



"Managing Resources Sustainably"

Loddon Campaspe Irrigation Region LAND & WATER MANAGEMENT PLAN Summary





Acronyms used in this publication

BCR	Benefit-Cost Ratio
CMA	Catchment Management Authority
DPI	Department of Primary Industries
G-MW	Goulburn-Murray Water
DSE	Department of Sustainability and Environment
EC	Electrical Conductivity
ha	hectare
km	kilometre
LCLWMP	Loddon Campaspe Land and water Management Plan
M	million
MAT	Management Action Target
MDBC	Murray-Darling Basin Commission
MERL	Monitoring Evaluation and Learning
ML	Megalitre
RCT	Resource Condition Target
yr	year

Acknowledgements

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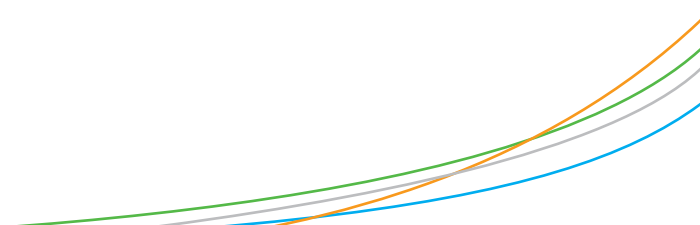
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Vision 'A diverse, proud and resourceful community achieving social, environmental and economic well-being firmly grounded in sustainable resource management.'

October 2007
Draft version 6.0



Implementation Committee's Foreword

On behalf of the regional community we have developed a Plan to build on the success of previous salinity management and regional development plans. The Plan sets regional directions and targets that integrate our land, water, environmental and people assets to achieve a sustainable and viable future.

The Loddon Campaspe Irrigation Region is experiencing the greatest level of change since the introduction of irrigation. This Plan provides opportunities for the regional community to direct change and not have to react to it. Considering where we are now the Plan provides a great foundation for going forward.

The Loddon Campaspe Irrigation Region has enjoyed real benefits from the foresight and leadership shown by community when confronted with the mounting environmental problem of salinity. Through banding together the community successfully averted an environmental disaster that would have occurred as a result of continually rising groundwater tables throughout the Loddon Campaspe Irrigation Region of northern Victoria.

The dedication and determination to overcome many environmental challenges whilst remaining productive embodied a strong individual and collective commitment to the ongoing prosperity of the Region. This same foresight and courage displayed by earlier community leaders is again required to tackle new and emerging environmental, economic and social challenges facing the Region.

This Plan is different to previous plans in that we deal with new and emerging issues including climate change, water reform and the

consequences of changing demographics. A new Healthy Productive Landscape Framework has been developed specifically for this plan. It enables the North Central CMA to integrate the targets set in this Plan with the reality of the current status of the Region. The Plan is strongly underpinned by rigorous technical understanding known and agreed to as of today. But there is major scope for the options offered to be adaptive to the changing circumstances and issues confronting and challenging us as a community. Importantly, we must have a plan that gives both public and private investors the confidence to invest in our Region.

Communities of North Central Victoria are leading the way in integrating on-farm and off-farm planning, and action, for the best possible protection and enhancement of the Region's natural assets. In this area the Plan complements current reconfiguration planning and works programs that will lead to social, economic and environmental outcomes for the benefit of the whole Region.

The Plan encourages significant investment in research, utilising technology and improving knowledge to effectively and efficiently manage our precious natural resources.

We encourage you to read the detail in the full Plan document, seek more information should you require it, but most importantly be actively involved in sustainable land and water management.

Geoff Williams, Christine Brooke, Ron Brooks, Charlie Gillingham, Neville Goulding, Barry Barnes, Bruce Macague, John McNeil
Loddon Campaspe Irrigation Implementation Committee



Geoff Williams
 Irrigation farmer at Tyntynder Flats and butchery owner in Swan Hill.



Charlie Gillingham
 Irrigation and dryland farmer at Lake Charm



Barry Barnes
 Retired mixed farmer from Boort.



Christine Brooke
 Beef producer and walnut grower at Pyramid Hill



John McNeil
 Irrigation dairy farmer at Myall



Neville Golding
 Irrigation dairy farmer at Cohuna



Ron Brooks
 Irrigation dairy farmer and grazer at Echuca West



Bruce Macague
 Irrigated cropping and fodder farmer at Rochester

Introduction

People managing land and water in the Loddon Campaspe Irrigation Region are having to adjust quickly to recent changes in Government policy. Irrigation water entitlements are being bought and sold throughout the Region, changes are being made to where and how farming occurs, people are moving from farms to live in towns and environmental values are changing as the population shifts.

Against the backdrop of one of the worst droughts on record, the Loddon Campaspe Irrigation community is being challenged to reassess how it manages natural resources across the Region.



Figure 1: The Plan Region within the North Central CMA catchment.

Government Water Policy - driving change

The management of Victoria's water resources has evolved in response to social, economic and environmental pressures. One hundred years ago, Governments allocated water to facilitate economic development with poor understanding of the impacts on the environment. One hundred years later, after experiencing changes in climate and economic market demands, social preferences have shifted from economic prosperity (at a cost to the environment) to economic sustainability. Today's priority is to protect, maintain and restore the environment so that it can be enjoyed by future generations whilst enhancing agricultural productivity.

In June 2004 the Victorian Government released its 'Our Water Our Future' action plan - a timely response to the impact of the drought, increasing water use demand by growing urban and rural-urban populations and the poor condition of Victoria's major rivers, wetlands and estuaries. 'Our Water Our Future' set out to change the way Victorians consume, manage and allocate water resources, to ensure a sustainable future for the economy, society and the environment.

Challenges facing the Loddon Campaspe Irrigation Region

The Loddon Campaspe Irrigation Region (see Figure 1) contains some of the most complex and often competing resource management issues in Victoria. The Plan has been designed to assist the Region's landholders and communities meet many of the challenges they are currently facing. However, as change occurs it invariably gives rise to additional unforeseen challenges that have not been considered by the Plan. Overcoming future challenges will require government agencies, landholders and communities to work in partnership. Some of these challenges may include:

- Understanding the risks and maximising opportunities for reconfiguration of the irrigation delivery system
- Linking on-farm and irrigation system delivery reconfiguration
- Unbundling of land and water entitlements – understanding how irrigators will manage their entitlements and their enterprises
- Understanding of how future trends in water trade effect the Region and the options available
- Balancing the increased demand for water resources for the environment, agricultural and urban use
- Implementing an effective monitoring, evaluation, reporting and learning program to enable the Plan to adapt as required
- Implementing research and development programs that provide answers to the key issues facing the Region
- Managing the ongoing impacts of salinity
- Adapting to the effects of climate change on the Region
- Improving the economic returns and efficiency of irrigation
- Understanding the impacts of taking water off land that was intensively irrigated and the opportunities it may provide
- Encouraging commercial enterprises to help manage salt and creating salt disposal credits to support land and water works
- Refining priority actions for agricultural, environmental and social outcomes to guide public and private investment
- Ensuring the future prosperity of the Region through significant new investment in modernising ageing infrastructure.

Rationale for developing a new land and water management Plan

Like all strategic natural resource management in the North Central CMA catchment the Plan is based around protecting the irrigation region's most important natural assets. The Plan provides for the best possible integration and coordination of the regional community's efforts to improve the Region's land, water and environmental assets.

Importantly, the Plan allows the regional community to maximise the opportunities to integrate policy with on-ground change to achieve the best possible outcomes on both public and private land.

This Plan gives the Region its best chance to integrate all its natural assets into one planning framework and for investment to achieve multiple outcomes across the landscape.

Achieving an increase in agricultural viability along with environmental improvements requires the community to choose from many varied and complex options. It takes a skilled community to make the choices that are in the best long-term interests of the Region. On-going skilling of the community is required so that people can adjust cope and direct change.

Recent years of low rainfall and increasing competition for water resources have put Victoria's rural water sector under the microscope. Water reform requires sensible and efficient management of water resources. Environmental water to restore stressed rivers and protect healthy waterways and wetlands, along with water for townspeople, is being sought from current irrigation allocations.

This Plan recognises the many benefits of integrating changes to water supply infrastructure with on-farm efficiency improvements to generate the irrigation system savings. Such an approach will lead to improved service delivery (water available on demand), improved agricultural productivity and environmental benefits.

The outcomes of irrigation system change are expected to further influence landholder behaviours and decisions, as well as land use. Coordinated decision making is vital to ensure the full benefits of delivery system infrastructure changes occur.

The terrestrial and aquatic environment of the Region is highly valued by the community, both within the Region and beyond. Activities associated with change must actively protect, enhance and restore priority environmental values.

For this Plan to be successful goals must be developed which are efficient, effective, innovative and adaptive. Achieving the goals of the Plan must generate improvements to regional assets. Plan activities will need to generate multiple benefits - e.g. water use efficiency, water savings and habitat enhancement - whilst mitigating the off-site impacts of irrigation.

Who produced this Plan?

The Loddon Campaspe Irrigation Implementation Committee is responsible for overseeing strategic land and water management across the Region.

This committee consists of individuals drawn from across the Loddon Campaspe Irrigation Region to represent the community's views concerning natural resource management within the Region. The Implementation Committee oversaw the development of this Plan on behalf of the community.

The Plan continues to build upon the foundation established by the region's previous four salinity management plans, regional development initiatives and the Loddon Murray Land and Water Management Strategy. Regional issues have changed substantially since the previous irrigation salinity management plans were developed and natural resource management has broadened from a focus on salinity to a broader range of land, water and environmental issues.

The Goulburn Broken CMA provides day-to-day land and water management services in the Rochester/Campaspe area via the Shepparton Irrigation Region Catchment Strategy.

The North Central CMA will lead strategic land and water management as well as providing other natural resource management services across the Rochester/Campaspe area for biodiversity, river health, floodplain and environmental flows.

All natural resource management services are consistent between both CMAs.

The Implementation Committee utilises local knowledge and expertise to advise the North Central Catchment Management Authority (CMA) Board on natural resource management. North Central CMA, in partnership with Departments of Primary Industries (DPI) and Sustainability and Environment (DSE), and Goulburn-Murray Water (G-MW), provide technical support to the Implementation Committee.

The North Central Catchment Management Authority (CMA) is responsible for strategic natural resource management across the entire North Central catchment. By managing change the North Central CMA aims to achieve increased agricultural productivity, enhanced environmental values and improved social well being. In the Loddon Campaspe Irrigation Region particular emphasis is placed on the on-going management of salinity.



This Plan is different to previous plans in that it deals with new and emerging issues including climate change, water reform and the consequences of changing demographics.

How the Plan was developed

Previously, strategic land and water management was successfully achieved via five geographically defined salinity management plans (Campaspe West endorsed by Government in 1990, Tragowel Plains 1990, Kerang Swan Hill 1993, Boort West of Loddon 1994 and Torrumbary East of Loddon 1996), and a regional development plan (Loddon Murray 2000+, 1999-2001) (see Figure 2).

When new challenges and issues began to emerge, community members combined the previous six plans into a new integrated strategy in 2002. Rapid change since 2002 has required the development of new approaches to assist the community in tackling the new land and water management challenges.

More than 100 community members were consulted during the development of the revised strategy in 2002. Additional community groups have contributed to the development of this Plan through to 2007, as well as agency and stakeholder group members.

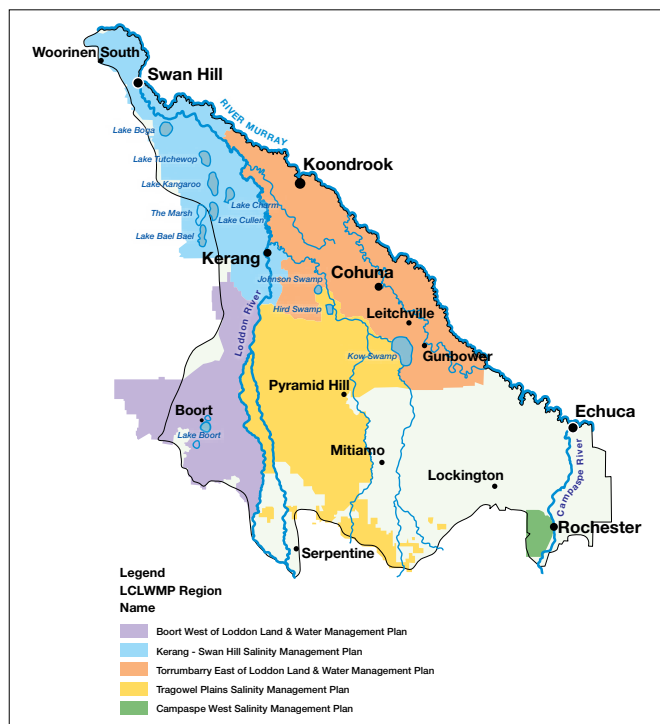


Figure 2: Previous Salinity Management Plan boundaries in the Loddon Campaspe Irrigation Region.



Figure 3: A Framework for achieving a “Healthy Productive Landscape.” For detail see the full Plan document.

Healthy Productive Landscape Framework

A new Healthy Productive Landscape (HPL) Framework, developed specifically for this Plan, enables the North Central CMA to integrate the targets set in the Plan with the reality of the current status of the Region, e.g. climatic conditions, water reform and the policy options available at the time.

The Plan adopts an ‘asset-based’ approach to managing the Irrigation Region’s natural resources. Assets are those biophysical elements of the region that provide productive, social or intrinsic services. The main asset groups are land, water, biodiversity, people and climate (see Figure 3). An asset-based approach to land and water management planning forms the basis of strategies for protecting, rehabilitating and managing natural resources that the community believes are important.

By developing new approaches the regional community can react positively to change, rather than be affected by it. This requires an understanding of the regional assets, threats and risks to assets, critical areas for targeted investment, new and existing tools to achieve meaningful change, targets with different levels of detail and a process by which change can be measured and better understood.

Individually these facets can achieve a certain level of change, but when combined into an integrated approach, then strategic and targeted intervention in the landscape will achieve far greater results. This has given rise to the development of the HPL framework that focuses on achieving a healthy and productive landscape across the Loddon Campaspe Irrigation Region.

Implementing the Plan

Following endorsement of the Plan by the North Central CMA Board the role of the Implementation Committee will switch to one of overseeing the Plan's implementation. In particular, the Implementation Committee will consider performance through the Plan's Monitoring Evaluation Reporting and Learning Framework. The Implementation Committee will draw on its local knowledge and expertise to ensure the activities undertaken through the Plan are progressing towards achieving the Plan's targets. The Implementation Committee will also advise the North Central CMA Board on the implementation of the Plan.

Implementation will largely be achieved through the strong partnerships that exist between the North Central CMA and the agencies and groups responsible for achieving the on-ground works in natural resource management across the Region. These include the Departments of Primary Industries (DPI) and Sustainability and Environment (DSE), and Goulburn-Murray Water (G-MW), along with Local Governments, Community groups and Landcare groups.

Justification for the Plan

In assessing the soundness of the Plan consideration has been given to the potential economic, environmental and social impacts, and the perceived risks under the 'with' and 'without' Plan scenarios. The Plan has a 30-year timeframe and is justified as follows:

- The Plan is financially attractive with a Benefit-Cost Ratio (BCR) of 1.94 and a Net Present Value of over \$271 million
- Landowners will contribute nearly 70% of the total incremental cost to implement the Plan, being \$287 million
- The total economic benefit of the implementation of the Plan is estimated to be \$4.2 billion. This includes significant new investment in modernising ageing infrastructure that will help ensure the future prosperity of the Region.
- The economic benefits are considered a conservative estimate and do not include the expected financial benefits attributed to salt mitigation works and the volume of water to be saved through improvements in farm and water service delivery efficiencies
- Government investment in the Plan will lead to an increase in landowner investment in the Loddon Campaspe Irrigation Region and achieve significant environmental benefits
- Taking into consideration both the economic and environmental benefits to be delivered through the implementation of the Plan, the projected incremental Benefit Cost Ratio (BCR) from a Government perspective is 4:1 (i.e. there will be a return of \$4 for every dollar invested). From the landowners' perspective, the financial BCR is 1.9:1 (i.e. there will be a return of \$1.90 for every dollar invested).

Natural environment of the Loddon Campaspe Irrigation Region

The Loddon Campaspe Irrigation Region covers approximately 713 876 ha of diverse land types. The major townships of the region are Swan Hill, Kerang, Cohuna, Echuca, Rochester, Serpentine, Boort and Pyramid Hill.

The region is recognised and valued worldwide for its environmental features. Soil types are varied, comprising sandy loam, clay and mottled duplex soils. The Region has a mild climate, with rainfall between 440 mm to 370 mm annually. The Region's major river systems are the lower reaches and floodplains of the Loddon, Avoca and the Campaspe. The River Murray forms the northern boundary of the Region. Other important waterways within the Region are the Gunbower, Bullock, Mount Hope, Pyramid, Barr, Wandella and Sheep Wash Creeks.

Major floodway systems flow in a northerly direction down the Loddon, Campaspe and Avoca Rivers. The extensive Kerang Lakes system comprises over 120 wetlands ranging from freshwater to hypersaline. Of the 120 wetlands, 23 are listed under the Ramsar convention as being wetlands of international importance. A further 25 wetlands are listed in the Directory of Important Wetlands in Australia and six wetlands are listed on the Register of National Estate.

The Region maintains a diverse range of native flora and fauna, with over 1 367 native flora and fauna species recorded. While the Region supports a diverse abundance of native flora and fauna the extensive fragmentation of the Region's native vegetation and wetlands has resulted in the loss of important regional biodiversity. The Region is home to important native fauna such as the Freckled Duck, the Growling Grass Frog, Murray Cod, Grey Crowned Babbler, Bush Stone Curlew and the Brolga.



This Plan provides the community with options and tools to integrate asset management and achieve a healthy, productive landscape.



The community is working to balance the increased demand for water resources, increasing agricultural production and protecting environmental features.

Table 1: Farm area, water use and gross margin, Loddon Campaspe Region.

	Total property area ¹ (ha)	Total irrigated area ¹ (ha)	Total water use ¹ (ML)	Total gross margin
Dairying	86 635	70 493	419 852	\$576/ML ²
Mixed	263 294	170 234	519 079	\$110/ML ³
Horticulture	8 985	5 381	21 636	\$525-\$2767/ML ⁴
Dryland	112 806		-	\$160/ha ³
TOTAL	358 914	246 108	960 567	

Sources: 1: Douglass, et al. (1998); 2: Australian Dairy Farmers, Melbourne (2007); 3: DPI Kerang (2007); 4: DPI Swan Hill (2007) [Table grapes \$525/ML, Nectarines \$2767/ML].

Life style farming in the Region is becoming increasingly popular, particularly in areas within close proximity to larger regional towns and areas with high environmental amenity value.

Productive landscapes of the Loddon Campaspe Irrigation Region

The Region's gross agricultural value of production is \$370 million from 359 000 hectares of farmland (see Table 1). The Region's main farming types are dairying, cropping, livestock (beef and sheep) and horticulture. Figure 4 illustrates the pattern of land use occurring across the Region.

Over 90% of the land is privately owned with a majority of this land being used for irrigated agriculture. The remaining 10% of public land is made up of wetlands, waterways and forests.

Table 1 provides an overview of the Region by farming enterprises and area, their respective water use and gross return per megalitre of water used.

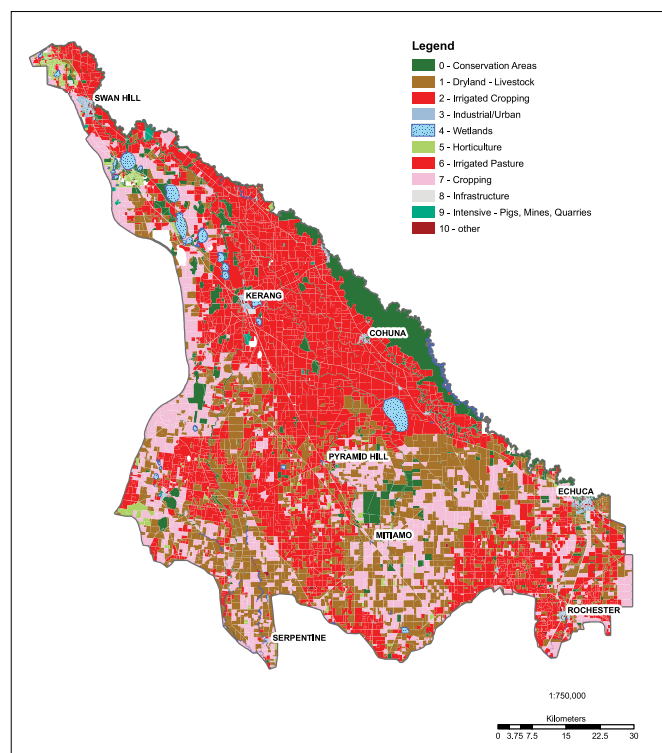


Figure 4: Map of land use Loddon Campaspe Irrigation Region.

Depth to Groundwater

There have been significant improvements in groundwater levels across the Region since the development and implementation of salinity management plans in the 1990s. It is important however to acknowledge that the improvements in groundwater levels across the Region have been strongly influenced by the cumulative effects of the dry years since 1996. Table 2 summarises the changes in depth to groundwater between 1990 to 2004.

Table 2: Depth to watertable (1990, 1994, 2004).

Depth to Watertable	1990 Area (ha)	1994 Area (ha)	2004 Area (ha)
<2m	494 593 (80%)	406 598 (66%)	50 804 (8%)
2 to 5 m	111 448 (18%)	201 129 (33%)	432 544 (70%)
>5m	10 582 (2%)	8 896 (1%)	133 113 (22%)

Source: 1: Theiss, 2004. (also see Figure 5).

Salinity has been, and will continue to be, a major challenge for the Loddon Campaspe Regional community (see Figure 6). The Region is a net accumulator of salt. Maintaining watertable depths below two metres from the surface will achieve significant improvements for regional and downstream assets.



The community aims to ensure all groundwater resources are sustainably managed with no adverse off-site impacts.

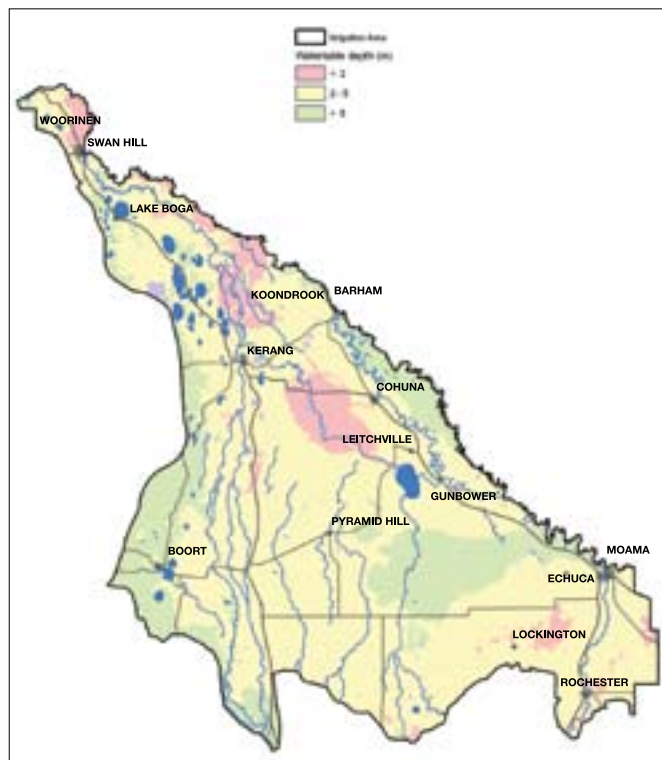


Figure 5: Map of Watertable Depth across the Loddon Campaspe Irrigation Region. Source: NCCMA, 2007.

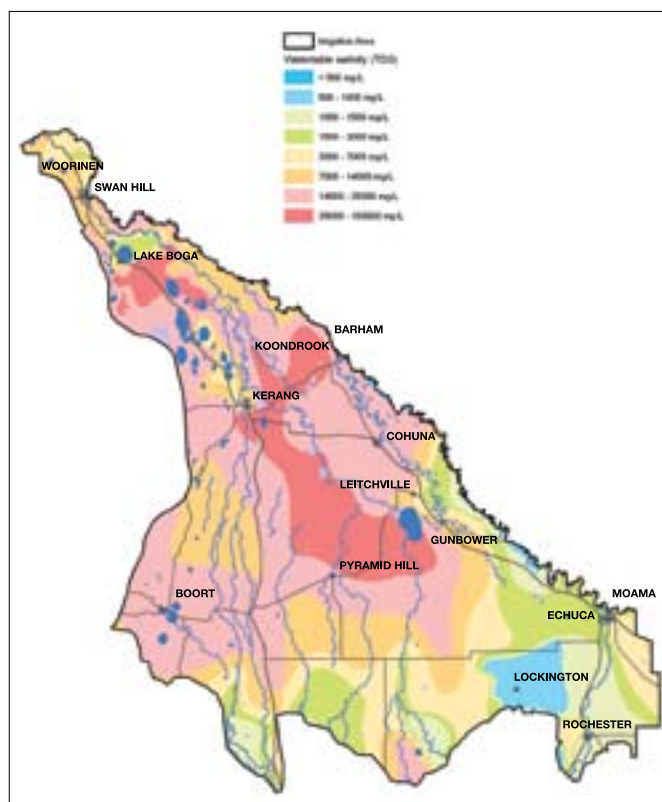


Figure 6: Map of Watertable Salinity across the Loddon Campaspe Irrigation Region. Source: NCCMA, 2007.

A strategic approach to regional land and water management

The strategic approach to achieving a sustainable future for our natural resources and community viability will always require us to adapt to changing circumstances. Government policy will change, people will adjust, and the landscape will alter when put under stress such as drought and flood.

This Plan has been structured so that the base elements are consistent for the longer-term. It takes into account that the natural resources of land, water and the environment will always be an important asset, and that the influence of people on these assets will continue to be a priority. All base elements require strategic planning and targeted development to ensure sustainability and viability across the Region.

The Plan is built on five recurring themes. Each theme has 30-year aspirational goals to improve the condition of natural resources. Each goal is associated with a resource condition target (RCT). Resource condition targets have 20-year timeframes and are more specific than aspirational goals (see Figure 9). Clearly this Plan is one of generational change with the current and the next community of irrigators sharing responsibility for its implementation.

In order to improve the condition of a resource, specific actions must be undertaken. Each action has a target and these targets are grouped into projects. Management action targets (MATs) have five-year timeframes and generally relate to specific on-ground works.



The Plan complements current irrigation system reconfiguration planning and works programs.

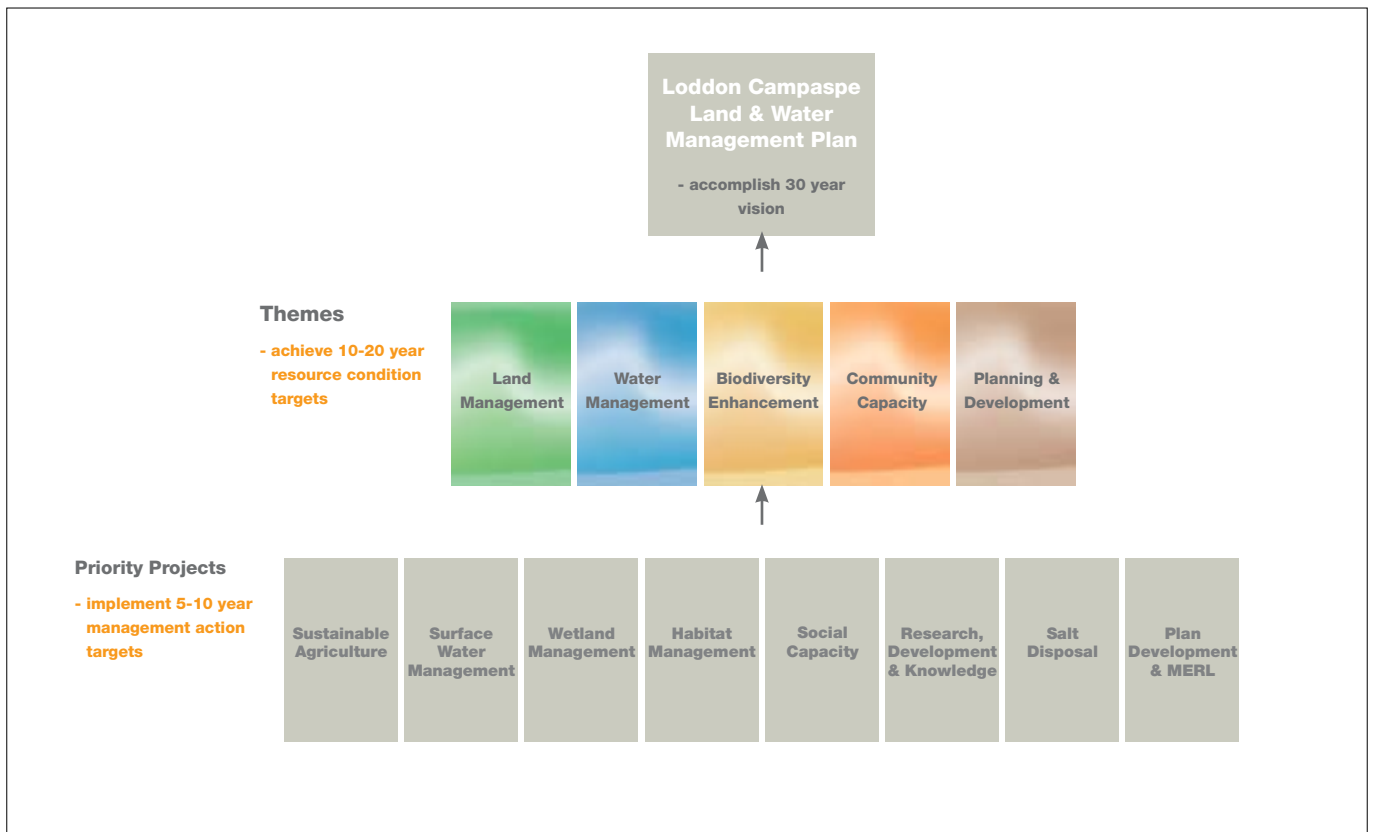


Figure 7: Linking the priority projects with the Plan's vision.



Five themes for achieving sustainable natural resource management

The Plan is built upon five recurring themes sourced from information provided by the community and Government.

For sustainable natural asset management to occur it is essential that land, water and the environment are managed competently into the future. It is therefore vital that the local community has the skills and capacity to carry out such management. All issues must be translated into meaningful actions for the future wellbeing of the Region.

While each theme can be viewed as a stand alone element of the Plan, there is clear overlap and integration in their delivery. Only by taking a holistic approach to addressing the five themes can the success of the Plan be realised (see Figure 8).



Figure 8: The interrelationship between the five themes (also see Figure 9).

Land Management

Sustainable land management seeks to ensure healthy soils, water and vegetation. Land use is matched to its capability, long-term agricultural and environmental productivity is enhanced; regional communities are resilient and prosperous.



Horticulture returns the highest gross margin per megalitre of water use in the Region.

The resource condition targets for the land management theme are:

- Increase the gross value of agriculture from \$370M to \$510M
- Increase the area with depth to watertable more than two metres from the surface under average conditions to 80% of the Region
- Reduce irrigation induced runoff from farms by at least 20% or 930 ML per year
- Improve on-farm Water Use Efficiency by 10%
- Reduce the land affected by water logging by 150 000 ha
- Reduce the area of regionally controlled weed infestations (1 500 ha) by 80%
- Reduce the number of pest animal sitings
- Achieve zero area net soil loss of more than 2 tonnes/ha
- Stabilise the area of land with sodicity (Exchangeable Sodium Percentage > 6%)
- Protect and maintain all traditional owner and European heritage sites
- Reduce flood damage by setting conditions on infrastructure built in floodplains.



Land management places equal importance on agricultural land and the natural environment.



Mixed farming occurs on approximately 68% of the irrigated land in the Region.

Water Management

Water management is a key issue in the Loddon Campaspe Irrigation Region. Determining and managing the competing needs of the beneficiaries of the Region's limited water resources is a difficult and complex task. The drought has heightened the complexity of this issue and has driven the state and federal water reform agenda.

The resource condition targets for the water management theme are:

- Increase the average agricultural production per ML of water used (based on the 2006 figure of \$364/ML) to at least \$700/ML by 2026
- Reduce the amount of water lost by evaporation and seepage during transportation and storage through the irrigation delivery system to 75% supply system delivery efficiency
- Full compliance with Murray-Darling Basin Commission Cap on diversions and with Living Murray and other environmental flow allocations
- Reduce the nutrient loads entering the Loddon River by 30 tonnes of phosphorous and 96 tonnes of nitrogen
- Reduce the nutrient loads entering the Campaspe River by 18.6 tonnes of phosphorous and 43 tonnes for nitrogen
- Reduce the nutrient loads entering the River Murray from the Loddon River by 30 tonnes of phosphorous and 100 tonnes of nitrogen
- Reduce the nutrient loads entering the River Murray from the Campaspe River by 18.6 tonnes of phosphorous and 43 tonnes of nitrogen
- Full compliance with the Murray-Darling Basin Salt Disposal Entitlement Agreement, including accountability arrangements
- Ensure all groundwater resources are sustainably managed with no adverse impacts (or unacceptable trade-offs)
- 25% reduction in the number of weeks of algal blooms
- Full compliance with the water quality objectives as set out in the State Environmental Planning Policy (Waters of Victoria).



The Plan encourages significant investment in research, utilising technology and improving knowledge to effectively and efficiently manage our precious natural resources.



There have been significant improvements in groundwater levels across the Region since the development and implementation of Salinity Management Plans in the 1990s.

Biodiversity Enhancement

The future protection and enhancement of the Region's biodiversity values depend on the strategic management of native vegetation, wetland, stream and riparian environments. The flora and fauna depends on the health of these systems to survive.



The terrestrial and aquatic environment of the Region is highly valued by the community, both within the Region and beyond.



The community aims to maintain and improve the viable populations of significant threatened and endangered species, such as the Growling Grass frog.

The resource condition targets for the biodiversity enhancement theme are:

- 10% increase in quality of vulnerable and endangered ecological vegetation classes (EVC) and a 10% increase in quality of other EVCs with <15% of pre-1750 distribution
- Improve the coverage of all vulnerable or endangered EVCs and any other EVCs with less than 15% of pre-1750 distribution by 10% (as measured by habitat hectare)
- Increase the extent of native vegetation coverage to 15% of the Irrigated Region
- Maintain and improve the viable populations of significant threatened species (including threatened flora, fauna and migratory birds) by complying with targets and indicators set out in Statewide bioregional planning principles
- Zero biological extinctions
- Maintain, and where possible, increase the condition (state of the biological, physical and chemical components of the wetland ecosystem and their interactions) of all priority wetland types
- No further decline in the extent (number and area) of all priority wetland types
- Improve the health of regional priority waterways by improving flow regimes, in-stream habitat and the health and connectivity of riparian vegetation
- At least 56 000 ha of floodplain to receive water appropriate to ecosystem maintenance.



The Murray Cod is an icon species of the Region's diverse range of flora and fauna.

Community Capacity

Building community capacity provides the community with the appropriate skills and tools to manage its land and water resources, influence management decisions and to adapt to an ever changing environment.

The resource condition targets for the community capacity theme are:

- Ensure the social and economic well-being of the community, while delivering environmentally sustainable outcomes
- Aim for at least 40% of population with the knowledge and understanding of current and emerging best practice opportunities
- Aim for at least 20% of population actively involved in natural resource management decision making
- Aim for at least 40% of population with access to natural resource management resources
- Community leadership at all levels of development to support effective land and water resource management
- 30% of natural resource management agency staff have active ties with the community.



Photo by Tom Lowe, courtesy of Goulburn-Murray Water

Implementing the Plan will help ensure the social and economic well-being of the community, while delivering environmentally sustainable outcomes.



Community priorities have set the direction for the planning and development of sustainable and viable land and water management in the Region.



A skilled community is required to make the choices that are in the best long-term interests of the Region. On-going skilling of the community will help people to both adjust and cope with change.

Planning and Development

Strategic planning and development of efficient, productive and coordinated management of land and water resources in the Region is vital in delivering an adaptive Plan. Attracting investment to realise opportunities to redevelop land and water resources for improving environmental, social and economic outcomes is vital.



We must have a Plan that gives both public and private investors the confidence to invest in our Region.

The resource condition targets for the planning and development theme are:

- Improve our understanding of all natural resource management risks and threats
- Ensure effective sharing of information within and between stakeholders
- Involve relevant stakeholders in NRM decisions to strengthen collaborative partnerships, achieving multiple land and water resource management outcomes consistent with regional development objectives
- 100% compliance with Murray-Darling Basin Salinity Management Strategy salt disposal entitlement allocation
- Shared understanding and expertise with all levels of government in the development of policies and strategies impacting on the Region's natural resources
- 100% implementation of an adaptive monitoring, evaluation, reporting and learning framework that demonstrates the effectiveness of land and water resource management in the Region.



The Plan is based around protecting the Region's most important natural assets.

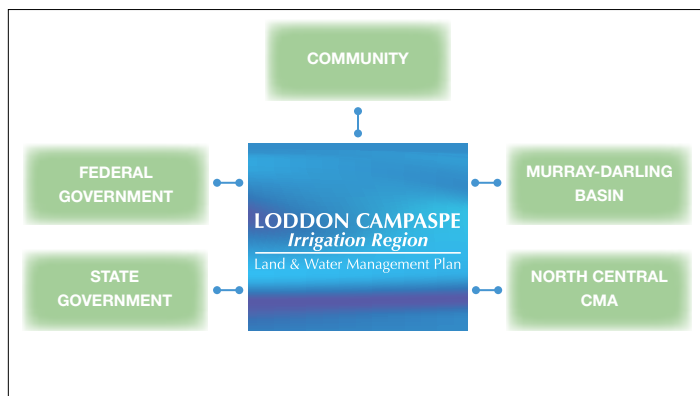


Figure 9: Stakeholder relationships with the Plan.



Priority Projects

The five themes are supported by eight priority projects designed to address issues of primary importance across the Region.

These are:

1. Sustainable Agriculture
2. Habitat Management
3. Wetland Management
4. Surface Water Management
5. Social Capacity
6. Salt Disposal Management
7. Research Development and Knowledge
8. Plan Development, Monitoring, Evaluation, Reporting & Learning.

A priority project integrates one or more components and targets from the themes. It provides strong linkages throughout the Plan and a holistic approach to asset management.



Project 1 Sustainable Agriculture

This project provides options to improve agricultural productivity via incentives, information and education. The project focuses on farming systems that integrate many aspects of farm and natural resource management.

Farmers in the Region are encouraged to undertake soil salinity surveys to ensure farm development occurs according to soil capability. Soil surveys are generally a prerequisite for the development of a whole farm plan, which is a prerequisite for a succession of additional on farm works. Whole farm plans ensure that any money invested in property development is well spent, and that farm works do not interfere with regional drainage, environmental or cultural features, or floodplain hydraulics.

This project incorporates the following activities:



MAT	On Ground MAT Description	Target	Timeframe
SUS-1	Ensure that all development satisfies "Irrigation Development Guidelines"	100% compliance	2026
SUS-2	Increase the number of approved whole farm plans for irrigated cropping, horticulture, mixed farming and dairy industries (Plan Preparation Only)	72 500 ha	2026
SUS-3	Increase the area of land surveyed to understand soil salinities	72 500 ha	2026
SUS-4	Increase area of laser assisted landforming	72 500 ha	2026
SUS-5	Increase the area supplied by sprinkler and micro irrigation systems in the Region	800 ha	2026
SUS-6	Increase the area of fenced out C and D class soils	900 ha / 180 km fencing	2026
SUS-7	Increase the understanding of cropping best management by implementing 20 practice trials	20 trials	2026
SUS-8	Increase the productivity of land by implementing double cropping	500 ha	2011
SUS-9	Improve irrigation scheduling through increasing the use of such things as soil moisture monitoring equipment use	720 additional properties with irrigation scheduling	2026
SUS-10	Increase (number and length) farm drains constructed to carry irrigation run off to irrigation reuse systems	2 450 km	2026
SUS-11	Increase the number of irrigation tailwater reuse systems installed	555	2026
SUS-12	Increase the number and extent of farm supply channels that are automated	525	2026
SUS-13	Increase the length of farm supply channels which are piped	4 500 ha	2026

Project 2 Habitat Management

This project aims to protect and enhance terrestrial and riparian environmental values through focusing on habitat values on private property. Strategic revegetation across the Region is targeted towards priority species and linking existing remnant vegetation patches enhancing the quality and increasing the extent of vegetation adjacent to wetlands and along waterways, as a part of a bioregional approach to vegetation management.

Remnant protection is focused on securing existing high value remnant vegetation through a range of activities, including legal agreements and fencing. The project will also implement activities listed under Recovery Plans for five nationally listed threatened species.

The project uses education, extension and incentives to protect and enhance vegetation cover and the extensive network of waterways and wetlands.

This project incorporates the following activities:



MAT	On Ground MAT Description	Target	Timeframe
HAB-1	Develop and implement a Bioregional Action Plan according to Statewide bioregional planning principles	Implement an annual adaptive bioregional action program	2021
HAB-2	Improve instream habitat by restoring indigenous vegetation and improving water quality	15 km river reach	2011
HAB-3	Increase the area of riparian vegetation protected, enhanced and managed by fencing	500 ha /125 km fencing	2011
HAB-4	Enhance, increase and rebuild the area of indigenous/local-origin (Lignum Swampy Woodland, Plains Grassy Woodland & Riverine Chenopod Woodland) vegetation	1 100 ha	2011
HAB-5	Increase the number and area covered by legal conservation covenants and other legal agreements	500 ha increase	2011
HAB-6	Increase the area of ecological vegetation classes of indigenous/local-origin vegetation protected by fencing and enhanced management.	700 ha	2011
HAB-7	Implement appropriate controls and measures to reduce the area affected by pest plants (terrestrial and aquatic)	Establish 20 target areas for Victorian priority and Regional priority weeds	2011
HAB-8	Implement appropriate controls and measures to reduce the sighting intensity of pest animals	90% compliance of participating landholders within identified and priority target areas. Annually, establish a target area to implement pest control programs. Conduct biannual spotlight transects to monitor pest numbers.	2011
HAB-9	Map the extent and quality of existing remnant vegetation on private land in the Region	7 500 ha	2011
HAB-10	Implement appropriate works and measures to protect the traditional owner and European heritage	100% protection	2011
HAB-11	Populations of endangered, vulnerable or threatened flora and fauna managed according to best practice (Recovery Plans).	100% compliance with Commonwealth and Statewide threatened species management program	2010

Project 3 Wetland Management

This project aims to minimise risks to wetlands, while maximising benefits to environmental values. Wetland types that have decreased in coverage are considered priorities for protection and enhancement. Improving water management in wetlands is a key focus of the project through integrated wetland operational plans, flow regimes and adjoining land management practices. On-ground works includes fencing, regulatory structures for water management, pest flora and fauna control, monitoring and other wetland health measures.

The project focuses on developing integrated Wetland Operational Plans in partnership with all stakeholders to identify and implement appropriate water management in wetlands. This ultimately maintains or improves wetland condition in the Region. The project will also deliver region-wide wetland awareness raising activities.

The project uses education, extension and incentives to protect and enhance vegetation cover and the extensive network of waterways and wetlands.

This project incorporates the following activities:



MAT	On Ground MAT Description	Target	Timeframe
WET-1	Develop an adaptive wetland action program that utilises current knowledge and understanding to foster sustainable wetland management	Develop an annual wetland action program	2021
WET-2	Identify and map wetland ecological vegetation classes of priority wetlands	Mapping of EVCs of priority wetlands	2021
WET-3	Implement wetland operational plans to increase the area of wetland ecological vegetation classes protected or enhanced in priority wetlands	Implementation of 5 wetland operational plans	2021
WET-4	Identify water requirements for priority wetlands in wetland operational plans to ensure the effective use of any environmental water allocation	Develop requirements for 5 wetland operational plans	2021
WET-5	Improve the understanding of hydrological and hydrogeological processes and interactions in priority wetlands	Completion of 15 research projects	2021
WET-6	Increase the understanding of altered irrigation management practices and future water trade impacts on the Region in order to maintain or enhance the condition of existing priority wetlands	Undertake an annual research activity	2021
WET-7	Restore proper floodplain function to lower catchment wetlands (as recommended in approved North Central CMA Floodplain Management Plans)	5 wetland works	2021

Project 4 Surface Water Management

This project coordinates water management in the Region, including surface water management, irrigation tailwater management and floodplain management. It involves specialists from the private and public sectors, key stakeholders including landholders and local government, environmental interests groups and technical experts.

Using a “whole-of-catchment” approach, the project will address long-term management roles and organisational responsibilities for sharing the ongoing operational requirements for over 1 000 km of community/government funded infrastructure. Regional works and measures such as the implementation of surface water management systems, strategic diversions, nutrient reduction re-use systems and the development of drainage course declarations are a focus of the project.



This project incorporates the following activities:

MAT	On Ground MAT Description	Target	Timeframe
SUR-1	Construction of the high priority Benwell Primary Surface Water Management Systems	18 km	2011
SUR-2	Construction of Community Regional Surface Water Management Systems	367 km	2021
SUR-3	Implement water quality and management action monitoring and reporting, as per the Irrigation and Drainage signatories to the Memorandum of Understanding	Implementation of actions	2026
SUR-4	Increasing the number of drain diverters and the volume of water annually diverted	11	2026
SUR-5	Increasing the number and length of waterways covered by Drainage Course Declarations	2 / 230 km	2016
SUR-6	Establish Water Management Schemes in the Tragowel Plains and Wandella Creek Catchment areas (to ensure that the Regional Surface Water Management Systems are sustainably managed)	2	2016
SUR-7	Ensure compliance with Groundwater Management Area or Groundwater Supply Protection Area requirements to avoid long-term reduction in level, water quality or pressure of water resource aquifers	100% compliance	2016
SUR-8	Construction of the high priority Barr Creek Primary Surface Water Management Systems	13 km	2016
SUR-9	Construction of Nutrient Reduction Reuse Systems	65	2021
SUR-10	Upgrading of priority Primary Surface Water Management Systems	200 km	2021
SUR-11	Restore the functionality of the floodplain by removing banks and levees (as per North Central CMA Floodplain Management Plan)	1 500 ha returned to active floodplain	2016
SUR-12	Increase the level of floodplain management assistance to local government through planning schemes to reduce flood damage	300 floodplain planning permits processed annually	2026
SUR-13	Support actions to achieve 11 000 ML of water savings for allocation to the environment	100% compliance	2021
SUR-14	Support water authorities to achieve an average water delivery system efficiency of 75%.	75% water delivery system efficiency	2021

Project 5 Social Capacity

The social capacity project will help build the skills of individuals and communities. It will facilitate communication between individuals and groups in the community and organisations. It seeks to build awareness and understanding by people so they can be involved and can support initiatives to improve natural resource management. The project will implement interlinked activities to build sufficient capacity within communities for them to better manage land and water resources.

This project incorporates the following activities:



MAT	On Ground MAT Description	Target	Timeframe
SOC-1	Develop an adaptive community engagement program that utilises current knowledge and understanding to foster sustainable land and water management	Develop an annual community engagement program	2011
SOC-2	Provide information on innovative tools, and technologies designed to increase the productive and sustainable use of the Region's natural resources	4 workshops run/yr 12 media articles/yr 5 field days attended/yr	2011
SOC-3	Undertake and present 3 case studies which demonstrate innovative approaches to farm management that have also produced sustainable natural resource management outcomes	3 case studies/yr	2011
SOC-4	Develop coordinated and integrated partnerships with financial planning service providers within the Region	2 partnerships established	2011
SOC-5	Encourage the establishment of new, and support existing, farming groups within the Region to build their capacity to undertake important leadership roles	4 training courses/yr 100 landowners attended a training course/yr	2011
SOC-6	Facilitate the collection, storage and promotion/reporting of the diversity of local knowledge and experience and utilise this information to build and develop natural resource management capacity in the Region	12 feature articles published/yr 12 local stories publish on database/website per year	2011
SOC-7	Develop mentoring programs whereby the natural resource management knowledge and experience of community members is utilised to support other lesser experienced community members (including younger farmers)	10-15 new landowners participating in mentoring programs/year	2011
SOC-8	Develop appropriate processes to ensure community involvement and participation in natural resource management decision making (e.g. development of a community involvement strategy involving variety of community groups)	20% of community involved in decision making	2011
SOC-9	Develop programs and activities in collaboration with education providers, to ensure regional natural resource management activities and issues are actively communicated and presented within the education system both internally and externally to the Region	10 educational providers exposed to NRM issues	2011
SOC-10	Develop the necessary skills and abilities in service providers to enable them to assist local groups achieve sustainable natural resource management outcomes	15 service provider employees undertake skill awareness training per year	2011
SOC-11	With existing organisations in the Region identify, encourage and facilitate the establishment of new commercial, agricultural and industrial opportunities for the Region	Provide support to and encourage the establishment of 2 new enterprises in the Region	2011

Project 6 Salt Disposal Management

Salinity management is an obligation under the Murray-Darling Basin Salinity Management Strategy. This Region is required to meet 'end of valley' targets and to meet the salt disposal protocols associated with drainage schemes and the operation of salinity interception works.

This provides accountability for our actions and also those of other regions in the Murray-Darling Basin to manage salt effectively.



This project incorporates the following activities:

MAT	On Ground MAT Description	Target	Timeframe
SAL-1	Develop the North Central CMA MDBC Schedule C - Salt Register A and Salt Register B	Development of Register	2008
SAL-2	Maintain the North Central CMA MDBC Schedule C - Salt Register A and Salt Register B	Satisfying reporting requirements	2016
SAL-3	Undertake investigations to enable existing reductions in salt disposal from the Region to be included on the MDBC Salt Register A or Salt Register B	22 EC reduction	2011
SAL-4	Identify, cost and prioritise potential new works and measures that will mitigate salt disposal from the Region	Completion of 5 research projects	2011
SAL-5	Implement high priority cost effective works and measures to achieve salt disposal reductions (within budget constraints).	10 EC reduction	2026

Project 7 Research Development and Knowledge

This project, in partnership with other priority projects, ensures that key issues are researched and workable options developed. The knowledge gained will be disseminated across priority projects to ensure consistent land and water management is achieved as effectively and efficiently as possible.

The project will identify future public and private agricultural and environmental works that could deliver a net gain to the Region and the basin.



This project incorporates the following activities:

MAT	On Ground MAT Description	Target	Timeframe
RDK-1	Develop an adaptive program that utilises current best practice to foster sustainable land and water management	Develop an annual research and development program	2011
RDK-2	Investigate the value, risks and threats to natural resources in the Region	Identification of value, risks and threat	2011
RDK-3	Increase the understanding of improved irrigation management practices to reduce the off-site impacts of irrigation	Undertake an annual research activity	2011
RDK-4	Understand the implications of water trade within and external to the Region	Undertake an annual research activity	2011
RDK-5	Develop options to synergise irrigation supply system efficiency with on-farm efficiency upgrades and environmental enhancement	Undertake an annual research activity	2011
RDK-6	Undertake research into the development and use of new technology to foster sustainable natural resource management	Undertake an annual research activity	2011
RDK-7	Improve the understanding of the market drivers and their influence in the Region	Undertake an annual research activity	2011
RDK-8	Improve the understanding of the potential impact of climate change on achieving sustainable natural resource management outcomes in the Region	Undertake an annual research activity	2011
RDK-9	Encourage varied and effective dissemination of current research and development information to natural resource managers throughout the Region.	Develop an annual adaptive knowledge strategy	2011

Project 8 Plan Development, Monitoring, Evaluation, Reporting & Learning

This project provides strategic planning and supports governance functions that are necessary to coordinate land and water management across the Region and manage the interfaces between the Plan and external environments.

The project also ensures appropriate and coordinated monitoring, evaluation, reporting and learning is undertaken across land and water management activities in the Region to gauge achievements and success.

This project incorporates the following activities:



MAT	On Ground MAT Description	Target	Timeframe
MERL-1	Monitor and routinely report changes in asset condition as a result of Plan implementation	Implementation of an appropriate monitoring, evaluation reporting and learning framework	2011
MERL-2	Ensure the continued adoption of current best practice in management of the Regions natural resources	Develop an annual strategy to adapt the Plan to best practice natural resource management	2011
MERL-3	Involve all land and water managers in making strategic decisions about natural resource management in the Region	Develop a Governance framework to capture all natural resource management decision making in the Region	2011
MERL-4	Improve the understanding of current and future government policies and strategies and their impact on the implementation of the Plan	100% incorporation of relevant government policies into regional land and water management	2011
MERL-5	Foster networking and cooperation between key Plan stakeholders	Develop and implement a communication strategy involving regional natural resource management stakeholders	2011
MERL-6	Develop a process which would allow improved sharing information between key natural resource management stakeholders	Develop and implement an natural resource management information sharing process.	2011
MERL-7	Undertake a formal detailed review of the LCLWMP in 2011.	Completion of 5-Year review	2011

Monitoring, Evaluation, Reporting and Learning Framework (MERL)

The MERL framework is an important part of the Plan. It provides a set of processes that will help stakeholders to:

- Monitor the state of the natural environment in the Region by coordinating data collection from all projects implemented under the Plan
- Evaluate and demonstrate the contribution of the Plan's priority projects and other contributing projects towards an improvement in the resource condition of the themes identified in the Plan
- Report accurately on the management of natural resources
- Provide accountability to investors and Plan stakeholders, while informing them about the benefits of implementation
- Generate performance details and knowledge to inform investment cycles and to improve and refine the Plan (adaptive management)
- Form part of the community education and engagement program.

It will continue to evolve over the coming years as more detailed information and processes develop. Below is a simple model of the MERL framework.

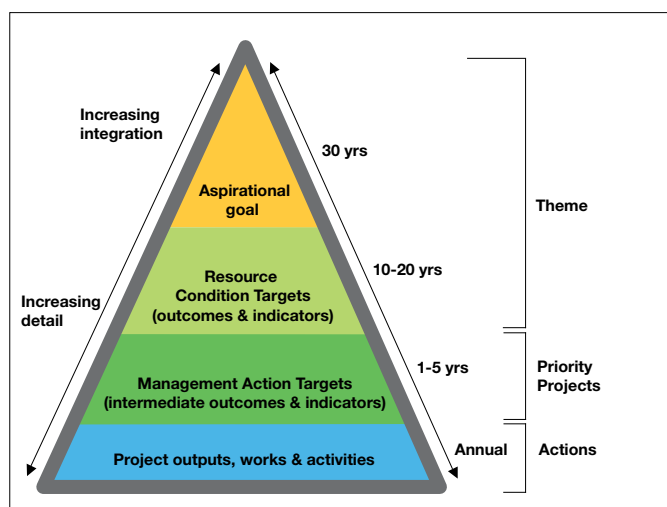


Figure 10: Monitoring, Evaluation, Reporting and Learning Framework.

Achievements to date

Successful land and water management has been achieved in the Region since 1990 and aimed to address: watertable trends; water and soil salinity; water and land use; the natural environment; and economic development.

In terms of achievement against key indicators:

- The depth to watertable has shown a dramatic reduction in area of depth to watertable less than two metres from the surface. This has been attributed to a combination of improved irrigation practices and drought.
- Soil salinity and water quality was stabilised. Water quality was addressed in terms of salinity and nutrients; and
- There was a shift from lower value enterprises to high value enterprises, mainly dairying and horticulture.

To summarise success against outputs, 14 out of the 18 outputs achieved 80% or greater than the stated total targets for the years reported. For example soil salinity surveys have been completed for 83% of the irrigated land in the Region.

Table 3: Performance against key output indicators 1990 to 2006.

Summary of Output Achievements	Total
Area of soil salinity surveys (hectares)	203 875
Number of whole farm plans	1 832
Area of whole farm plans (hectares)	179 931
Number of irrigation water reuse systems installed (*many others without incentives)	399
Area of remnant vegetation protected (hectares)	868
Remnant vegetation enhanced (number of trees planted)	803 450
Length of surface water management schemes (km) (Bullock Creek Irrigation Trust and Community Surface Water Management)	850

The way forward

The Loddon Campaspe Irrigation Region is a region undergoing significant transformation as a result of long and short-term pressures driving change. This land and water management plan has been developed to enable landholders and the community to respond to many challenges and opportunities facing the Region.

The Plan enables the Region to manage its natural resources more sustainably whilst improving the state of the natural environment as well as the economic and social prosperity of the Region. This will require landholders, communities, regional bodies and governments to work collaboratively as the Region moves towards achieving its long-term goal of being a *diverse, proud and resourceful community achieving social, environmental and economic well-being firmly grounded in sustainable resource management.*



Photo by Tom Lowe, courtesy of Goulburn-Murray Water



Investors and partners in this Plan



