vegetation mapping.	Agriculture Western Australia.
Plant identification and mapping.	Western Australian Herbarium; Department of Conservation and Land Management, Florabase.
Fauna mapping and identification.	Western Australian Museum; Department of Conservation and Land Management.
State priority or rare and endangered species listings.	Department of Conservation and Land Management.
International rare and endangered species listings.	International Union for the Conservation of Nature.
International wetlands of significance.	Environment Australia – Biodiversity Group. http://ramsar.org/key_sitelist.htm
Directory of important wetlands.	Environment Australia http://www.biodiversity.environment.gov.au/environm/wetlands/directory/wetdir.htm
Regional information support.	Regional Development Commission.
Register of the National Estate.	Environment Australia. http://www.environment.gov.au/heritage/
Protected areas.	Environment Protection Authority.



Social, cultural and economic setting

A RAP must be developed with the understanding that the environmental management decisions are made in the context of the social and cultural perspective and economic constraints. To ensure that the action plan takes into account these influences it is valuable to identify existing plans and conduct further studies where necessary. It is also important that the information and any decisions made are within the context of an overall catchment management plan (where available). The types of social, cultural and economic information necessary for the development of a RAP includes:

- Vesting of land and zoning in local Town Planning Scheme.
- Heritage values, including sites of historical association and Aboriginal significance.
- History of land use on the river and what the river was like in the past.
- Existing plans and surveys.
- Land use and future planning proposals.
- Existing recreational use and potential for future use.
- Relevant legislation and policy.

One way of ensuring that the RAP meets local government policy and planning scheme requirements and by-laws is to ensure that a representative of local government agencies is consulted or include in the RAP development team. This person should be aware of any policies and regulations that may influence the plan and will be able to describe how this will affect any proposed actions. The representative may also be able to indicate if there are any proposed changes to the current use of the actual waterway or land around the waterways.

When collecting social information on your waterway it is useful to review the lists of heritage sites by contacting the Western Australian Heritage Commission (<http://www.heritage.wa.gov.au/>). Local historical societies and local residents will also be useful sources of information.

Local Aboriginal communities should be acknowledged and involved in the preparation of a RAP. All waterways and wetlands have significance to Aboriginal communities and any alterations to the river therefore

must be with the knowledge and support of the local Aboriginal community. In most cases the proposed restoration and rehabilitation of a waterway will be consistent with the protection of Aboriginal culture and heritage, but consideration is required and is a requirement of the *Aboriginal Heritage Act 1972*. The Western Australian Aboriginal Affairs Department is able to provide the contacts for specific areas.

A RAP must be consistent with State laws and regulations and should wherever possible reflect government policy. A good understanding of what legislation exists and is relevant to the plan is important. In Western Australia, some of the legislation that should be considered, and the organisations that are responsible for their administration, are presented in Table 4.

Under the *Waterways Conservation Act (1979)*, a number of waterways and in some cases catchments, have been declared as waterways management areas. Waterway Management Authorities, are community based organisations supported by the Water and Rivers Commission and have the responsibility of protecting and managing a declared area. Where plans are being developed in these areas Management Authorities should be consulted. The role of the Authorities and their management responsibilities are discussed in the waterway planning overview document (Water and Rivers Commission, River Restoration Report RR 11).

3. Strategic outline

RAPs focus on waterways and therefore must broadly link to catchment plans and regional plans. RAPs should utilise existing information and planning recommendations of other scales of planning where they exist, rather than “rewriting” management plans or revisiting communities for consultation about priorities. Importantly, the relevant goals, issues and strategies of broader planning documents should be clearly reflected in the RAP, with emphasis on those most relevant to the local community. In addition, funding bids for a RAP are more likely to be successful if actions are linked with recommendations and priorities identified at a regional or catchment scale, as well as the priorities and objectives of the funding body.



Table 4. A River Action Plan must be consistent with State laws and regulations and should wherever possible reflect Government policy. Some of the legislation that should be considered when preparing a River Action Plan is presented below.

Administering Organisation	Legislation
Water and Rivers Commission and Waterway Management Authorities (e.g. Avon River Management Authority).	<i>Water and Rivers Commission Act 1995. Waterways Conservation Act 1976. Country Areas Water Supply Act 1947. Rights in Water and Irrigation Act 1914. Metropolitan Water Supply, Sewerage and Drainage Act 1909, and by-laws.</i>
Swan River Trust.	<i>Swan River Trust Act 1988.</i>
Agriculture Western Australia.	<i>Soil and Land Conservation Act 1945.</i>
Western Australian Planning Commission, Ministry for Planning and Local Government.	<i>Western Australian Planning Commission Act 1985. Town Planning and Development Act 1928.</i>
Department of Land Administration.	<i>Land Administration Act 1997. Transfer of Land Amendment Act 1996. Registration of Deeds Act 1856.</i>
Environmental Protection Authority and the Department of Environmental Protection.	<i>Environmental Protection Act 1986.</i>
Department of Conservation and Land Management.	<i>Conservation and Land Management Act 1984. Wildlife Conservation Act 1950.</i>
Aboriginal Affairs Department.	<i>Native Title Act 1993. Aboriginal Communities Act 1979. Aboriginal Heritage Act 1972. Aboriginal Affairs Planning Authority Act 1972.</i>
Fisheries Western Australia.	<i>Fish Resources Management Act 1994.</i>
Office of Water Regulation.	<i>Water Services Coordination Act 1995.</i>

Developing a vision for the waterway

A vision provides a foundation and a reference point. Most river rehabilitation projects last for many years so it is essential to describe the underlying motivation that sustains community effort. When preparing a vision for a RAP ensure that it aims to inspire people to become involved, such as the vision: “the river will be an ideal place for swimming and fishing again”.

Questions to ask when developing a vision:

- Why is the RAP important?
- What does your community value about the river?
- What is special that you want to maintain?
- What are the long term benefits to the river system?
- What are the benefits to the community and individuals?
- What are the broader social, cultural, environmental and economic values?



Identifying issues

Once a vision has been agreed upon, it then takes time to explore all the possible hurdles that restrict the attainment of this vision.

Finding out about the issues:

- What are the environmental issues facing our waterway?
- What are the social, cultural and economic issues facing our waterway?
- What is known about these issues?
- Why do the issues exist?
- What is causing the problem?
- What evidence is there, that this is a real problem?
- How do perceptions and value judgements contribute to the recognition of the problem?
- Are there things about these issues that need to be investigated?
- Is any other group addressing these issues?

A list of waterway issues that may be addressed in a RAP are given in Table 5.

If the RAP is being prepared without a context of an overall Catchment Plan it should define the issues that could be addressed at the local level. Some issues may need to be addressed at a broader level. These should be identified but it needs to be acknowledged that the action plan cannot address these issues comprehensively. A RAP will raise community awareness and bring pressure to bare in relation to broader scale issues and planning.

Define goals, objectives and priorities

The next step is to identify what the community and stakeholders would like to see the RAP achieve, in other words, the ideal goals and objectives.

To define the goals and objectives there needs to be some decision on which are the priority issues. The stakeholders will need to decide on waterway issues that are important and whether they should be addressed in the short and long term.

When deciding priorities it is necessary to take into account that it is usually more effective to protect

reaches of a river that remain in good condition and work outwards from these areas, than to invest resources and time trying to rehabilitate degraded reaches. It is also worthy to prevent degradation rather than try and fix it later, as rehabilitation is usually far more costly. Priority should also be given to areas that show signs of recovery or to sites that are deteriorating quickest.

When defining goals and objectives consider:

- What is the issue?
- What needs changing?
- What is the outcome of addressing this issue?

Vague or very general project objectives will make management and evaluation difficult.

Check to see if the objectives are S.M.A.R.T.

Specific - what will be achieved is clearly defined.

Measurable - there is some way of measuring what will be achieved.

Achievable - the objective is realistic given the resources available.

Relevant - the objective is essential to the project vision and goals.

Timeframed - there is a time by which the objective will be met.

Example: The *Vasse River Action Plan* (Water and Rivers Commission, 1999) has as its goal:

‘To ensure progress towards the sustainable management, rehabilitation and conservation of rivers and to improve the health of these rivers’.

The specific objectives of the Plan were to:

- *Provide a benchmark against which the local community’s future work to protect the river can be gauged.*
- *Provide a tool to better guide the limited resources available for weed control, erosion control, tree planting and rehabilitation.*
- *Provide a sound technical basis for future funding or project submission.*



Table 5. Water resource management issues.

Theme	Issue	Condition	Cause/Pressure
Ecological	Instream and riparian vegetation degradation.	Declining riparian vegetation. Exposed and eroded foreshores. Erosion and sedimentation. Ecosystem decline. Fragmentation. Loss of diversity.	Livestock grazing. Salinisation and waterlogging due to clearing. Inappropriate fire regimes. Conflicting and unsustainable use of the riparian zone.
	Exotic plant and animal invasions.	Weed infested foreshores. Clogged waterways. Loss of native vegetation. Altered stream ecology. Ecosystem degradation. Threat to native species by predation and disease.	Weed introductions. Livestock grazing. Aquaculture escapees. Existing pests. Garden escapees.
	Nutrient enrichment.	Declining water quality. Algal blooms – macro and micro. Fish kills. Loss of seagrass. River pool stagnation. Anoxic events.	Nutrient and organic matter transport from catchments.
	Point source pollution.	Declining water quality. Algal blooms – macro and micro. Fish and invertebrate fauna kills. Loss of seagrass. River pool stagnation. Anoxic events. Environmental contamination.	Discharge of pollutants. Biocide use.
Hydrological	Stream salinisation.	Decreased useability of water. Dying vegetation. Changes from freshwater to saltwater conditions. Salinised stream water quality. Exposed foreshores. Loss of diversity.	Altered catchment hydrology brought about by clearing.
	Waterlogging and inundation.	Dying vegetation. Increased extent of water logging along waterways. Stagnation.	Altered catchment hydrology brought about by clearing. Inadequate drainage. Sedimentation of waterways.
	Stream flow changes.	Declining basal flows. Vacant niches for invasive species. Blockage to fish passage.	Damming of streams. Building weirs, culverts and crossings.



Theme	Issue	Condition	Cause/Pressure
Hydrological cont'd.	Stream flow changes cont'd.	Altered flow regimes. Drowned river valleys. Altered timing, pattern and volume of flow. Loss of wetland and floodplain connection. Altered stream ecology.	Pumping from streams and wetlands. Pumping from streams and wetlands. Water drainage and extraction. Increased groundwater levels.
	Flooding.	Increased flood frequency. Increased flood damage. Use of floodplain for development. Erosion and avulsions.	Inappropriate floodplain development.
	Drainage.	Degraded drains. Erosion and sedimentation. Weed infestation. Eutrophication of downstream waterways.	Rural and urban drainage. Channel straightening and desnagging.
Geomorphological	Channel changes.	Channel widening and deepening. Changes to riffle patterns. In-stream erosion and sedimentation. Floodplain erosion. Loss of river pools.	Altered catchment discharge regime and loss of vegetation. Direct excavation of channel bed.

4. Establish Management Actions

The development of suitable “actions” for a resource is not necessarily a simple process. There are usually many issues, constraints and factors that should be considered. These include:

- Existing management plans and strategic plans;
- Legislative and policy requirements;
- Detailed natural resource information (e.g. foreshore assessments);
- Community concerns; and
- Any relevant research information on the processes occurring in the catchment and within the waterway itself.

Questions that could be asked of each management option:

- What needs to be done?
- What options are available?
- Is this option feasible?
- How will it be done?
- When does each task need to be done?
- Who will do each task?
- What resources are needed?
- Are there special circumstances that should be taken into account?



Table 6. Examples of actions that address waterways issues and protect river values.

Issue	Action
Riparian zone degradation.	Fence the riparian zone. Revegetate area using native species. Discourage vandalism and arson.
Weed invasion.	Weed removal and control techniques implemented.
Protection of river pools.	Sediment removal such as pool excavation.
Feral animal invasion.	Implement feral animal control measures.
Fire damage.	Remove rubbish and weeds, undertake fuel reduction and create fire breaks to protect the riparian zone.
Biodiversity protection.	Fence the riparian zone, weeds removal, feral animal control, revegetation, community education using signs.
Point source pollution.	Improve nutrient management and chemical handling and usage.
Stormwater drainage.	Best management practices – water sensitive urban design.
Community awareness.	Community education (e.g. signs, bird observation points, and brochures).
Salinity.	Revegetation with salt tolerant plant species.
Flood management.	Retention basins and floodplain protection.
Water abstraction.	Improved awareness of historical and heritage sites. Community education of environmental water provisions and waterway ecology.
Flora and fauna protection.	Habitat creation.
Protection of waterway variability and habitat diversity.	Establish stream hydrological features (e.g. riffles and pools) and ecological features (e.g. large woody debris).
Erosion.	Revegetation, bank stabilisation, applying jute matting, and fencing for livestock control.
Habitat protection.	Fencing the riparian zone. Monitoring, evaluation and vigilance. Education through improved awareness of environmental issues.
Recreation.	Improved access including paths, roads, tracks and horse riding trails. Provision of recreation areas and amenities such as toilets, boat launching sites and parking.

In the planning stage, it is essential to obtain competent technical advice on best management practices. For example, in Western Australia river restoration techniques are relatively new and informed judgement is needed to maximise the chances of success. Mistakes will be made and should be documented so waterway managers will learn and improve their technical competence over time.

It is also important to identify those actually required to implement the plan and the time frame in which the actions will be undertaken. Various stakeholders should be consulted before they are assigned tasks. The *Yallingup Brook Action Plan* (Water and River Commission, 1999), (Table 7) provides an excellent example. Here, issues were identified and actions are assigned to stakeholders to be completed within a given timeframe.

Table 7. An example of an action table from the Yallingup Brook Action Plan (Water and Rivers Commission, 1999). An action table was prepared for each 150 meter section of the river. NB: the condition rating system employed is that developed by Pen and Scott (1995) for assessing stream foreshores in farming areas (Water and Rivers Commission, River Restoration Report RR 3).

Condition Rating	
North Bank	South Bank
C3/D1 (eroding and subsiding). 2 (drain, weed dominated).	D1 (ditch eroding). D2 (drain, weed dominated).

Issues Identified	Management Advice	Timing	Implementation
Weeds.	<ul style="list-style-type: none"> • Treatment of weeds, especially giant reed, castor oil and arum lily. 	<ul style="list-style-type: none"> • When actively growing. 	<ul style="list-style-type: none"> • Shire in consultation with LCDC and residents association.
Erosion.	<ul style="list-style-type: none"> • Rehabilitation of banks with vegetation. • Resolution of stormwater pipe construction. • Stabilisation of head-cut. • Resolution of crossover construction. 	<ul style="list-style-type: none"> • All prior to wet season. 	<ul style="list-style-type: none"> • Shire in consultation with LCDC and residents association. • Shire. • Shire. • Shire and local business owner and LCDC.
Loss of vegetation.	<ul style="list-style-type: none"> • Seed collection. • Establish vegetation and sedges. 	<ul style="list-style-type: none"> • Workshop. • During wet season. 	<ul style="list-style-type: none"> • Shire with local residents association and landowner.
Litter.	<ul style="list-style-type: none"> • Remove litter. 	<ul style="list-style-type: none"> • During holiday periods. 	<ul style="list-style-type: none"> • Shire with local residents association and land owner.
Fire.	<ul style="list-style-type: none"> • Investigate incorporating goals of regeneration into any planned burn. 	<ul style="list-style-type: none"> • Prior to burning. 	<ul style="list-style-type: none"> • Shire in consultation with CALM, LCDC, fire brigade and land owner.



It is essential to consider the costs of the action and how much of the total cost can be provided by in-kind contribution, donations or outside funding. The RAP can be used to seek funding from outside sources as shown as a specific goal of the *Vasse River Action Plan* (Water and Rivers Commission, 1999).

Once all the actions have been identified, responsibilities have to be set to ensure that the plan will be implemented and properly evaluated. It may be decided that a sub-group will be responsible or that a coordinator is needed. Many groups employ a coordinator to facilitate the implementation of the RAP.

5. Gaining approval

The process of gaining approval is ongoing throughout the planning stage. Involving all stakeholders in decisions made in the planning process will mean that endorsement of your plan is made easier. It is a good idea to get your RAP endorsed by the Local Shire/Town Council and local community groups. As decisions are made you will need to check that all stakeholders continue to support the plan and remain willing to help implement it. Most projects languish, if false assumptions are made about the strength of community support.

At the planning stage, it is important to get endorsement from people who are not necessarily involved with your plan but may be affected by the outcomes. For example, it is essential to work with neighbouring communities to ensure that your RAP does not conflict with other action plans or management plans.

Implementing the plan

Implementing the plan is an exciting time as this is when the RAP generates interest and motivation with the wider community. This is the time when the broad community can begin to see value of planning and hopefully there will be some evidence of works that are contributing to improved river condition. During the implementation phase it is vital that the group maintains good internal communication as well as maintaining good working relationships with stakeholders, especially keeping them informed on how things are progressing.

Review

As situations change over time both physically and socially, it is important that a detailed monitoring and evaluation process is undertaken to ensure that the RAP meets the needs of the community and is successfully addressing the condition of the river.

Monitoring is an ongoing process and it requires careful planning if it is to be effective. It is necessary to review actions and evaluate if they need to be altered given further acquisition of information or recognition that the original decisions were not entirely appropriate.

Questions to ask while monitoring the progress of a River Action Plan:

- How is the implementation of the actions progressing?
- What has been done so far?
- What has not been done that was intended to be done?
- Is the budget being kept to?
- Is the right information being collected?
- What feedback is being received to support and improve our plan?
- Are we keeping people informed?
- Are the relevant people involved?
- Does anything need changing?

Evaluation is the process of reconsidering the validity of the RAP vision, issues, goals and objectives. It should be carried out every 12-24 months. This should be part of the time line for the RAP.

The vision is unlikely to change much, however, the priority given to issues may change in light of a new understanding of their impact, new issues arising and changing management practices or technology. It is essential that the RAP be assessed for the level of action achieved in relation to the set targets. The effectiveness of the works in meeting the overall aim of the Plan (i.e. the condition of the natural resources) can be assessed by asking the following questions:

- What worked in relation to getting towards the goals?
- What did not work?



- Were the project objectives met?
- Did anything change as a result of the actions?
- Were there any unexpected results from the plan?
- What would be done differently next time?
- What evidence is there that the plan made a difference?
- What information is there to support this?
- Are people doing things differently?
- Have people changed their management practices?
- Are the problem areas getting better?
- Have the issues people are talking about changed?
- Is there a wider understanding of river restoration and management in the community?
- Has the landscape changed?

Keeping records

It is also useful to quantify what work was undertaken and what has changed. This information is useful for future planning and in assisting other groups with their action plans.

Ideas for quantifying the success of your RAP are below:

- How much remnant riparian vegetation has been protected (ha)?
- How much streamline is being managed (ha)?
- How much streamline has been fenced (km)?
- What is the total length of fencing (km)?
- What are the types of fences erected?
- How much area of site preparation was carried out (ha)?
- What type of site preparation was employed (e.g. ripping, mounding, and spraying)?
- What type of revegetation method was used and what area was revegetated (e.g. planting, direct seeding, natural regeneration, fibre matting)?
- Were any paths or walk trails built?

- What type of path or walk trails were erected (e.g. concrete, limestone, gravel, scalped substrate)?
- Length of path or walk trails established (km)?
- Was the area weeded (methods employed and level of success)?
- Major type of weeds removed (e.g. Watsonia, Cottonbush, Arum Lily, and Blackberry)?
- What type of environmental surveys and monitoring were undertaken?
- How many people took part?
- Were any publications/brochures produced?
- Type of publications/brochures produced (action plan, general information on a topic, educational materials etc.)?
- In terms of materials, time taken and effort, what was the cost of the following: fencing, site preparation, revegetation, path construction, signage, weed management, publication production, project management, convening workshops and field days, monitoring and evaluation etc?

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Appendix 1

Notes on Preparing a River Action Plan: A Perspective from the Oldfield Catchment

Introduction

The Oldfield Catchment is located midway between the towns of Ravensthorpe and Esperance on the south coast of Western Australia. The catchment covers an area of approximately 248 000 hectares and includes the Oldfield and Munglinup river systems.

The beginning

The River Action Plan (RAP) began with a group of community members realising the need for on-ground action to manage their waterways. In the Oldfield catchment, the Oldfield Landcare Group decided to develop a RAP.

The RAP development team began stage one of the catchment planning process by encouraging stakeholders to meet and discuss natural resource management issues in the catchment. Stakeholder groups identified included Local Government, interested community groups, farmers, Bushcare Support Officers and Government Agencies such as the Water and Rivers Commission, Department of Conservation and Land Management and Agriculture Western Australia. At this meeting, stakeholders identified various issues ranging from pest control, salinity, and waterlogging through to social issues. The Oldfield Landcare Group identified the protection of tributaries through fencing and revegetation as a priority issue for all sub-catchments.

Surveying the condition of waterways in the catchment

Prior to undertaking on-ground works, the Oldfield Landcare Group wanted to gain an understanding of the physical condition of the catchment and social, environmental and economic setting. This enabled the Group to outline key issues affecting the sustainability of the catchment's natural resources. Funding was sought from the Natural Heritage Trust for a consultant

to assess the current condition of the catchment, particularly with respect to native vegetation, dryland salinity, waterlogging, and erosion (Oldfield Catchment Report, 1998). In addition to this, the Esperance Catchment Support Team was determined to address the hydrological status of the catchment and provided soil-landscape maps, rainfall isohyet maps, digitised farm maps showing potential areas of degradation as well as providing ongoing support in planning and implementation.

Waterways were assessed as part of the catchment survey by recording the condition and fencing status of riparian vegetation on each landholder's property. Further foreshore surveys of the river itself and the vegetation surrounding the Oldfield Estuary were also completed through various methods such as on-ground surveys, analysis of aerial photographs, field walks with community groups, liaison with landholders and through digital multi-spectral video imaging.

Reviewing the waterways not only included an environmental assessment, but an examination of the historical, cultural and recreational values of the waterways, including Aboriginal significance. This was achieved through site visits, conducting a literature review, liaison with key landholders in the area and discussions with relevant agencies.

Information was also collected on the existing rivercare works that had been undertaken by landholders in the catchment. Many landholders in the Oldfield Catchment had fenced and revegetated riparian areas, as well as carried out engineering works (e.g. stock crossings). It was found that landholders had a wealth of local knowledge and had developed practical innovations, with examples of successes and failures that had been trialed over many years. In many cases farmers had learnt the hard way with comments like "if I fenced again I would fence much higher".

The value of the RAP was also to capture some of the landholder's experience, not only on paper, but also through communicating with different landholders on field walks. During the various field walks that were held, landholders often discussed their trials and errors.



Assessing what rivercare works had been undertaken in the catchment enabled the Water and Rivers Commission to identify the river restoration needs of farmers. For example, it was noted that a number of stock crossings had failed. Therefore information on how to build and design stock crossings was included in the local RAP.

Planning and prioritising on-ground works

The next step of the RAP was to plan and prioritise on-ground works. The Oldfield Landcare Group identified those priority areas which needed urgent attention, either to prevent further degradation or to protect high value sites.

On-ground actions identified included fencing, revegetation (species selection and site preparation), weed removal and control, fire management, remedial measures for erosion, establishment of alternative watering sources, bank stabilisation, creation of river pools and riffle zones and pest control.

Increasing community awareness

One of the most important aspects of a RAP is to increase landholder awareness of the waterways. This includes raising awareness of the social, cultural, environmental, ecological, historical, aesthetic and economical values of waterways. It is essential that increasing awareness includes educating the community about the vital processes of waterways and how they function, particularly with respect to the fluvial geomorphology and ecology of the system. Furthermore increasing community awareness on the linkages between individual waterways on farming properties and the downstream estuary was important to encourage landholders to see beyond their local area.

To achieve this, demonstration sites were established on six properties to promote successful “in-paddock” waterway rehabilitation practices. These demonstration sites will be monitored over time to record their success and will form part of future catchment tours. Each demonstration site will be sign-posted to give recognition to active landholders.

Monitoring and evaluation

In many cases farmers had measured the success of their works through visual assessment. However, much of this information was not recorded. Farmers were aware of the areas of salt affected land, the improved stability of stream banks, the success of different tree species and the regeneration of native species after the exclusion of stock. Encouraging farmers to take photos and record this information forms part of the monitoring and evaluation program.

While each farmer is encouraged to monitor their own site, a whole catchment monitoring and evaluation program is needed to show what has been achieved in the catchment. This needs to include photographs, stream surveys using approved methods, estimates of kilometres fenced and seedlings planted, involving landholders and organising field days. The monitoring and evaluation program must be community driven with appropriate feed back mechanisms to encourage the on-going implementation of the plan.

The future

Through the implementation of the River Action Plan, the management of waterways will continue on for many generations. The final stages of the Action Plan will be incorporated into individual farm plans that each landholder implements over time.









