foreword

wimmera waterway health strategy

The Wimmera CMA region is home to a unique range of waterways that support life in an otherwise dry landscape. Unfortunately, these lifelines are under threat from reduced flows, sedimentation and erosion, invasion by pest plants and animals and declining water quality. Gully and land erosion occurs extensively throughout the catchment, particularly in the upper catchment, and is contributing significant sediment to waterways. The associated decline in water quality is further exacerbated by grazing pressure on the bed and banks of waterways. Changes in flow regimes and increasing sedimentation are leading to significant changes in aquatic vegetation growth and, combined with a history of snag removal, are having a significant impact on aquatic habitats.

In publishing this Strategy, Wimmera CMA reaffirms its commitment to improving not only the health of streams, but also wetlands across the region. For this reason, and to emphasise the importance of wetlands in the Wimmera and Millicent Coast basins, Wimmera CMA has chosen to release this as the Wimmera Waterway Health Strategy, as it applies to all forms of surface water bodies. The key assets that are the prime focus of the Strategy are the Wetlands and Streams of the Wimmera River Basin, Terminal Lakes of the Wimmera River Basin, and Wetlands and Streams of the Millicent Coast Basin.

The strategic vision encompassed by the Strategy is *'waterways for life'*. To achieve this vision Wimmera CMA, in its role as caretaker of river health in the region, is committing effort and dollars to protecting the best waterways in the region, maintaining those waterways that are in good condition, restoring at-risk waterways, ensuring future generations enjoy the health diversity and productivity of healthy waterways, and that Indigenous values are respected.

Wimmera CMA recognises that the community and other agencies involved in natural resource management are key players in achieving improvements in waterway health. The scope of the work identified in this Strategy is vast. To achieve improvements in the health of our waterways, we need to be working together to meet the challenges of implementing this Strategy.

I thank everyone who has contributed to the development of this Strategy, and invite you to actively participate in achieving healthier waterways in the Wimmera.

Ms Jo Bourke
Chairman
Wimmera CMA Board

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introduction

wimmera waterway health strategy

The Wimmera community and Wimmera Catchment Management Authority (Wimmera CMA), in partnership with Local Government and the Victorian and Australian Governments, have united to manage the waterways of the Wimmera and to work collaboratively in identifying actions that address waterway health issues across the Wimmera CMA region.

The *Wimmera Regional Catchment Strategy* (2003-2008) identified the waterways of the Wimmera River and Millicent Coast basins and the Terminal Lakes of the Wimmera River as being high value assets in our region. The *Wimmera Waterway Health Strategy (WHS)* has been developed to provide the strategic framework for protecting and enhancing these assets.

The *Wimmera WHS* identifies important values intrinsic to waterways, and prioritises the threats to those values, to clearly identify which actions need to be implemented, and in what order.

The *Wimmera WHS* brings together a large amount of work, completed by numerous agencies, into a single coherent plan for protecting and enhancing waterway health.

The *Wimmera WHS* is the first attempt to combine the elements of waterway management in one umbrella document. The *Wimmera WHS* integrates waterway programs into a multi-disciplinary framework and considers floodplains, wetlands, riparian land, instream habitat and channel form, Environmental Water Reserve management, water quality, significant flora and fauna and communication, education and engagement. The Strategy also includes an adaptive management framework for monitoring, evaluating and reporting on the achievements of activities undertaken in implementing the Strategy.

our vision

Wimmera CMA's vision for waterways of the Wimmera is **waterways for life.**

how we will achieve our vision

The *Wimmera WHS* aims to achieve this vision through four key objectives:

1. The waterways of the Wimmera region are proactively managed by all to protect and enhance their environmental, social and economic values.
2. The condition of ecologically healthy waterways are maintained.
3. An overall improvement in the environmental condition of the region's waterways is achieved.
4. Damage to waterways from future management activities is prevented.

background and context

wimmera waterway health strategy

The *Wimmera WHS* has been developed, and will be implemented, within the broader state-wide strategic frameworks of:

- Victorian River Health Strategy (2002)
- State Environmental Protection Policy (Waters of Victoria) (2004)
- Victorian Biodiversity Strategy (1997)
- Victorian Nutrient Management Strategy (1995)
- Victorian Flood Management Strategy (1998)
- Victoria's Native Vegetation Management – A Framework for Action (2002)
- Victoria's Salinity Management Framework (2000)
- The regional framework of the Wimmera Regional Catchment Strategy (2003 - 2008)

The *Victorian River Health Strategy (VRHS)*, sets out the framework for reaching Victoria's long-term vision for its rivers. The *VRHS* outlines the approach that Government, in partnership with the community, will use to make decisions on managing and restoring Victoria's rivers.

Along with the VRHS, the *State Environmental Protection Policy (Waters of Victoria) (SEPP, WoV)* is a key state-wide statutory policy for surface waters in Victoria. The *SEPP (WoV)* includes a range of actions required to protect and enhance waterway health. Many of these actions form part of the *Wimmera WHS* and sub-strategies.

The *SEPP (WoV)* contains objectives for water quality and biological health. These environmental quality objectives provide the 'benchmarks' that describe the conditions required to protect all beneficial uses/assets. The *Wimmera WHS* integrates these objectives as targets where appropriate.

In June 2004, the Victorian Government released the White Paper, *Our Water Our Future*, an action plan including new initiatives to secure Victoria's water for the next 50 years through sustainable water management.

The *Our Water Our Future* action plan strengthens the role of catchment management authorities as caretakers of waterway health and managers of the Environmental Water Reserve.

The Victorian Government has also recently released the Our Environment Our Future: Victoria's Environment Sustainability framework. The framework reinforces Victoria's commitment to maintaining and restoring our natural assets for a prosperous and liveable Victoria.

The *Wimmera Regional Catchment Strategy (RCS)* provides the vision for the future landscape of the Wimmera and is helping guide natural resource management through current challenges until 2008. It represents a change in focus from dealing with issues that confront us such as salinity, soil erosion and loss of biodiversity, to protecting and enhancing our key assets – our land, water, biodiversity and communities.

In addition to the *Wimmera RCS*, the region has a number of guiding documents for waterway health including:

- Wimmera Water Quality Strategy (2002)
- Wimmera Floodplain Management Strategy (2001)
- Wimmera Rural Drainage Strategy (2001)
- Wimmera Regional Salinity Action Plan (2004)
- Wimmera Native Vegetation Plan (revised Draft 2004)
- Wimmera Weed Action Plan (2000)
- Wimmera Rabbit Action Plan (2000)
- Waterway Action Plans (Various)
- Stressed Rivers Project – Environmental Flow Study Wimmera River system (2002)
- Environmental Flow Recommendations for the Bulk Entitlements (2004)
- Wimmera River Geomorphic Investigation, Sediment Sources, Transport and Fate (2001)
- Geomorphic Categorisation and Stream Condition Assessment of the Wimmera River Catchment (2003)
- Geomorphic Investigation of Wetlands in the Wimmera CMA Section of the Millicent Coast Basin (2004)
- Social and Economic Drivers of Wetland Rehabilitation (2005)
- Wimmera Wetland Condition Assessment Project (2005)

emerging initiatives

There are a number of emerging initiatives that will impact on achieving waterway health objectives in the Wimmera CMA region. Two of particular note are the Wimmera-Mallee Sustainable Water Strategy and the Wimmera Mallee Pipeline Project.

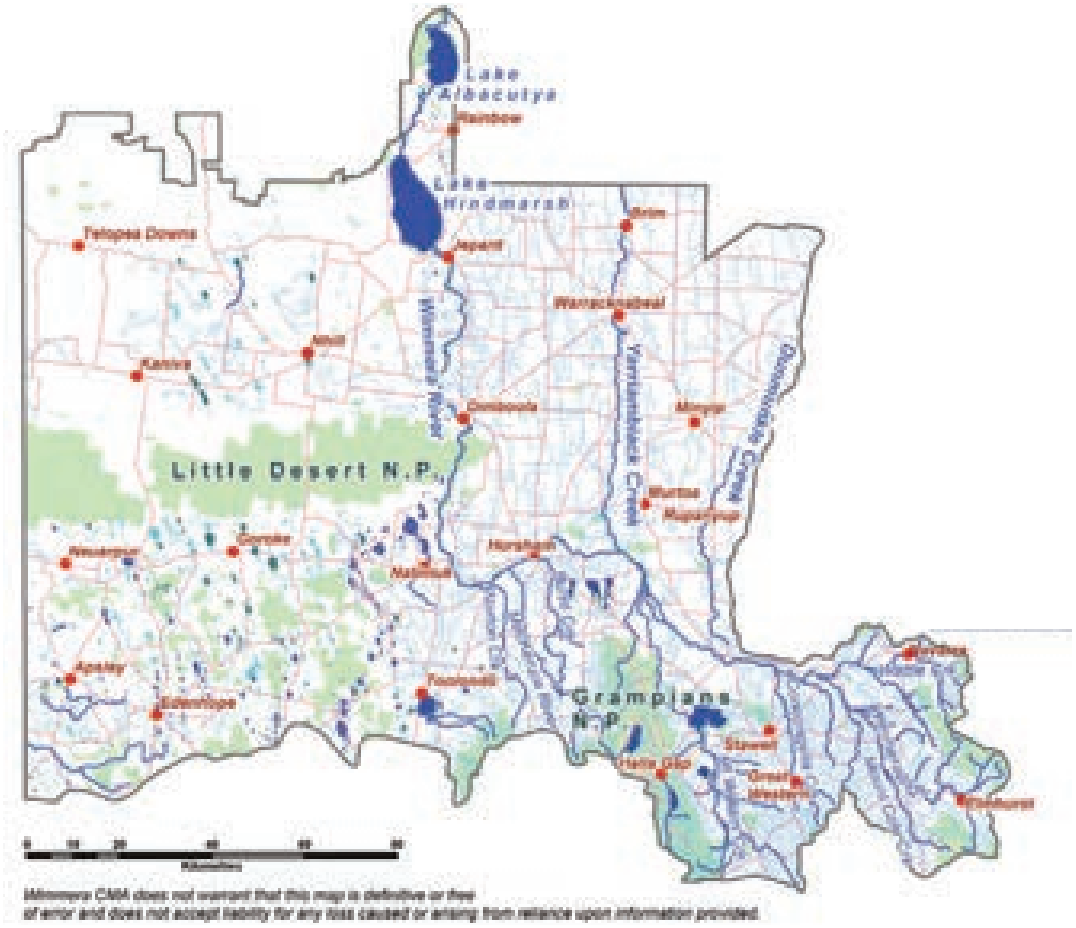
Sustainable water strategies will plan for water security by assessing the various requirements for water and the quantity (in terms of volume and quality) of existing and potential sources of water supply available in five regions across Victoria, including the Wimmera.

The Wimmera Mallee Pipeline Project is a major initiative that will deliver significant water savings to the Wimmera, Glenelg, and other river systems in the area. The project is expected to deliver water savings that will be passed onto the environment via Environmental Water Reserve management. These allocations will, over time, play a pivotal role in the rehabilitation of the region's biodiversity, and assist in reversing the demonstrable and unsustainable decline in waterway health.

wimmera waterways

wimmera waterway health strategy

*This data was obtained from the Department of Sustainability and Environment's (DSE) Corporate Library Database.



MAP 1 waterways of the Wimmera CMA region

The Wimmera CMA region (Map 1) covers sections of the Wimmera River Basin and the Millicent Coast Basin. The Wimmera is diverse; with mountains, plains and desert, moist foothill forest, box ironbark forest, woodlands, grasslands, mallee heath and mallee woodlands. Average annual rainfall varies from up to 1000 millimetres (mm) in the Grampians, to as low as 300mm in the northern plains. This diverse environment also contains a broad-scale agricultural landscape and an ageing and declining population.

The major waterway of the Wimmera River Basin is the Wimmera River, which has a catchment of about 2.4 million hectares (ha). At the head of the catchment, numerous tributaries rise in the Mount Buangor State Park and the Pyrenees Ranges, joining the main Wimmera River upstream of Glenorchy. Water is also received from the major sub-catchments of Wattle, Concongella and Mt William creeks. The Wimmera River flows west to Horsham where it collects the waters of Burnt Creek, and just downstream the MacKenzie River, and Norton Creek from the south. The MacKenzie River and these other streams originate in the Grampians National Park, on the southern boundary of the Wimmera CMA region.

summary

Just east of Mt Arapiles, the river swings to the north and continues through Dimboola and Jeparit to Lake Hindmarsh, Victoria's largest freshwater lake. During exceptionally wet periods Lake Hindmarsh overflows into the ephemeral Outlet Creek and onto Lake Albacutya, a Ramsar wetland, extending to the Wirrengren Plain in Victoria's Mallee region. Overflows of Lake Hindmarsh into Outlet Creek have only occurred five times this century, the last in 1996. Historic records show flooding of lakes beyond Lake Albacutya, though they have not received floodwater since 1974-75.

The Wimmera River between Polkemmet (10km northwest of Horsham) and Wirrengren Plain has been proclaimed a Victorian 'Heritage River' under the *Heritage Rivers Act 1992*.

A notable feature of the Wimmera River system is its effluent streams or distributaries, Yarriambiack and Dunmunkle creeks, which carry water away from the river. Yarriambiack Creek flows from Longerenong through Warracknabeal, Brim and Beulah into Lake Coorong near Hopetoun. Dunmunkle Creek carries water north from Glenorchy through Rupanyup, dissipating in the southern Mallee.

The main features of Millicent Coast Basin waterways are wetlands, terminal streams and small ephemeral west-flowing streams.

There are over 3,000 wetlands in the region, 90% of which are in private ownership. Most of these occur in the Millicent Coast Basin. Many of these wetlands are ecologically of state significance as well as being important water storages and recreational areas. These wetlands are also economically important for agriculture and tourism.

The Millicent Coast Basin is also characterised by a number of streams that flow west into South Australia. It is important to manage these streams, which include Mosquito, Koijak, Morambro, Tatiara and Thompson creeks, because of cross-border impacts.

waterway management units

The Wimmera CMA region is divided into 19 Waterway Management Units (Map 2). These systems are:

1 Upper Wimmera River
2 Mt Cole Creek
3 Wattle Creek
4 Concongella Creek
5 Upper Mt William Creek
6 Lower Mt William Creek
7 Grampians
8 MacKenzie River and Burnt Creek
9 Norton Creek
10 Lake Toolondo Creek
11 Natimuk Creek
12 Heritage River
13 Terminal Lakes
14 Yarriambiack Creek
15 Dunmunkle Creek
16 Millicent Coast Lakes
17 Millicent Coast west-flowing
18 Little Desert National Park
19 North of the Little Desert National Park

Within each Waterway Management Unit, individual waterways are identified by waterway reaches and wetlands. Eighty-six individual reaches have been identified in rivers and streams of the region.

waterway assets

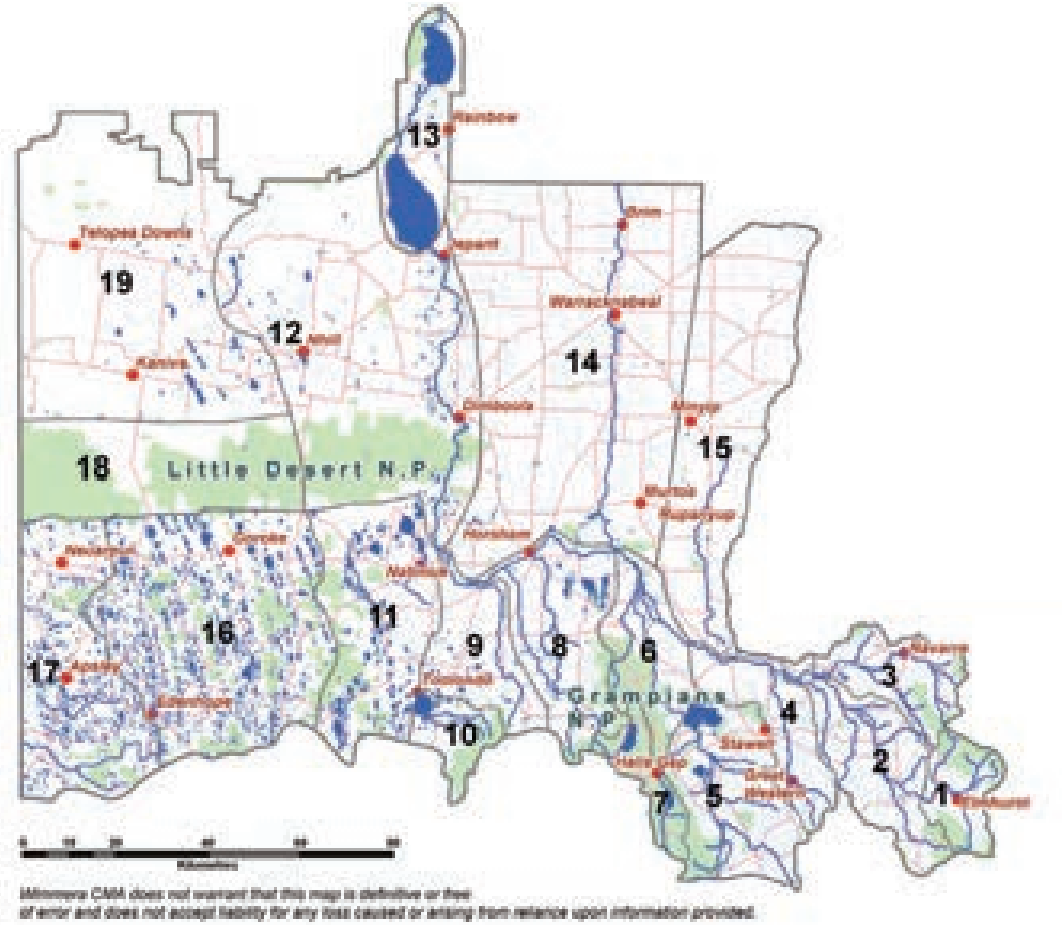
The Wimmera has a rich suite of natural assets including open forests and semi-arid landscapes, aesthetic features, agricultural areas, the Wimmera River, wetlands and ephemeral streams. The prominent regional industries of agriculture and tourism are dependent on the conservation and sustainable use of the natural assets. Continued agricultural productivity is dependent upon the soil and water resources, while many recreational activities rely on healthy natural ecosystems.

Protecting waterway assets is a key objective of the *Wimmera WHS*. It is important to keep this objective at the forefront of our minds when using the Strategy. The focus of natural resource management is on protecting the environmental services provided by the environment. The *Wimmera WHS* goes one step further to focus on the threats to those values, as well as the values themselves.

legend

- Waterway Manangement Units
- 18 Waterway Management Unit Number
- River Reaches
- Wetlands*
- Other Waterways/Channels*
- Major Towns*
- Major Roads*
- Public Land*
- Wimmera CMA Boundary*

*This data was obtained from the Department of Sustainability and Environment's (DSE) Corporate Library Database.



MAP 2 Wimmera CMA region waterway management units

waterway condition

Rivers and Streams

The conditions of many of the waterways within the Wimmera CMA region were classified in 1999 and 2004 (Map 3), using the Index of Stream Condition (ISC) waterway health assessment. The condition of the region's streams varied quite considerably, with over half of the length of waterways in the region (875km) being in a 'moderate' condition, with the remainder mainly being classified in 'good' (148km) and 'poor' (266km) condition, as well as smaller sections in 'excellent' (27km) and 'very poor' (25km) condition.

Within the Wimmera River Basin, the ISC condition scores were heavily influenced by the many low ratings calculated for the hydrology sub-index. The low scores are due to the presence of highly-modified flow regimes, as large volumes of water are diverted for use in the stock and domestic channel system. Some reaches in the upper Wimmera region as well as Norton Creek and Golton Creek score highly due their natural or near-natural flow regimes.

The classifications of numerous stream reaches, especially the smaller tributaries of the Wimmera River are also affected by relatively low scores for the streamside zone and physical form sub-indices. The low scores for the streamside zone sub-index are attributed to heavily-modified vegetation due to land clearing, stock access and the presence of invasive weeds. The physical form sub-index scores are affected by such things as the accelerated erosion of the stream banks and beds. The most concerning issue is the absence of large woody debris from channels.

Measurement of the water quality and aquatic life sub-indices only took place at relatively few reaches monitored by the Environment Protection Authority (EPA) and the Victorian Water Quality Monitoring Network. However, their higher ISC scores demonstrate that water quality and aquatic life are generally classified as being in a better condition than the other sub-indices.

The stream reaches within the Millicent Coast Basin are on the whole in better condition than those in the Wimmera River Basin, mostly due to the fact that flows are unmodified by diversions. The physical form sub-index scores were also relatively high, indicating that the streams are relatively unaffected by accelerated erosion/aggradation and other impacts to the physical form and habitat. The streamside zone sub-index scores were slightly lower because these waterways flow through mostly rural land. Aquatic life and water quality sub-index scores were not obtained for the Millicent Coast Basin.

In 2005, Wimmera CMA conducted an assessment of wetland condition for wetlands in the Natimuk-Douglas chain of lakes (Wimmera River Basin) and the Millicent Coast Basin (Map 4). A selection of representative wetlands was assessed for physical, chemical and biological condition.

Most wetlands assessed appear to be in 'good' to 'moderate' condition with 75% of the wetlands surveyed as 'moderate' to 'good'. In the Natimuk Douglas chain of lakes and the wetlands south of the Little Desert, the general condition is 'good' with only a few wetlands showing signs of stress. Wetlands south of Edenhope show a higher proportion of sites with 'moderate' to 'poor' hydrological integrity. Wetlands north of Little Desert are all showing signs of stress from prolonged drought. It is, however, anticipated that flowing rains will result in many of these systems being considered as in a 'moderate' to 'good' condition.

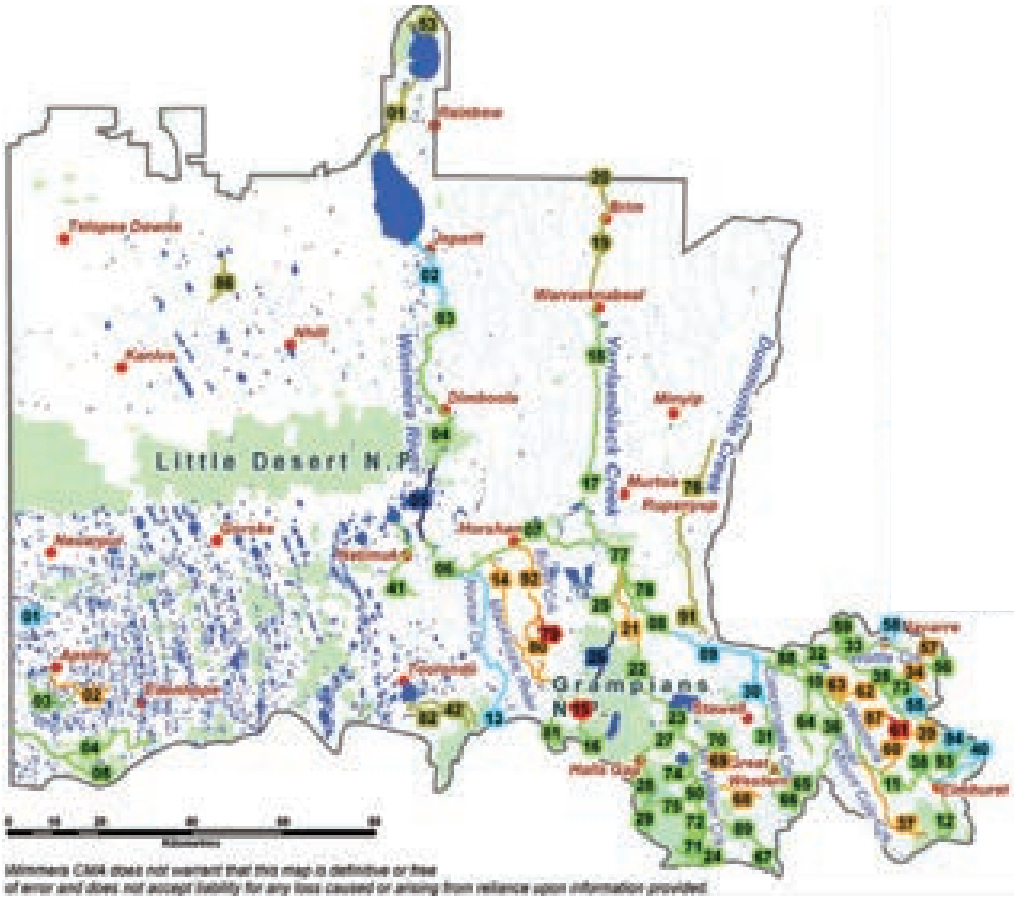
legend

River Reaches by 2004 Index of Stream Conditon (ISC)

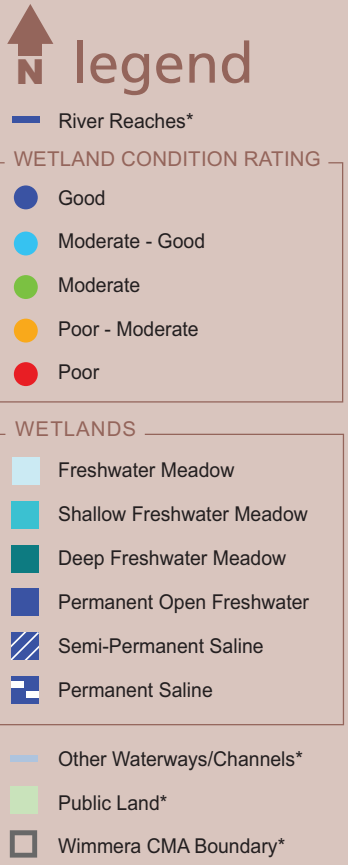
- Excellent
- Good
- Insufficient Data
- Moderate
- Poor
- Very Poor

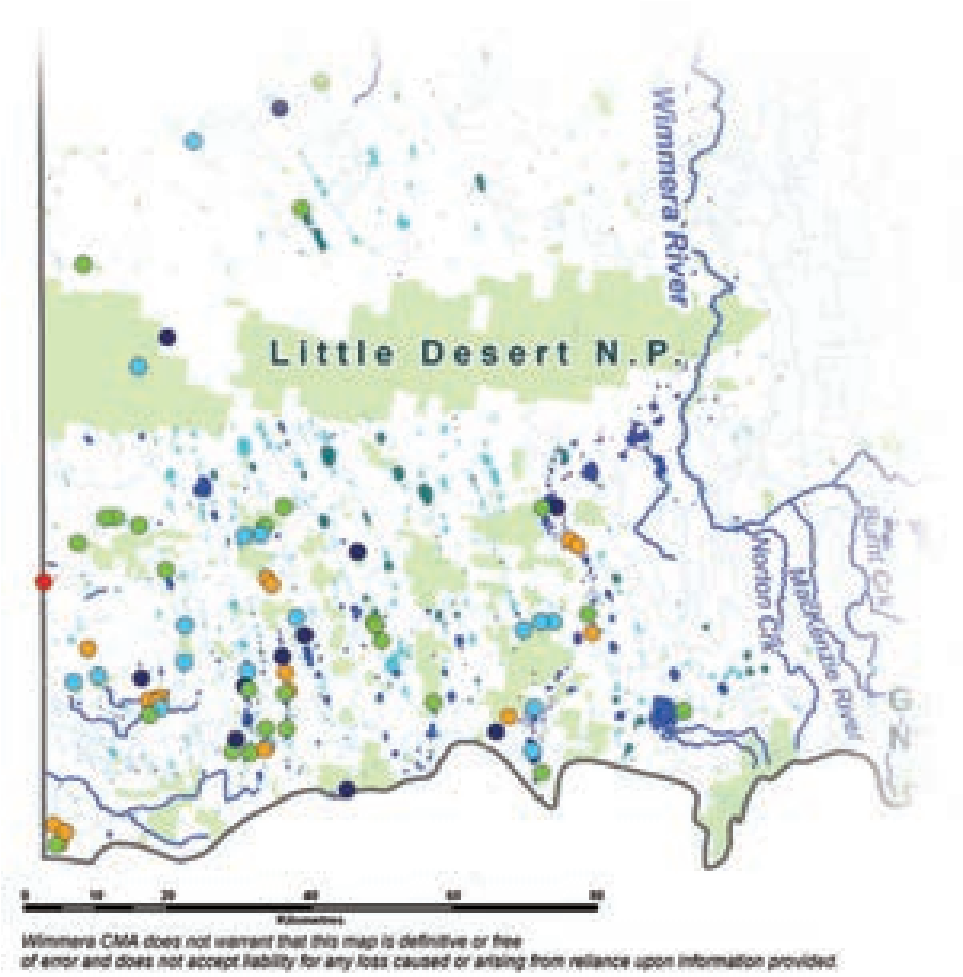
- 11 River Reach No.
- Wetlands*
- Major Towns*
- Public Land*
- Wimmera CMA Boundary*

*This data was obtained from the Department of Sustainability and Environment's (DSE) Corporate Library Database.



MAP 3 environmental condition of waterways in the Wimmera CMA region (2004 ISC)





Map 4 Wetland condition in the Wimmera CMA region assessed during the 2005 wetland condition assessment

While these preliminary investigations reveal that most wetlands are in a moderate condition, it should be noted that wetlands are being threatened by drainage works, altered flow regimes, agricultural practices and invasion of pest plant and animal species.

In the future, the condition of the wetlands in the Wimmera River and Millicent Coast basins will be determined regularly, using a state-wide Index of Wetland Condition (IWC) tool currently under development.

threats to waterway health

The Wimmera's catchment and water management planning processes have identified a number of issues that affect the health of the region's waterways. Many of these threats are interrelated and can impact on a number of key aspects of waterway health. For example, changed flow regimes greatly affect biodiversity, recreation and economic uses. Altered flow regimes can cause a decline in water quality, increased groundwater intrusion into streams and wetlands with a resultant increase in salt loads, a loss of native biodiversity (riparian and aquatic) and result in changes to the channel form. Accelerated stream erosion is reducing the availability of habitats and threatening land and infrastructure. It is also important to maintain a balance between the beneficial effects of floods on biodiversity and the loss or damage that might arise to floodplain infrastructure.

The key threats to waterway health in the Wimmera can be grouped into the following:

- Altered drainage and flow regimes
- Deterioration of water quality
- Loss of native flora and fauna biodiversity
- Changed channel form (bank and bed erosion)
- Poor floodplain management

The major causes of these threats are:

- Unsustainable water harvesting and river regulation for stock and domestic, irrigation and commercial use
- Drainage of wetlands and of paddocks to wetlands
- Increased runoff from urban areas
- Point-source and diffuse-source pollution
- Increasing salinity and rising watertables
- Riparian degradation – grazing, firewood collection, clearing for agricultural purposes
- Pest plants and animals
- Recreational pressures
- Channel form changes through increased runoff from cleared catchments, road crossings, channel works, etc
- Weirs and other instream structures creating flow barriers
- Ageing and poorly-managed waterway infrastructure
- Inappropriate development on floodplains
- Inadequate data/knowledge, limited availability and/or currency of data/knowledge
- Planning deficiencies
- Lack of adequate/appropriate community knowledge

summary

priority waterways

wimmera waterway health strategy

legend

- Priority Rivers
- Priority Wetlands

WATERWAY MANAGEMENT UNITS

1	Upper Wimmera River
2	Mt Cole Creek
3	Wattle Creek
4	Concongella Creek
5	Upper Mt William Creek
6	Lower Mt William Creek
7	Grampians
8	MacKenzie River and Burnt Creek
9	Norton Creek
10	Lake Toolondo Creek
11	Natimuk Creek
12	Heritage River
13	Terminal Lakes
14	Yarriambiack Creek
15	Dunmunkle Creek
16	Millicent Coast lakes
17	Millicent Coast west-flowing
18	Little Desert National Park
19	North from Little Desert National Park

- Major Towns*
- Wimmera CMA Boundary*

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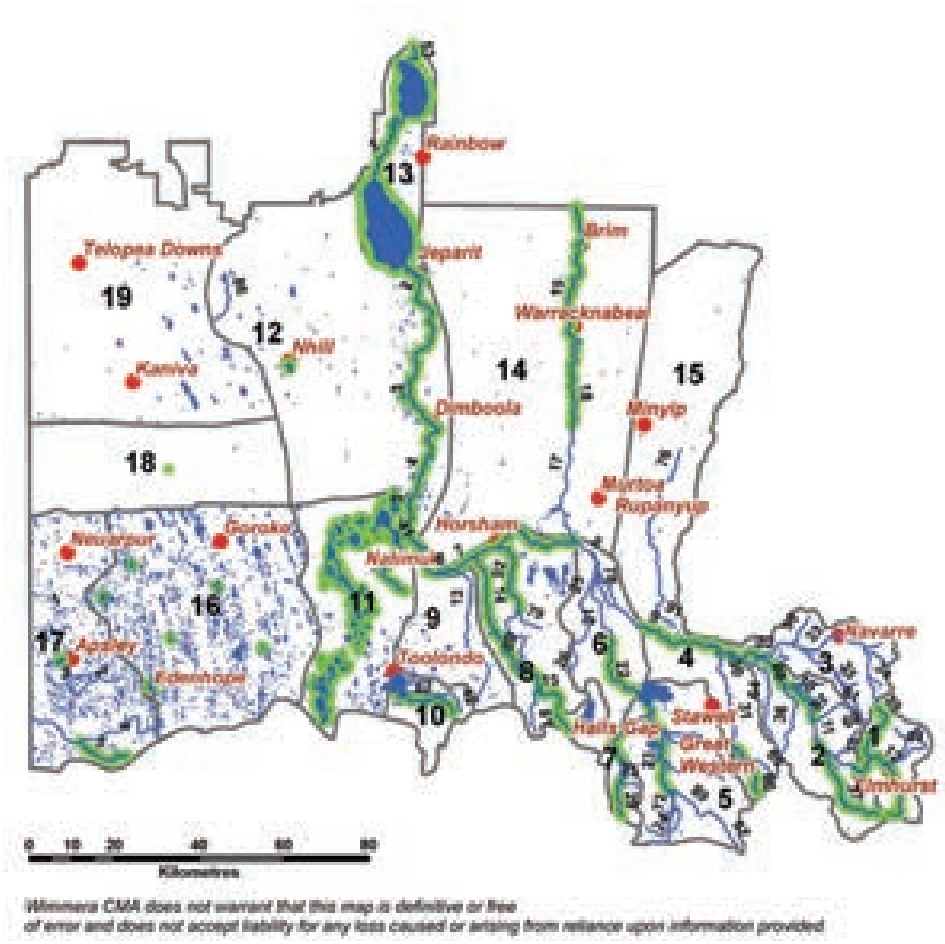

Wimmera CMA does not warrant that this map is definitive or free of error and does not accept liability for any loss caused or arising from reliance upon information provided

MAP 5 high priority waterways in the Wimmera CMA region

The *Wimmera WHS* has identified a number of waterways (reaches and wetlands) that are of high value for environmental, social, and/or economic purposes. In line with the principle of 'protect the best', the waterways that have the highest environmental, social, and/or economic values are the high priority waterways in the *Wimmera WHS* (Map 5).

Actions for these high priority waterways, as well as influencing waterways that contribute to the condition of these high priority waterways, have been developed in each Waterway Management Unit based on a risk assessment and prioritisation process undertaken as part of developing the *Wimmera WHS*.

Actions identified for high priority waterways and influencing waterways form the core of the *Wimmera WHS*.

priority actions

wimmera waterway health strategy

Setting priorities for management ensures that resources are allocated to the most important areas and issues. Prioritisation is especially critical where values are high, threats are great and resources are limited. The best use of those resources can only be directed by the information currently available.

Prioritisation of actions in individual waterway reaches in the *Wimmera WHS* was completed using a methodology that combines the level of a threat and the significance of the values in the reach. This methodology provides a ranking of values (environmental, social, and/or economic) that may be affected by various threats.

For each high priority waterway in the region, the method was used to identify priority actions for that waterway. These priority actions address the key threats that are affecting the significant values of that waterway.

Actions were also developed for influencing waterways – non-priority areas where conditions present a risk to waterway health in downstream or nearby priority reaches. These actions were mainly developed to address threats from water quality, changes to flow and pest plants and animals that might affect priority reaches.

waterway health targets

wimmera waterway health strategy

Waterway Health Targets have been set to measure achievement of the vision and goals for waterway health in the Wimmera. Three types of targets have been set:

- Aspirational Target (AT): long-term visions or goals to be achieved over 50+ years
- Resource Condition Target (RCT): medium-term goals for the condition of the resource achieved by implementing the Management Action Targets (over a 10- 20 year period)
- Management Action Target (MAT): short-term targets specific to management actions that need to be implemented to achieve progress towards the Aspirational Targets (to be conducted over a 1-5 year period)

aspirational targets

Aspirational Targets (ATs) are statements of the conditions that need to be met to achieve the vision for waterways in the Wimmera region ('Waterways for Life'). Ten ATs have been set for the *Wimmera WHS* (Table 1). They cannot be measured directly, but achieving the ATs is reliant on improving specified conditions in resources, outlined in the Resource Condition Targets (RCTs), which are achieved through the effective implementation of Management Action Targets (MATs).

Achievement of the ATs is reliant on the effective delivery of specific management actions (MATs) leading to achieving specified condition in resources (RCTs).

TABLE 1 aspirational targets for the Wimmera WHS

Aspirational Targets	
AT1.	Floodplains and floodplain wetlands of the Wimmera River Basin managed to maintain their ecosystem services while protecting social, cultural and economic assets.
AT2.	Utilise flow savings from the Wimmera Mallee Pipeline to fulfil the environmental water requirements of floodplains and floodplain wetlands in the Wimmera River Basin.
AT3.	Wetlands of the Millicent Coast Basin in an ecologically healthy condition with no loss of wetland type or extent from 1994 levels.
AT4.	To retain or re-establish natural riparian vegetation along all significant waterways and wetlands of the Wimmera region.
AT5.	Preserve reaches/waterways in geomorphologically pristine condition, restore high value reaches/waterways and rehabilitate degraded reaches through stability assessment, grade control, maintenance of structures, vegetation and stock management.
AT6.	Streams and rivers of the Wimmera region to have adequate environmental water releases to sustain ecosystem functions and processes.
AT7.	To utilise the water savings from the Wimmera Mallee Pipeline to meet environmental water requirements for waterways of the Wimmera region.
AT8.	A net increase in water quality across the Wimmera region, with appropriate water quality standards met at all high priority reaches and wetlands.
AT9.	Natural ecosystems, habitats and landscapes are conserved, restored, linked and managed to provide increased viability for significant native species and communities.
AT10.	An informed and engaged community actively participating in waterway management in the Wimmera CMA region.

resource condition targets

RCTs are pragmatic and achievable medium-term goals over a 10-20 year period. They represent the on-ground outcomes of our management actions. Key RCTs for the *Wimmera WHS*, as set out in the *VRHS*, are shown in Table 2.

TABLE 2 key resource condition targets for the Wimmera WHS

Resource Condition Targets
534.0km of river in excellent or good condition: • 27.0km maintained in excellent condition • 130.0km raised from good or moderate to excellent condition • 76.0km maintained in good condition • 301.0km raised from moderate or poor to good condition
Environmental Water Reserve established and improved flow regimes achieving environmental flow objectives in 27 high priority reaches.
A 33% reduction in total phosphorous loads from 2003 levels in the Wimmera River Basin (measured at Tarranyurk gauging station).
A 10% reduction in total salinity loads from 2003 levels in the Wimmera River Basin (measured at Tarranyurk gauging station).
786.0km of river with improved riparian condition (increased ISC streamside zone sub-index).
645.5km of river with improved physical form (increased ISC physical form sub-index)
All identified environmental and social values of the Heritage River Waterway Management Unit maintained.
Aquatic life protected in 180km of river as measured by the ISC aquatic life sub-index.

management action targets

MATs are short-term targets specific to management actions to be implemented in a 1-5 year time frame. They describe the works to be done to help achieve the ATs. Key MATs for the *Wimmera WHS*, as set out in the *VRHS*, are shown in Table 3.

TABLE 3 key management action targets for the Wimmera WHS

Management Action Targets
3,583.2ha of riparian land revegetated and/or fenced (note: 1,223.4ha identified as high priority).
3,126.9ha of riparian land under management agreement, mainly for off-stream stock watering (note: 2,292.0ha identified as high priority).
1,376.8km of river subjected to riparian weed control (note: 112.0km identified as high priority).
13 waterways (incorporating 27 priority reaches) with Environmental Water Reserve established and a negotiated environmental flow regime.
88.5km of bed and/or banks stabilised.
100km of river with improved instream habitat by reintroduction of woody debris at 18 sites.
Potential barriers to fish migration evaluated for seven Waterway Management Units where identified as a high risk.

All targets were set on the basis of the best information available at the time. Targets were set in accordance with the National Framework for Natural Resource Management Targets and the *VRHS*. Additional targets, not mandated by either of these documents, were developed for assets and programs specific to the Wimmera CMA region.

strategy implementation

wimmera waterway health strategy

The health of a waterway is a cumulative outcome of the combined impacts of land and water management within the catchment and the waterways. Improvement in the health of waterways in the Wimmera CMA region can only occur when all parties engage in the planning and implementation of the *Wimmera WHS*. The skills, capabilities and roles of individuals, organisations, Local Government and other government agencies have the potential to give effect to the Strategy; however the challenge remains to foster relationships between these groups, and to ensure that actions which achieve improvements in waterway health are undertaken in partnership.

Implementation of the *Wimmera WHS* is the responsibility of Wimmera CMA as caretaker of waterway health, in partnership with the Wimmera community and landholders, Local Government, GWMWater, and State Government agencies such as the Department of Sustainability and Environment (DSE), Department of Primary Industries (DPI), EPA and Parks Victoria. Resources from these agencies, groups and individuals need to be directed to the areas of highest priority, as identified in the Strategy, while reflecting the cost-sharing principles, also outlined in the Strategy.

Wimmera CMA is responsible for implementing the bulk of the actions identified in the Strategy. Actions to be undertaken by other agencies and individuals have been identified where possible. It is also important to note that other strategies, action plans and the like that are developed under the auspices of the *Wimmera RCS* may also contribute to waterway health, but are not directly costed or implemented under the *Wimmera WHS*.

The *Wimmera WHS* will be implemented within an adaptive management framework. The implementation of monitoring, evaluation and reporting is necessary to ensure that management actions are being implemented and are contributing to the achievement of RCTs, and ultimately conservation or improvement in the Wimmera's waterways.

With much of the knowledge in waterway health under development, the *Wimmera WHS* will be subject to periodic review to ensure that listed actions are accurate, up-to-date and based on the best available information.

Further to this, as actions are completed, priorities for ongoing actions will shift, necessitating review of the Strategy. The *Wimmera WHS* is intended to be reviewed every five years.

waterway health programs

The *Wimmera WHS* has been designed to be delivered in eight key Waterway Health Programs targeting the key areas of waterway management. The order of this listing does not reflect priority.

Program 1. Floodplain Management

Floodplain management objectives are to:

- Manage floodplains to minimise flood risk and damage to people and property.
- Enhance the ecological values of floodplain environs of the Wimmera.
- Improve our knowledge of Wimmera floodplains and their flood characteristics.
- Achieve a balance between economic, social and environmental values on Wimmera floodplains.

Program 2. Wetland Management

Wetland management objectives are to:

- Protect the high value wetlands of the Millicent Coast Basin
- Manage wetlands and wetland systems of the Millicent Coast Basin to achieve a balance between economic, social and environmental values.

Program 3. Riparian Land Management

Riparian land management objectives are to:

- Establish a regional network of protected and maintained riparian zones with high environmental value through fencing, revegetation along with grazing and pest plant and animal management.
- Protect and enhance riparian land and vegetation according to current best practice.

Program 4. Instream Habitat and Channel-form Management

Instream habitat and channel-form management objectives are to:

- Undertake on-ground management actions targeting bed and bank erosion, sedimentation and gully erosion.
- Restore diversity, habitats, connectivity and movement of instream material, through stabilising and restoring channels, banks, substrate and riparian vegetation.

Program 5. Environmental Water Reserve Management

Environmental Water Reserve management objectives are to:

- Manage the Wimmera Environmental Water Reserve to improve waterway health.
- Achieve minimum environmental water needs of priority rivers and creeks through the implementation of bulk entitlements, Environmental Water Reserve management, recognition of ecological stress, risk-based approaches, and the development of the Sustainable Water Strategy for the Wimmera-Mallee.
- Provide environmental water releases to improve water quality, enable diversity of aquatic and water-dependent flora and fauna ecosystems, and maintain channel form.
- Improve efficiency of consumptive water use to reduce the pressure on waterways through water harvesting.
- Realise savings from the Wimmera Mallee Pipeline to achieve minimum environmental water needs of priority rivers and creeks.

Program 6. Water Quality

Water quality management objectives are to:

- Coordinate water quality management projects to improve the quality of water in the region's waterways.
- Provide information on the trends in waterway health in relation to water quality.
- Implement priority waterway and catchment land management activities to improve water quality in the region's waterways.
- Work towards meeting *SEPP (WoV)* criteria for water quality.
- Limit nutrients and sediments entering waterways by reducing soil loss from dryland and agricultural areas, and reducing the impact of urban wastewater, stormwater, irrigation and intensive animal industries on receiving waters.
- Reduce the frequency of algal blooms in waterways.
- Reduce stream salinities and the impact of salinity on waterway health.

Program 7. Significant Flora and Fauna

Significant flora and fauna management objectives are to:

- Enhance the diversity and populations of native aquatic
- Protect and enhance threatened flora and fauna species and communities that rely on healthy waterways, floodplains and wetland systems.

Program 8. Communication, Education and Engagement

Objectives for communication, education and engagement in the *Wimmera WHS* are to:

- Increase knowledge and awareness of waterway health issues within our regional community.
- Develop and maintain an effective Waterwatch program that is dedicated to community education and community-based monitoring of Wimmera waterway environments.
- Engage the community in planning, and participating in actions to improve the health of waterways, floodplains and wetland systems. The community includes everyone who lives and works in the Wimmera CMA region, visitors and those otherwise connected.
- Achieve common goals across the community for waterway health.
- Establish partnerships between all stakeholders.
- Facilitate knowledge-transfer between stakeholders.
- Ensure all stakeholders have ownership of waterways and issues affecting waterway health.
- Ensure all stakeholders accept responsibility for waterway health and waterway management issues.
- Achieve a common belief/acceptance that waterway health issues need to be addressed by all stakeholders.
- Achieve an understanding of, and commitment to, compromise and tradeoffs between the often-competing needs of economic, social and environmental concerns.
- Achieve a good understanding of floodplain management, wetland management and water-sensitive urban design by key stakeholders such as Local Government and state partnership agencies.
- Reduce the number of referrals on waterway health issues between key stakeholders such as Local Government and state partnership agencies.

costs of implementing the Wimmera WHS

The indicative cost of implementing priority actions in the Strategy is approximately $11,073,500 per year, with a total of $55,367,500 identified for priority actions over five years. This investment is focused on management actions in priority and influencing waterways across the 19 Waterway Management Units of the Wimmera region (Table 4). These will be implemented by a range of partners including Wimmera CMA, DPI, DSE, EPA, Local Government, GWMWater and the community.

The indicative costs relate primarily costs for Wimmera CMA, with support from partnership agencies and the community, to implement waterway health activities as per its responsibilities as statutory waterway manager and caretaker of waterway health. Waterway health-related activities undertaken by other agencies, such as DPI, DSE, EPA, Local Government and GWMWater, have been identified and documented where possible.

The indicative costs of implementing the Strategy include funding for on-ground management actions as well as strategic planning, communication, community education and engagement, regional partnerships and monitoring, evaluation and reporting. A broader program than on-ground management actions is necessary for a successful adaptive waterway health improvement program that is informed by good science and supported by the community and land managers.

It is important to also note that the estimated funding requirements and proposed cost shares are indicative. Wimmera CMA coordinates and implements waterway health-related activities on behalf of Government, in accordance with Government polices. Government's investment in the *Wimmera WHS* is contingent on Government budgets and priorities. The timeline for implementing the Strategy and achieving the targets may need to be amended in line with funding provided.

It is also important to note that these indicative costs will be refined through the development of more detailed action plans for specific sub-catchments or issues/threats.

TABLE 4 indicative costs for implementing actions in priority and influencing reaches in the 19 waterway management units

	Waterway Management Unit	Indicative Cost ($)
01	Upper Wimmera River	5,008,500
02	Mt Cole Creek	12,073,500
03	Wattle Creek	5,965,500
04	Concongella Creek	3,777,500
05	Upper Mt William Creek	3,508,000
06	Lower Mt William Creek	2,592,500
07	Grampians	1,529,000
08	MacKenzie River and Burnt Creek	3,156,500
09	Norton Creek	1,677,500
10	Lake Toolondo Creek	621,000
11	Natimuk Creek	726,000
12	Heritage River	2,387,500
13	Terminal Lakes	2,923,500
14	Yarriambiack Creek	2,355,500
15	Dunmunkle Creek	1,498,500
16	Millicent Coast lakes	1,675,000
17	Millicent Coast west-flowing	2,237,000
18	Little Desert National Park	390,000
19	North from the Little Desert National Park	1,675,000
	TOTAL	**55,367,500***

* Total does not include the cost of implementing the Wimmera Mallee Pipeline Project.

adaptive management framework

wimmera waterway health strategy

The *Wimmera WHS* will be delivered within an Adaptive Management Framework. Adaptive management is about learning and applying what has been learnt to improve the management of operational or investment programs and is often referred to as 'learning by doing'.

Adaptive management frameworks include monitoring, evaluating and reporting.

...monitoring

is the systematic collection of data. Baseline monitoring provides the baseline social, economic or environmental data necessary for evaluating and reporting on catchment health. Targeted monitoring allows for measurement of trends or changes that may be direct or indirect results of activities.

...evaluation

is conducted to assess the efficiency, effectiveness and appropriateness of actions. Evaluation may be based on qualitative or quantitative data.

...reporting

involves the documentation of results of monitoring and evaluation. Key purposes of reporting may include accounting for expended funds or feeding data into decision-making processes.

The Adaptive Management Framework determines linkages between aspirational, resource condition and management action targets and most importantly, the actual condition of the natural resource in question. Implementation of the monitoring and evaluation necessary to apply this framework will require significant resources and coordination.

A **coordinated effort** is necessary to ensure management actions are implemented, and **contribute to achieving** resource condition targets and ultimately, protecting and enhancing Wimmera waterways.