Lake Mulwala

Land and On-water Management Plan
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Acknowledgement

Many people have assisted in the development of the Plan and we thank them and acknowledge their input. They include members of the community who have spent many hours talking through issues, and members of the Steering Committee listed in Appendix A.
Executive Summary

Many different sectors of the community regard Lake Mulwala as a valuable resource. Lake Mulwala is important because it provides:

- water for irrigation, domestic and stock use;
- recreation and tourism opportunities;
- regional economic benefits;
- biodiversity conservation values; and
- a social and cultural focus for the towns of Yarrawonga and Mulwala.

It is critical that these multiple uses are managed in an integrated way to ensure they are sustainable in the long term.

The Lake Mulwala Land and On-water Management Plan begins the task of realising the vision for Lake Mulwala as part of a healthy working River Murray system, managed for water supply, environmental, recreational and tourism needs.

To achieve the vision for Lake Mulwala the Plan has identified five key outcomes as:

- a clearly identified planning and development framework for activities at Lake Mulwala;
- improved water quality in Lake Mulwala;
- improved ecological health of Lake Mulwala;
- safe use of Lake Mulwala; and
- a community committed to the sustainable use of Lake Mulwala.

Part A of the Plan describes the context and need for the Plan. Part B sets out the strategies and actions required to achieve the five key outcomes identified.

Some of them require co-ordination of current management activities, others will be developed over time, building on the co-operative approaches developed through the planning process.

The series of strategies and actions presented in this Plan to achieve these outcomes are designed to be realistic and achievable.

The Living Murray Initiative, which commenced after the Lake Mulwala project, is about restoring the health of the River Murray and the Murray-Darling Basin. Decisions made concerning environmental flows as part of the Living Murray may have a bearing on the future operating level of the lake. The possible economic benefits arising from Living Murray projects will be weighed up against any economic and social impacts.

The Lake Mulwala Land and On-water Management Plan does not itself provide for any changes to the way in which the lake is operated. Any future changes to operating rules to meet the goals of the Living Murray project would only be implemented following comprehensive environmental and social impact studies and further extensive community consultation.

Consultation has been an important part of the development of this Plan. The planning process has stirred strong views within the local community, and the responses and feedback received during the consultation process have helped to clarify the issues that are presented in the Plan.
Partnerships between governments, regional bodies and the community are essential to maintain and enhance the social, economic and environmental values of the lake.

The establishment of a Community Reference Group will be an important step towards engaging the community in the long term management of Lake Mulwala. This group will provide advice to Goulburn-Murray Water, the NSW Department of Infrastructure, Planning and Natural Resources, the Murray-Darling Basin Commission and other partner agencies in relation to Lake Mulwala, help prioritise the implementation of actions in the Plan and provide a link between the management agencies and the community.

The Lake Mulwala Land and On-water Management Plan is a dynamic document. It brings together the current understanding of the issues relating to the management of Lake Mulwala but will continue to evolve as the various plans and strategies that it identifies are developed and implemented. Consultation and increased awareness will be critical to achieving the goal of protecting Lake Mulwala’s important values and assets. It is proposed that this Plan be reviewed every five years in order to provide an opportunity to incorporate changes due to the dynamic nature of the planning process and assess the progress with implementing the actions in the Plan.
PART A

Introduction
## About Lake Mulwala

### 1.1 Lake Mulwala facts and figures

Lake Mulwala is the water storage created by Yarrawonga Weir, the largest of the Murray-Darling Basin Commission’s 16 weirs. With a surface area of approximately 4,390 hectares, Lake Mulwala has a storage capacity of 118,000 megalitres (ML).

### 1.2 History of Lake Mulwala

The first proposal for a River Murray weir to provide water for irrigation downstream of Albury was in 1885 at Bungowannah, however there were engineering constraints with this site and opposition from local landholders. It was not until 1934 that the then River Murray Commission (now the Murray-Darling Basin Commission) granted approval for the building of Yarrawonga Weir (Figure 1) further downstream.

Yarrawonga Weir was constructed for the River Murray Commission by the State Rivers and Water Supply Commission of Victoria. Construction was completed in 1939. Today the weir is operated and maintained by Goulburn-Murray Water under the direction of the Murray-Darling Basin Commission. Funding for its operation and maintenance is provided by the states of New South Wales, Victoria and South Australia. The Australian Government shares the costs of construction with the three states, including costs of the $12.9 million upgrading completed in 2002.

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**Figure 1** Location of Lake Mulwala on the River Murray
1.3 Importance of Lake Mulwala

Lake Mulwala allows the diversion of water from the River Murray through the Mulwala Canal to Murray Irrigation Limited’s irrigation areas in New South Wales for the irrigation of rice, pastures and other crops as well as for domestic and stock use. Water is also diverted south to Goulburn-Murray Water’s Murray Valley Irrigation Area in Victoria where it is used in horticulture, viticulture, pasture and other crop production as well as for domestic and stock use. The West Corrugan pumped irrigation system also relies on water from Lake Mulwala. Bulk water supplies for domestic, commercial and industrial use in the Yarrawonga and Mulwala townships are drawn directly from Lake Mulwala.

A total of 1.68 million megalitres was diverted in 2000-2001 for irrigation purposes. The farmgate value of production generated from the irrigated lands totalled $538 million (1996-97 economic data). The value to the regional economy is approximately $1.6 – $2.7 billion (based on a multiplier of 3-5). Since much of the output of agricultural production is also exported, there is also considerable benefit to the national economy.

Lake Mulwala is one of the few storages along the River Murray used for both water supply and irrigation that retains a near constant level. During normal operating conditions, the water level fluctuates by about 0.5 metres (between 124.60 and 125.15 m AHD) and from time to time for flood operation and maintenance purposes the lake has been drained completely.

The near constant level of the lake arises because Yarrawonga Weir is designed to raise the water level in the River Murray so that gravity diversion is possible. The near constant level also means that the lake is well suited to a range of water-based recreational activities such as fishing, sailing, canoeing, rowing and waterskiing. Consequently, Lake Mulwala supports a thriving regional tourism industry and has attracted considerable development into the neighbouring towns of Mulwala and Yarrawonga as well as around the perimeter of the lake, in particular at Bundalong in Victoria.

It is estimated that the population of the Yarrawonga–Mulwala area increases by up to 7,000 people during the summer peak period beginning in December at Christmas time. The holiday season at Yarrawonga–Mulwala extends until after the Easter holidays each year. Some of these people visit friends and relatives as Yarrawonga–Mulwala has a high proportion of retirees. Some stay at the many caravan and tourist parks or at the numerous motels in the towns. Other people use their holiday homes, while large numbers of people camp out on the land adjoining the lake and on the islands in the lake.

Tourism in Yarrawonga-Mulwala results in visitors to this region making a major contribution annually to the local economy.

Although Lake Mulwala is a constructed lake, it plays an important role from an environmental perspective. It provides valuable habitat for a variety of flora and fauna, in particular fish and bird species. The lake is an important breeding ground for the Murray cod.
1.4 Role of Lake Mulwala in the management of the River Murray

Lake Mulwala is the greatest single point of diversion of irrigation flows from the River Murray and as such plays a vital role in regulating water flows to the irrigation areas to the north and south of the river. The weir also has a hydro-electric power station and a fish lift to facilitate the upstream movement of fish past the weir.

Over the past 80 years, increasing water consumption has significantly altered the natural flow regime in the River Murray. In its natural state the River Murray carried high flows in winter and spring and was low in summer and autumn. Today that regime has been reversed. During winter, flows are low as winter inflows are stored in the major upstream dams. During summer and autumn, flows are high to meet irrigation demands downstream.

Downstream of Yarrawonga Weir the River Murray passes through the Ramsar listed Barmah-Millewa Forest. Channel capacity in the river between Hume Dam and Yarrawonga Weir is 25,000 ML/day, however as it reaches the Barmah-Millewa Forest the river’s capacity is reduced to only 10,000 ML/day.

With river levels through the ‘Barmah choke’ near the top of the bank for most of the summer, any minor increases in flow due to local storms or storms in the Ovens and Kiewa catchments result in unseasonal flooding of the forest. In addition, the same local storms may reduce irrigation demand, even though the water to meet that demand may already be in transit from Lake Hume.

The combination of local rain and temporary reduction in irrigation demand produces a ‘rain rejection’, which results in a combination of a rise in the level of Lake Mulwala and flooding of the Barmah-Millewa Forest. The capacity of a lake to hold water above its normal operating or target level is known as ‘air space’. Thus, the more air space that is maintained in Lake Mulwala, the less unseasonal flooding occurs. At Lake Mulwala increasing air space means lowering the target level, which may impact on the capacity for irrigation demand to be met in the Yarrawonga and Mulwala canals.

1.4.1 Murray–Darling Basin Ministerial Council

The Murray-Darling Basin Ministerial Council is the primary body responsible for providing the policy and direction needed to implement the Murray-Darling Basin Initiative\(^1\), which promotes and coordinates sustainable management of the basin’s resources. The Ministerial Council was established at a meeting of Government Ministers in Adelaide in 1985 and its operation is specified in the Murray-Darling Basin Agreement.

The Ministerial Council comprises the Ministers responsible for land, water and environmental resources within the contracting governments (i.e. Australian government and the governments of the states of New South Wales, Victoria, South Australia and Queensland. The Australian Capital Territory also participates in the Murray-Darling Basin Initiative through a Memorandum of Understanding with the contracting governments).

\(^1\) MDBC (2002)
The Ministerial Council’s main functions are to:

- consider and determine major policy issues of common interest to the contracting governments concerning effective planning and management for the equitable efficient and sustainable use of the water, land and other environmental resources of the Murray-Darling Basin; and
- develop, consider and, where appropriate, authorise measures for the equitable, efficient and sustainable use of such water, land and other environmental resources.

1.4.2 Murray–Darling Basin Commission

The Murray-Darling Basin Commission is the executive arm of the Murray-Darling Basin Ministerial Council and is responsible for:

- managing the River Murray and the Menindee Lakes system of the lower Darling River; and
- advising the Ministerial Council on matters related to the use of the water, land and other environmental resources of the Murray-Darling Basin.

The Commission is an autonomous organisation equally responsible to the governments represented on the Ministerial Council and the Ministerial Council itself.

The main functions of the Commission are to:

- advise the Ministerial Council on the planning, development and management of the basin’s natural resources;
- assist Council in developing measures for the equitable, efficient and sustainable use of the basin’s natural resources;
- coordinate the implementation of or, where directed by Council, implement those measures; and
- give effect to any policy or decision of the Ministerial Council.

The Commission is also required to equitably and efficiently manage and distribute the water resources of the River Murray in accordance with the Murray-Darling Basin Agreement to obtain the highest achievable quality and efficiency of use of such resources.

The Commission works cooperatively with the partner governments, committees and community groups to develop and implement policies and programs aimed at the integrated management of the Murray-Darling catchment. It also manages and distributes the water of the River Murray in accordance with the Murray-Darling Basin Agreement. This cooperative approach reflects the importance placed on government-community partnerships, benefits from shared concerns and expertise, and enables the development of integrated solutions. It also avoids duplication of effort.
1.4.3 **Role of management authorities**

River Murray Water (a business unit of the Murray-Darling Basin Commission) manages the river system to ensure that available water is distributed to South Australia, Victoria and New South Wales in accordance with the *Murray-Darling Basin Agreement*.

River Murray Water shares and supplies water to the states through three main processes:

- assessing future availability of water;
- accounting for actual use of water; and
- regulating river flows.

Under the *Murray-Darling Basin Agreement* the State of Victoria is responsible for the management of Yarrawonga Weir with Goulburn-Murray Water being the designated management or ‘constructing’ authority for Lake Mulwala.

Goulburn-Murray Water has appointed a Land and Water Management Officer for Lakes Hume and Mulwala to support the management of all foreshore lands around the lakes for and on behalf of the Murray-Darling Basin Commission in New South Wales and Victoria.

The Department of Infrastructure, Planning and Natural Resources, representing New South Wales as a state contracting government, is able to grant all powers, licences or permission to Goulburn-Murray Water as may be necessary for the construction, operation or maintenance of any works, implementation of any measures and carrying out of any operation required pursuant to the agreement within New South Wales.

**Land tenure at Lake Mulwala**

One of the main aims of this Plan is to implement similar management strategies around the lake. Land ownership around the lake is different in New South Wales and Victoria (Figure 2) and this affects the way some strategies can be implemented.

As the designated constructing authority for Yarrawonga Weir, Goulburn-Murray Water owns and manages most of the land surrounding the Victorian side of the lake, on behalf of the Murray-Darling Basin Commission.

This land is either freehold title in the name of Goulburn-Murray Water, Crown Land vested in Goulburn-Murray Water or Crown Land reserved for water supply purposes (and is under the control and management of Goulburn-Murray Water). There is also some Crown Land reserved for forest purposes on the Ovens River Arm immediately downstream of the Murray Valley Highway Bridge. This land is under the control and management of Parks Victoria.

In New South Wales most of the submerged land is held as freehold title by the Water Administration Ministerial Corporation. Much of the other land around the lake is held in private freehold title, with easements attached. Most of this land is covered by flood easement but a variety of other easements also exist. These include easements for drainage and right of way, public works and storage purposes. Other land in New South Wales has been appropriated for storage purposes and vested in the Ministerial Corporation in the form of the Minister for Public

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Figure 2

Land Tenure at Lake Mulwala

Legend

- Public land
- NSW land tenure
- Vic land tenure

Metres

0 1,500 3,000 4,500 6,000
Works. There is also Crown Land administered by the Department of Lands and a travelling stock route (Kyfinn’s Reserve) administered by the Rural Land Protection Board. Further public land is under the control and management of the Corowa Shire Council by way of trusteeship.

Government agencies involved in various aspects of management of Lake Mulwala are listed in Appendix B.

1.4.4 Lake Mulwala and the Living Murray Initiative

The Murray-Darling Basin Ministerial Council has as its vision for the Living Murray Initiative 3:

… a healthy River Murray system, sustaining communities and preserving unique values.

The Ministerial Council recognises both the complexity of the environmental flows issue and the need for certainty in the communities relying on irrigated agriculture. Its strong desire is to manage the resources of the River Murray and its tributaries to protect its environment, while enhancing the social and economic benefits obtained from water use.

The Living Murray Initiative, which commenced after the development of the Lake Mulwala Land and On-water Management Plan, is working towards restoring the health of the River Murray and the Murray-Darling Basin. The determination of the optimum ‘target level’ for Lake Mulwala is the subject of continuing study as part of the Murray-Darling Basin Commission’s Living Murray Initiative. All of the projects covered by the Living Murray program will weigh up the possible environmental benefits against any economic and social impacts.

In the specific case of looking for options to better manage rain rejections at Lake Mulwala in order to achieve healthier outcomes in the Barmah-Millewa Forest, there will need to be extensive economic and social impact studies, specifically relating to Lake Mulwala. These studies have not been commenced, nor even scoped.

In relation to options to better manage rain rejections, the Murray-Darling Basin Commission will:

- complete all necessary environmental, social and economic studies;
- consider a wide range of engineering and operational responses;
- present the findings of these studies to the community as the basis for meaningful discussion;
- hold discussions with the community; and
- report the outcome of those discussions to the Murray-Darling Basin Ministerial Council, which will determine what, if any changes to current operating rules will be implemented, including any works to facilitate such changes.

The possibility that the Murray-Darling Basin Commission may, as a result of the Living Murray process, in the future seek to operate the lake below the lower bounds of the historic operating levels (124.60 and 125.15m AHD as measured at the weir), is outside the scope of this Plan.

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3 Murray-Darling Basin Ministerial Council (2002)
Need for this Plan

This Plan has been developed as a result of increasing concerns by Goulburn-Murray Water, the Department of Infrastructure, Planning and Natural Resources and the Murray-Darling Basin Commission about issues relating to the use of Lake Mulwala and its foreshore lands.

Issues of particular concern included:

- inappropriate planning around the lake (such as private buildings on or too close to public land);
- increasing incidence of unauthorised construction or activities by private citizens on public foreshore land;
- increasing concerns of the impacts of development on water quality;
- health impacts of unregulated camping around the lake;
- conflicts between on-water users of the lake; and
- differences in policy and legislation between New South Wales and Victoria.

2.1 Objectives of the Lake Mulwala management study

Lake Mulwala is operated as a water supply body by Goulburn-Murray Water on behalf of the Murray-Darling Basin Commission. Given its primary purpose of supplying water for irrigation, the main objectives of the Lake Mulwala management study were to:

- ensure management of the lake does not adversely affect its future operation as a water storage and supply asset;
- identify key issues for the management of the foreshore;
- identify and develop strategies to protect and improve water quality;
- obtain commitments to appropriate management from key agencies responsible for the management of Lake Mulwala and its foreshore;
- establish a framework for future development;
- outline key actions to be implemented over the next 5 – 10 years to protect the lake and its foreshore;
- prepare a management plan (this document); and
- identify resources and strategies for implementation of the management plan.

2.2 An integrated approach to water management

The issues associated with the management of water resources are currently being addressed at the national and regional level, as shown in the examples below.

In 1994 the Council of Australian Governments agreed to the Strategic Water Reform Framework for Australia. This supports the National Water Quality Management Strategy which seeks as its primary objective “to achieve sustainable use of the nation’s water resources by protecting and enhancing their quality while maintaining economic and social development.”

The National Water Initiative was agreed to by the member jurisdictions of the Murray-Darling Basin in July 2004. The National Water Initiative covers a range of areas in which

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4 ANZECC (1994)  
5 COAG (2004)
greater compatibility and the adoption of best-practice approaches to water management nationally will bring substantial benefits. In particular, the National Water Initiative will result in:

- expansion of permanent trade in water bringing about more profitable use of water and more cost effective and flexible recovery of water to achieve environmental outcomes;
- more confidence for those investing in the water industry due to more secure water access entitlements, better and more compatible registry arrangements, better monitoring, reporting and accounting of water use, and improved public access to information;
- more sophisticated, transparent and comprehensive water planning that deals with key issues such as the major interception of water, the interaction between surface and groundwater systems, and the provision of water to meet specific environmental outcomes;
- a commitment to addressing overallocated systems as quickly as possible, in consultation with affected stakeholders, addressing significant adjustment issues where appropriate; and
- better and more efficient management of water in urban environments, for example through the increased use of recycled water and stormwater.

The National Action Plan for Salinity and Water Quality has provided the impetus for the development of integrated catchment/regional management plans by communities. Some 21 priority catchments have been identified across Australia, including the Murray (NSW) catchment which includes Lake Mulwala.

In its publication Integrated Catchment Management in the Murray-Darling Basin 2000-2010, the Murray-Darling Basin Ministerial Council sets out a “call to communities and governments to protect the health and productivity of the Murray-Darling Basin.”

In the publication the Council also recognises that:

We need to radically change the management and use of Basin resources in order to maintain healthy ecosystems and productive land use … The way forward requires changes in land use, changes in management practices, and changes in the way communities and governments work together.

The Murray-Darling Basin Initiative is a cooperative arrangement between the community and governments including the New South Wales, Victorian and Commonwealth governments. It seeks to put into practice the purpose of the 1992 Murray-Darling Basin Agreement, which is “to promote and co-ordinate effective planning and management for the equitable, efficient and sustainable use of the water, land and other environmental resources of the Murray-Darling Basin”. The Murray-Darling Basin Initiative includes the Living Murray program which is discussed in section 1.4.4.

The Water Sharing Plan for the NSW Murray-Lower Darling Regulated Rivers Water Sources focusses on the improvement of water quality in the NSW Murray-Lower Darling. It aims to “achieve a healthy River Murray and Lower Darling system, sustaining communities and preserving unique values.”

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6 COAG (2000)
7 Murray-Darling Basin Ministerial Council (2001)
8 DLWC (2003)
Lake Mulwala is situated on the north-western edge of the Ovens Catchment in Victoria. The North East Catchment Management Authority is seeking to address issues of natural resource management in this catchment through a range of strategies and priorities including the *Rural Land Stewardship Pilot Program*\(^9\), *North East Salinity Strategy - Reversing the Trend*\(^10\), *Ovens Basin Water Quality Strategy*\(^11\), *Upper North East Water Quality Strategy*\(^12\), *Draft North East Regional Vegetation Plan*\(^13\), *Ovens Basin Water Quality Strategy*\(^14\) and the *North East Regional Rural Drainage Management Strategy*\(^15\).

The Murray catchment of New South Wales includes Lake Mulwala on its southern side. The *Integrated Catchment Plan for the Murray Catchment 2002 - Murray Catchment Blueprint*\(^16\), which includes social, economic, water, soil health and biodiversity objectives, aims to provide water of a quality to meet human, agricultural, industrial and environmental requirements. The Blueprint specifically acknowledges that “water is one of the Murray’s most valuable assets, which underpins the existence of human settlement, the survival of many of the catchment’s industries and environmental well being.”

Recently the NSW Government announced new natural resource management reforms. Catchment Action Plans will consolidate and build on catchment blueprints and regional vegetation management plans and will incorporate other plans over time. The Murray Catchment Management Authority will be responsible for administering the plans for the Murray Catchment and any incentive programs that may be associated with them.

All of the above documents recognise the need for an integrated approach to water management. This entails recognising the many and varied values of our water resources and understanding the needs of all users.

### 2.3 Why the health of Lake Mulwala is important

A healthy Lake Mulwala provides quality water for a range of uses, including human consumption, recreation, agriculture, industry and the environment. Activities on the land around the lake as well as on the lake itself have a direct impact on the health of the lake.

The *National Strategy for the Conservation of Australia’s Biological Diversity*\(^17\) aims to “protect biological diversity and maintain ecological processes and systems.” A key objective of this strategy is to manage water resources such as Lake Mulwala in accordance with biological diversity conservation objectives and to satisfy economic, social and community needs.

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\(^9\) NECMA (undated)  
\(^10\) NECMA and North East Salinity Working Group (undated)  
\(^11\) NECMA (2000a)  
\(^12\) NECMA (2000b)  
\(^13\) NECMA (2001)  
\(^14\) NECMA/ID&A (1999a)  
\(^15\) NECMA/ID&A (1999b)  
\(^16\) Murray Catchment Management Board (2001)  
\(^17\) Department of Environment, Sport and Territories (1996)
2.4 How this Plan was developed

This Plan has been developed to provide a coordinated approach to the management of activities on Lake Mulwala and its foreshore.

In order to achieve this, a project manager was appointed and a consulting firm engaged to help develop the Plan, facilitate meetings of the Steering Committee and consult with key stakeholders and the community.

The Steering Committee comprised representatives from:

- River Murray Water;
- NSW Department of Infrastructure, Planning and Natural Resources;
- Goulburn–Murray Water;
- Victorian Department of Sustainability and Environment;
- Victorian Department of Primary Industries;
- Moira Shire Council;
- Corowa Shire Council;
- Goulburn Broken Catchment Management Authority;
- Parks Victoria;
- Waterways Authority of NSW;
- NSW Department of Primary Industries (Fisheries); and
- Moira Tourism.

The members of the Steering Committee are listed in Appendix A.

The role of the Steering Committee was to:

- be actively involved in the development of the Lake Mulwala Land and On-Water Management Plan;
- review and develop new ideas;
- provide a sounding board for the project manager and the consultants; and
- build community confidence in the approach to planning for the future.

Extensive consultation was undertaken to ensure that all issues and views were addressed in the formulation of the Plan.

An Issues Paper\textsuperscript{18} was made available for community comment from January to March 2002. Consultation on the Draft Plan was from June to October 2003. Discussions continued with the Lake Mulwala Community Action Group until a submission was received in February 2004. In March 2004 meetings were held with key groups and organisations to clarify the issues raised in their submissions on the Draft Plan.

A Consultation Report has been prepared for release in conjunction with this Plan. The Consultation Report is designed to provide the community with a summary of the issues raised during the consultation on the draft Plan, to provide a detailed response to all submissions on the Draft Plan and to indicate how the issues raised have been dealt with in the Plan.

\textsuperscript{18} MDBC (2001)
2.5 **Vision for Lake Mulwala**

*Part of a healthy working River Murray system, managed for water supply, environmental, recreational and tourism needs*

2.6 **Area covered by this Plan**

This Land and On-Water Management Plan applies to Lake Mulwala and its foreshore lands, defined as the area delineated by Yarrawonga Weir to the west, Boiling Downs Creek to the east, the Corowa-Mulwala Road to the north and the Murray Valley Highway to the south (Figure 3). The original course of the River Murray marks the border between New South Wales and Victoria.

Clearly, the activities which occur within the catchment for Lake Mulwala will have an influence on the health of the lake. While this Plan concentrates on the management of the lake and its foreshore lands, as indicated in section 2.2 there are a number of initiatives underway at the catchment level.

*Figure 3* Area covered by the Lake Mulwala Land and On-Water Management Plan
2.7 **Implementing the Plan**

This Plan is about ensuring the long-term sustainable use of Lake Mulwala.

In order to achieve sustainable use of the lake, the Plan focuses on five key outcomes:

- a clearly identified planning and development framework for activities at Lake Mulwala;
- improved water quality in Lake Mulwala;
- improved ecological health of Lake Mulwala;
- safe use of Lake Mulwala; and
- a community committed to the sustainable use of Lake Mulwala.

The Plan provides the impetus for the coordination of current management activities and building partnerships between the key players as well as the development of new strategies. This will involve all interested players including governments, regional bodies and the community (Figure 4).

This will primarily be achieved through consultation and negotiation over time, building on the cooperative approach initiated through the planning process to date.

The Plan has a 5 – 10 year focus. It is intended that this document will be reviewed every five years, which will provide an opportunity to incorporate changes due to the dynamic nature of the planning process and assess the progress with implementing the actions in the Plan.

---

**Figure 4** Planning for Sustainable Use
2.8 How to use this Plan

The Plan is structured around the five outcomes needed to achieve the vision for the Plan.

A quick-find index (on page 17) is designed to help quickly identify information on the issues of interest.

Table 1 (on pages 20-21) summarises the strategies and actions in each section.

Each outcome has explanatory text to cover the strategies and actions in that section, followed by a summary table. Each action has been assigned a suggested high, medium or low (H, M, L) priority. These priorities will be reviewed by the proposed Community Reference Group.

A glossary of some of the technical terms used in this plan is provided in Appendix C.

The overall vision for Lake Mulwala and the five key outcomes provide the framework for the Plan (see previous page).

Many issues are addressed in more than one section of the plan. For example, the issue of safe boating in relation to submerged and floating timber is dealt with under boating (Outcome B), fish habitat (Outcome C) and safe use (Outcome D). Therefore, it is important to follow the links between sections in the Plan in order to fully appreciate the approach to management in relation to a particular issue.
## Quick-find Index

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<td>Timber - submerged</td>
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<td>Traffic management</td>
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<td>26</td>
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<tr>
<td>Trees - falling</td>
<td>D</td>
<td>1</td>
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<tr>
<td>Unsafe structures</td>
<td>D</td>
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<td>45</td>
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<tr>
<td>Wake-enhancing devices</td>
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<td>2</td>
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<tr>
<td>Water quality monitoring</td>
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<td>30</td>
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<tr>
<td>Weeds</td>
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<tr>
<td>Weir bridge closure</td>
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<td>Zoning for on-water activities</td>
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</table>
PART B

Plan for the management of Lake Mulwala
Table 1 The five key outcomes required in order to achieve the vision for Lake Mulwala

The strategies and actions needed to achieve these outcomes are described in the subsequent sections of this Plan. Actions that meet more than one outcome have been included under the most relevant outcome. This summary table should be read in conjunction with the text of the Plan for a full explanation.

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<thead>
<tr>
<th>OUTCOME</th>
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<th>ACTIONS</th>
<th>WHAT THIS WILL MEAN</th>
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<td><strong>A  A clearly identified planning and development framework for activities at Lake Mulwala</strong></td>
<td>Adopt an integrated planning framework for Lake Mulwala</td>
<td>1 Ensure people know about existing Acts and Regulations for development and comply with them</td>
<td>▪ Public awareness of requirements for development</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>▪ Landscape Management Plans needed for new developments and changes to existing landscaping of publicly-owned foreshore lands in Victoria</td>
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<td></td>
<td></td>
<td>2 Implement policies for access and management of activities on the foreshore</td>
<td>▪ Public access to the lake foreshore to be encouraged with walking/cycling trails to be developed over time</td>
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<tr>
<td></td>
<td></td>
<td>3 Develop cultural heritage approach</td>
<td>▪ Greater awareness of cultural heritage</td>
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<td>4 Develop traffic management plan</td>
<td>▪ An integrated traffic management plan covering townships</td>
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<td></td>
<td>5 Implement plan for weir bridge closure</td>
<td>▪ Planning for weir bridge closure in 2020, including enhancement of other river crossing(s)</td>
</tr>
<tr>
<td><strong>B  Improved water quality in Lake Mulwala</strong></td>
<td>Reduce impacts on water quality in Lake Mulwala</td>
<td>1 Establish a coordinated water quality monitoring program</td>
<td>▪ Water quality monitored</td>
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<td></td>
<td></td>
<td></td>
<td>▪ Enhanced knowledge to inform management decisions and raise community awareness</td>
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<td></td>
<td></td>
<td>2 Implement stormwater management strategies</td>
<td>▪ Reduction in stormwater pollution</td>
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<td></td>
<td></td>
<td>3 Monitor effluent disposal systems and upgrade where necessary</td>
<td>▪ Management of effluent pollution</td>
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<td></td>
<td>4 Implement foreshore buffer management policy</td>
<td>▪ Garden plantings of native flora encouraged on foreshore land</td>
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<td>▪ Reduction in amount of phosphorus flushed into the lake from surrounding lands</td>
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<td>5 Develop camping management strategy</td>
<td>▪ Social, economic and environmental analysis of camping</td>
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<td></td>
<td>▪ Bush camping managed to minimise ecological impacts and human health concerns</td>
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<td>6 Implement fuel storage policy</td>
<td>▪ Underground fuel tanks and fuel lines removed from foreshore</td>
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<td></td>
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<td></td>
<td>▪ Aboveground fuel tanks and pumps secured and bunded</td>
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<td></td>
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<td></td>
<td>▪ No new fuel tanks or pumps on foreshore</td>
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<td></td>
<td>7 Develop and implement guidelines for boating</td>
<td>▪ Clear boating guidelines developed in partnership with boat owners and operators</td>
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<td></td>
<td></td>
<td></td>
<td>▪ All watercraft and users meet NSW marine legislation and watercraft operated in accordance with this legislation</td>
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<td></td>
<td></td>
<td></td>
<td>▪ Boat ramps and jetties to be licensed and community boat ramps encouraged</td>
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<tr>
<td>OUTCOME</td>
<td>STRATEGY</td>
<td>ACTIONS</td>
<td>WHAT THIS WILL MEAN</td>
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</tbody>
</table>
| C Improved ecological health of Lake Mulwala | Improve management of Lake Mulwala's biodiversity | 1 Implement biodiversity management actions | • Grazing and cropping phased out on foreshore land subject to consultation  
• Foreshore revegetated and fenced in rural areas |
| | Feral animals managed | 2 Implement management plan for riparian vegetation | • Rehabilitation of riparian vegetation |
| | | 3 Implement management plan for aquatic vegetation | • Native water plants conserved  
• Aquatic weeds managed |
| | | 4 Implement fish management policy | • Consistent fishing arrangements between NSW and Victoria |
| | | 5 Implement fish habitat protection policy | • Dead timber retained as habitat |
| | | 6 Identify and remedy unacceptable environmental risks | • Risks to the ecological health of Lake Mulwala minimised |
| | | 7 Improve local knowledge and understanding of biodiversity | • Community that values local biodiversity |
| D Safe use of Lake Mulwala | Undertake a risk-based approach to safety management at Lake Mulwala | 1 Identify and remedy unacceptable safety risks | • Unacceptable safety risks addressed  
• Maintenance of navigable areas within Lake Mulwala |
| | | 2 Improve awareness of the need for safe use | • Users of the lake consider the safety of themselves and others |
| E A community committed to the sustainable use of Lake Mulwala | Engage the community in the management of Lake Mulwala in order to enhance its values | 1 Develop and implement community awareness-raising approach | • A community that recognises how their activities affect the lake’s sustainability  
• A community that understands the role of agencies and knows where to go for advice |
| | | 2 Establish Lake Mulwala Community Reference Group | • A community working in partnership with agencies to manage Lake Mulwala |
Outcome A

A clearly identified planning and development framework for activities at Lake Mulwala

Clear guidelines on the activities that can be undertaken on or adjacent to Lake Mulwala and where users can go for information are fundamental to the management of the lake and its foreshore. Outcome A requires a collaborative approach between all agencies and organisations involved in managing Lake Mulwala with clear and consistent application of the policies, plans and guidelines involved.

3.1 Strategy: Adopt an integrated planning framework for Lake Mulwala

3.1.1 Action 1: Ensure people know about existing Acts and Regulations for development and comply with them

Development of all types around Lake Mulwala (for example, housing, stormwater design, vegetation management, landscaping, recreational structures and infrastructure) is subject to control measures and approval. Whatever the particular type of development there are regulatory authorities that have the responsibility to ensure that current legislation, policy, local planning schemes and respective state guidelines currently operating are adhered to. The first point of call for any development proposal requires that individuals contact their local council office, either the Moira Shire Council in Victoria or Corowa Shire Council in New South Wales.

Planning controls in planning schemes are important mechanisms for achieving a range of objectives. In Victoria the Planning and Environment Act 1987 is the legislative basis for the planning system. This Act sets out: the objectives of planning and the planning framework, council’s responsibilities to administer the planning system, the content and structure of the planning scheme, the planning permit application process, the right of review to the Victorian Civil and Administrative Tribunal, the process for changing the planning scheme (called an amendment to the planning scheme), the responsibilities of the Minister for Planning, and the enforcement provisions for breaches of the planning scheme. Every municipality has a planning scheme that includes the State Planning Policy Framework, the Local Planning Policy Framework and the zone and overlay provisions that control the use and development of land. The council is usually responsible for the day-to-day administration of the planning scheme. Victoria’s planning schemes are based on an over-arching State policy framework and strategic plan. Decision makers have to develop, understand and give appropriate weight to these policies in planning decisions. Local policies can be of assistance to decision makers within this broader policy and strategic framework.\(^\text{19}\)

In New South Wales, a taskforce has recently reviewed NSW PlanFirst to ensure planning system improvements occur, and the resulting document is known as the Kibble Report. The recommendations under consideration include a proposal that local plans as proposed under PlanFirst not be pursued and be replaced with integrated plans that contain a Local Environmental Plan (statutory) component as provided for under the Environmental Planning and Assessment Act 1979. The Kibble Report recognises the role of an integrated plan as: an instrument that has a known and certain position in a hierarchy of planning documents that are produced by government (such as State planning policies, regional strategies and Regional Environmental Plans), an instrument that is consistent with and gives effect to State planning policies, Regional Environmental Plans and regional strategies, a statutory planning and land use control document that provides a single source of all land use controls applying to a particular parcel of land, an instrument that is consistent with, displays clear links to, and where relevant gives effect to other council management, strategic and operational plans and is an instrument that provides a consistent (standard) set of definitions and provisions that are common to all local government areas and provides certainty to the community.\(^\text{19}\)

\(^\text{19}\) Municipal Association of Victoria 2002
The *Moira Planning Scheme* administered by the Moira Shire Council in Victoria and the *Corowa Local Environmental Plan* administered by the Corowa Shore Council in New South Wales provide the basis for establishing consistent guidelines for development at Lake Mulwala. Issues to be taken into account will include potential impacts on water quality and likely future water supply or land use requirements.

**Landscape management plans**

On the Victorian side of the lake, the long-term aim is for Goulburn-Murray Water foreshore lands to be revegetated with native species to improve water quality and the biodiversity values of the lake. In order to achieve this, landscape management plans will be required if any changes are to be made to private developments on Goulburn-Murray foreshore lands. Plans which provide for a transition between garden style private land and a predominantly native landscape along the foreshore will be permitted. The rights of private landholders to maintain their properties as they see fit within the council’s regulations will be respected and voluntary revegetation using native species on private land adjacent to Goulburn-Murray Water’s foreshore lands will be encouraged.

The principles to be followed for changes to existing developments on Goulburn-Murray Water foreshore land are:

- a proactive program for the planting of native vegetation, with no exotic trees or shrubs;
- grasses grown that do not require fertiliser;
- no new beaches;
- removal of cross fences and other obstacles to public access;
- clearly delineated property boundaries, which will generally be in the form of non-intrusive line-of-sight markers;
- no removal of native or beneficial in-stream vegetation, whether alive or dead;
- any construction on Goulburn-Murray Water foreshore lands requires approval and in some instances a licence from Goulburn-Murray Water, issued at Goulburn-Murray Water’s sole discretion;
- licensed structures such as fences, pump sheds, pipes, jetties and boat ramps are to be maintained in a safe condition, otherwise they may be removed;
- retaining walls are to be maintained in a safe condition, otherwise they may be removed; and
- fixed sprinkler or other irrigation systems shall only be permitted where their use is in accordance with an approved landscape management plan.

Re-landscaping on Goulburn-Murray Water foreshore land will only be permitted in accordance with an approved landscape management plan.

The principles to be applied to new privately owned developments on Goulburn-Murray Water foreshore land on the Victorian side of the lake are:

- an approved landscape management plan, including the terms of maintenance is required;
- no retaining walls for existing and stable frontages to allow the wetting and drying cycle of the bank;
- existing foreshore native vegetation to be retained unless it presents a safety hazard;
- grasses grown that do not require fertiliser;
- no new beaches;
- removal of cross fences and other obstacles to public access to allow foreshore access;
- clearly delineated property boundaries;
- no removal of native or beneficial in-stream vegetation, whether alive or dead; and
- native vegetation zones to be created which do not require artificial watering.
On the New South Wales side of the lake, management of the foreshore land, the majority of which is privately owned, will be achieved using the application of planning instruments such as the *Corowa Local Environmental Plan* and the *Murray Regional Environmental Plan No. 2 – Riverine Land*. This will ensure that the impact of development on the New South Wales foreshore is managed to minimise potential environmental impacts.

**Garden design** *(refer to Outcome B, Action 4)*

**Building guidelines**
In addition to the landscape management plans detailed above, developments should plan for controlled pedestrian access to the public lands around the lake. Buildings constructed on private property adjoining the foreshore lands may be designed to be in sympathy with the character of the landscape, including their colour, texture, height and size. If designed well, these buildings will not have any detrimental effects on the natural riparian zone such as continuous overshadowing of the foreshore areas.

**Building setbacks**
Inappropriate planning decisions in the past have resulted in buildings being too close to the lake in some instances.

On the Victorian side of the lake, the Significant Landscape Overlay which forms part of the *Moira Planning Scheme* triggers a referral to Goulburn-Murray Water in the event of an application for development on land adjoining the foreshore strip managed by Goulburn-Murray Water. Setback distances on the Victorian side of the lake will be in accordance with the North East Planning Referrals Committee *Guidelines for the Protection of Water Quality*.

On the New South Wales side of the lake, the *Corowa Local Environmental Plan* and *Murray Regional Environmental Plan No. 2 – Riverine Land* contain principles and requirements for setback distances which must be addressed in relation to developments involving buildings adjacent to the lake.

In general this will mean that the front of the houses facing the lake follows a common line, thereby minimising the overall intrusiveness of these buildings in the landscape.

**Boat ramps and jetties** *(refer to Outcome B, Action 7)*

**Revegetation** *(refer to Outcome C, Action 2)*

**Aquaculture**
Aquaculture developments will not be permitted at Lake Mulwala by the Murray-Darling Basin Commission unless it can be demonstrated that such intensive industries can operate as a truly closed system, with no waste or other by-product leaving the site.
3.1.2 Action 2: Implement policies for access and management of activities on the foreshore

All of the foreshore on the Victorian side of the lake is held in public ownership, mostly under the control of Goulburn-Murray Water (see section 1.4.3). In New South Wales there are also significant sections of the foreshore held in public ownership.

Residential development on the Victorian side in particular has put increasing pressure on public access, habitat and water quality. These aspects must not be further compromised by existing and future development adjacent to the foreshore.

Walking/cycling trail
A walking and cycling trail has been proposed along the length of the Victorian foreshore as part of the River Murray Trail. This could be accommodated within a linear park running the full length of the Victorian foreshore but would depend on the willingness of interested parties to fund both construction and maintenance. Residents in the nearby urban developments who do not have properties immediately abutting the public lands and the many day visitors to the area must also continue to have access to these lands.

Revegetation (refer to Outcome C, Action 2)

Environmental risks (refer to Outcome C, Action 6)
The removal of environmentally hazardous structures of the foreshore, such as underground fuel tanks, will be required. No approval will be given for the creation of artificial beaches on the Victorian side of the lake.

Erosion
Foreshore erosion at the lake will be managed to minimise impacts on water quality and biodiversity and ensure that encroachment to freehold land does not occur. This will be done through the involvement of agencies with landholders and community groups, taking both a site-based and catchment-wide approach to erosion control.

Boat ramps and jetties (refer to Outcome B, Action 7)

Public risk (refer to Outcome D, Action 1)
Structures that pose a public risk are not permitted on the foreshore lands controlled by government agencies. Any such existing structures must be removed, unless they are licenced by Goulburn-Murray Water.

Public facilities
Any future requirement for increased public facilities on Goulburn-Murray Water land on the Victorian side of the lake, such as boat ramps or public jetties will require appropriate planning. As the width of land owned by Goulburn-Murray water is not sufficient to permit the construction of vehicle and boat trailer parking or other related facilities this will mean that within the development process consideration for additional parking, toilet facilities and open space for picnic areas will need to form part of the overall proposal on council or private lands.
Public events
Public events may take place on the foreshore but must be conducted in a manner that ensures the ecological health and safety of lake users is not compromised.

It will be a requirement for most events that the organisers obtain public liability insurance and agree to remove all rubbish from the site used. The relevant authorities must be notified and approval sought from the local council.

Camping (refer to Outcome B, Action 5)
Boating (refer to Outcome B, Action 7)
Fuel storage (refer to Outcome B, Action 6)

3.1.3 Action 3: Develop cultural heritage approach
The preservation of cultural heritage is important to the entire community. Indigenous and European heritage forms a valuable part of our history and must be managed appropriately.

Heritage significance is determined by considering a broad range of criteria including historic, scientific, cultural, social, archaeological, aesthetic, natural and Indigenous attributes. The reason for identifying heritage significance is to facilitate the preservation of the cultural environment.

As the managers of Lake Mulwala, Goulburn-Murray Water has an obligation to minimise the impacts on the natural and cultural environment at sites under its management, and encourages its neighbours and the wider community to act in a similarly responsible and ethical manner.

A comprehensive cultural management policy needs to be developed for Lake Mulwala and its foreshore, in which sites of cultural significance are identified and activities managed in order to protect, preserve and ensure that site disturbance is minimised.

3.1.4 Action 4: Develop traffic management plan
Transport issues around Lake Mulwala fall into two categories:

- the use of the weir bridge as a means of access across the state border; and
- vehicular access to the public lands around the lake.

A traffic management plan is required to address vehicular access to the foreshore in order to prevent damage to vegetation and bank erosion. Traffic management at public access points on both sides of the lake used for recreation activities, such as boating, camping and picnics, needs to be addressed specifically in addition to being part of the foreshore access policy.

As indicated above, future public facilities, such as boat ramps or public jetties, on publicly owned lands, must have areas set aside for parking, and toilet and picnic facilities on council managed or privately owned land. These will not be permitted on the foreshore lands managed by Goulburn-Murray Water.
3.1.5 Action 5: Implement plan for weir bridge closure

In November 2000, as part of a major remedial works program, the Murray-Darling Basin Commission as owners and Goulburn-Murray Water as asset managers foreshadowed the closure of the weir bridge as a means of vehicular access between the states by 2020. This closure would be for safety and risk management reasons as well as to ensure the security of existing assets. The 20-year period allows a long planning horizon and recognises the need for an additional transport corridor, which the respective state road authorities (the Roads and Traffic Authority NSW and VicRoads) have the responsibility to build. Concerns have also been raised about the safety of the existing road bridge.

The framework for an initial study into an alternative river crossing is being developed by the Roads and Traffic Authority NSW, VicRoads, the Shires of Corowa and Moira and the Murray-Darling Basin Commission.
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<tr>
<th>Strategies</th>
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<th>What this will mean</th>
<th>Implementation mechanism</th>
<th>Coordinating responsibility</th>
<th>Partner organisations</th>
<th>Priority</th>
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</table>
| An integrated planning framework for Lake Mulwala | 1 Ensure people know about existing Acts and Regulations for development and comply with them | ▪ Public awareness of requirements for development  
▪ Landscape Management Plans needed for new developments and changes to existing landscaping of publicly-owned foreshore lands in Victoria | Murray River Regional Environmental Plan No. 2 Moira Planning Scheme  
NSW Environmental Planning and Assessment Act 1979  
Victorian Planning and Environment Act 1987  
Corowa Local Environment Plan  
Corowa Development Control Plans 2 & 6 - Development standards  
Goulburn–Murray Water Storage Management Plan Policies | GMW | Shire of Corowa  
Shire of Moira  
River Murray Water  
DSE/DPI  
DIPNR  
Waterways NSW  
NSW DPI (Fisheries) | H |
| 2 Implement policies for access and management of activities on the foreshore | Ensure public access to the lake foreshore to be encouraged with walking/cycling trails to be developed over time | NSW Environmental Planning and Assessment Act 1979  
Murray River Regional Environmental Plan No. 2  
Victorian Water Act 1989  
NSW Marine Safety Legislation  
(Lakes Hume and Mulwala) Act 2001  
Lake Mulwala Aquatic Vegetation Management Plan | GMW | Shire of Corowa  
Shire of Moira  
DIPNR, DSE/DPI  
Parks Victoria  
Waterways NSW  
Murray Catchment Management Board  
Moira Tourism  
Yarrawonga-Mulwala Tourism | M |
| 3 Develop cultural heritage approach | Greater awareness of cultural heritage | Victorian Archaeological and Aboriginal Relics Preservation Act 1972  
Aboriginal and Torres Strait Islander Heritage Protection Act 1984  
NSW National Parks and Wildlife Act 1974 | GMW | Shire of Corowa  
Shire of Moira  
DIPNR, DSE/DPI  
Parks Victoria  
Yorta Yorta Aboriginal Community | M |

DIPNR: Department of Infrastructure, Planning and Natural Resources, NSW  
DSE/DPI: Department of Sustainability & Environment/Department of Primary Industries, Victoria  
DEC: Department of Environment and Conservation, NSW  
EPA: Environment Protection Authority  
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GMW: Goulburn-Murray Water  
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<tr>
<td>4 Develop traffic</td>
<td>▪ An integrated traffic management plan covering townships and vehicle</td>
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<td>Shire of Corowa NSW Roads and Traffic Authority</td>
<td>Shire of Moira</td>
<td>NSW Roads and Traffic Authority</td>
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<tr>
<td>management plan</td>
<td>access to the foreshore</td>
<td></td>
<td>VicRoads</td>
<td>Shire of Moira, GMW River Murray Water</td>
<td>VicRoads</td>
<td></td>
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<tr>
<td>5 Implement plan for</td>
<td>▪ Planning for weir bridge closure in 2020, including enhancement of other</td>
<td></td>
<td>NSW Roads and Traffic Authority</td>
<td>Shire of Corowa</td>
<td>Shire of Moira, GMW River Murray Water</td>
<td>H</td>
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<tr>
<td>weir bridge closure</td>
<td>river crossing(s)</td>
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<td>VicRoads</td>
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Outcome B
Improved water quality in Lake Mulwala

Clean water is an essential part of a healthy environment and ensures the continued use of Lake Mulwala for recreation, agriculture, aquatic ecosystems and domestic use.

4.1 Strategy: Reduce impacts on water quality in Lake Mulwala

4.1.1 Action 1: Establish a coordinated water quality monitoring program

The development of water quality targets is essential to provide the impetus for improving water quality. A coordinated monitoring program will provide an objective measure of whether water quality targets are being met. Understanding chemical and biological processes within the lake will provide information on the priority and effectiveness of actions aimed at improving water quality.

The Murray-Darling Basin Commission has developed Interim Water Quality Objectives as part of its *Environmental Flows and Water Quality for the River Murray* project. The environmental values and beneficial uses identified for ‘Yarrawonga pooled waters’ are:

- modified ecosystems;
- recreation and aesthetics; and
- agricultural water supply.

The Interim Water Quality Objectives identified for Lake Mulwala are:

- protection of aquatic ecosystems; and
- primary contact recreation.

Wherever possible, the water quality monitoring program for Lake Mulwala will be integrated with existing water quality monitoring activities, such as those of the Murray-Darling Basin Commission. The Commission program will be used as the basis for a coordinated program that standardises measurement of water quality parameters by the relevant authorities.

The National Health and Medical Research Council and the Agriculture and Resources Management Council of Australia and New Zealand have developed the *National Water Quality Management Strategy*, which provides the overarching framework for water quality monitoring programs.

In Victoria, the Department of Sustainability and Environment/Department of Primary Industries and the Department of Human Services, adopt a catchment to tap approach for the management of drinking water, and are developing a framework for the regulation of drinking water quality.

Both Victoria and New South Wales have comprehensive legislation relating to impacts upon water quality and the management of water resources.

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20 MDBC (2003)
21 NH&MRC/ARMCANZ (1996)
The Murray-Darling Freshwater Research Centre has been commissioned by Goulburn-Murray Water to collate all existing data in relation to water quality. Aspects being examined include water chemistry (salinity, pH, nutrients such as phosphorus and nitrogen, turbidity, colour, pesticides and metals), algae, bacteria, macro-invertebrates, fish and plants. This will provide the basis for a coordinated approach to the monitoring and assessment of water quality in Lake Mulwala.

**Environmental risks** *(refer to Outcome C, Action 6)*

The water in Lake Mulwala has in the past been contaminated by blue-green algae, naturally occurring pathogens, sewage spills, heavy metals, high turbidity and sediment loads, pesticides and fuel spills. When Goulburn-Murray Water becomes aware of a contamination incident, the appropriate environmental incident response procedures, as detailed in its Environmental Management System, are implemented.

**Blue-green algae**

Blue-green algae, also known as cyanobacteria, are tiny aquatic plants. In small numbers, they are a natural part of the aquatic ecosystem. However, too much nutrient material in the water or poor water flow can cause the algae to multiply rapidly or "bloom," discolouring the water, forming a scum, and creating a bad smell.

Blue-green algae also have the potential to be toxic, to both humans and animals. Decaying algae use the oxygen supply in a waterbody, resulting in the death of vertebrate and invertebrate fauna. Blue-green algae are opportunistic and factors leading to an outbreak include:

- increased nutrient loads (in particular phosphorus and nitrogen) from point or diffuse sources;
- reduced and/or slowed water flow through regulation or during low rainfall periods;
- light infiltration; and
- temperature increase of the waterbody\(^\text{22}\).  

In combination with reduced flows and overall catchment degradation, blue-green algae outbreaks are an indication of poor water quality. As a consequence, local conditions are important in determining the occurrence of blue-green algae outbreaks.

The existing water quality monitoring program includes the measurement of the abundance of blue-green algae at various sites around the lake. This program is likely to be expanded to incorporate additional monitoring sites.

The *Lake Mulwala Blue-green Algae Local Emergency Management Plan*\(^\text{23}\) has been developed to ensure the timely and effective response to outbreaks of blue-green algae in the lake so as to protect the safety of lake users.

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\(^{23}\) GMW (1991)
4.1.2 Action 2: Implement stormwater management strategies

Runoff water collects litter (e.g. cigarette butts, cans, paper, plastic bags), chemical pollution (e.g. fertilisers, herbicides, oil, detergents) and ‘natural’ pollution (e.g. leaves, garden clippings, animal droppings). Water from rainfall events, known as stormwater, ends up discharging into waterways bringing with it sediment, sludge and solids. Clearly this has the potential to significantly impact upon the quality of water in a storage such as Lake Mulwala and it is imperative that appropriate management strategies be put in place for stormwater.

The Victorian Stormwater Action Program\textsuperscript{24} and the NSW Urban Stormwater Program\textsuperscript{25} are initiatives aimed at improving the environmental management of stormwater. The River Murray Regional Environmental Plan No. 2 - Riverine Land prohibits the disposal of untreated stormwater in the River Murray system.

Stormwater management plans have been developed by both Corowa and Moira Shire Councils. Initiatives include the requirement for new developments around the lake to use swale drains and buried, minimal outlets to the lake.

4.1.3 Action 3: Monitor effluent disposal systems and upgrade where necessary

Effluent disposal systems are an obvious source of water pollution. Given that septic systems are notorious for being incorrectly maintained and liable to leakage, it is important that they be inspected regularly. Authorities such as the Environment Protection Authority can implement inspection programs but a program of educating property owners in the management of their septic systems will ensure better outcomes.

The need to upgrade effluent disposal systems around Lake Mulwala is widely recognised. All premises in Bundalong should be connected to the new sewerage system, and in particular those in close proximity to the lake.

On the Victorian side of the lake, all domestic effluent treatment and disposal systems must be installed or upgraded to meet the requirements of EPA Victoria’s Code of Practice - Septic Tanks\textsuperscript{26} and the Code of Practice for Small Wastewater Treatment Plants\textsuperscript{27}. Septic tanks or effluent lines are prohibited on Goulburn–Murray Water land.

In New South Wales, On-site Sewage Management for Single Households\textsuperscript{28} provides guidelines for the on-site management of domestic sewage and wastewater while protecting and enhancing the quality of public health and the environment.

Australian Standard ISO 1547:2000 provides further guidelines on effluent disposal.

\textsuperscript{24} EPA Victoria (2002)\textsuperscript{25} NSW EPA (2004)\textsuperscript{26} EPA Victoria (2003)\textsuperscript{27} EPA Victoria (1997)\textsuperscript{28} Department of Local Government et al. (1998)
4.1.4 **Action 4: Implement foreshore buffer management policy**

The values of the foreshore include water quality protection, flood surcharge use, access, cultural heritage, asset maintenance, habitat and biodiversity conservation, recreation, grazing and other development.

The restoration of the foreshore to create a buffer zone is a necessary step towards improving water quality in the lake. Native riparian vegetation plays an important role in bank stabilisation and filtering contaminants from runoff water, as well as providing habitat and food for a range of terrestrial and aquatic fauna.

**Grazing and cropping (refer to Outcome C, Action 1)**

**Building guidelines (refer to Outcome A, Action 1)**

**Garden design**

The design of gardens on or near the foreshore of Lake Mulwala will be encouraged to be in sympathy with the native Australian landscape. Native plants are appropriate as they are drought resistant, require limited water and fertiliser, shed leaves throughout the year rather than all at once, as well as providing habitat for birds and animals. The planting of locally adapted indigenous species with bank stabilising attributes, including sedges, rushes, groundcovers, grasses, shrubs and trees, will be required on or near the edge of the water.

**Revegetation (refer to Outcome C, Action 2)**

4.1.5 **Action 5: Develop camping management strategy**

The excellent camping opportunities on offer are a major recreational drawcard at Lake Mulwala, particularly during summer and autumn. Camping, however, brings with it the potential for significant impact, whether intentional or not, on the quality of water in the lake. Campers generate refuse including rubbish and human waste, as well as causing bank erosion along the foreshore. Recent examples of particular concern include the construction of a rudimentary toilet system on one of the islands in the lake with an outflow going directly into the water and the distribution of toilet paper with human faeces across Kyfinn’s Reserve close to the water. There is mounting evidence pointing to major human health concerns due to the contamination of water bodies from such camping activities.

Camping also results in a loss of dead timber from the forest floor for use as firewood. This removes important habitat for a range of fauna including reptiles, birds and small mammals.

The Goulburn-Murray Water Recreational Areas By-law states that there is to be no camping on the islands within Lake Mulwala or on the foreshore except at designated serviced camping sites.

Parks Victoria permits camping in the reserved forest areas adjacent to the Ovens River immediately downstream of the Murray Valley Highway Bridge and Parola’s Bridge. Camping on Thompson’s Island has tacitly been permitted over a long period of time.
Circumstances are similar in New South Wales where camping is allowed in some of the forest reserves. Camping is not permitted in the portion of Kyfinn’s Reserve managed by the Rural Lands Protection Board, although there is evidence of campsites in the locality. There is a long history of camping on the freehold islands in the lake on the New South Wales side of the river. There is also evidence of permanent structures on Khyber Pass Island and Thompson’s (Jackson’s) Island.

The intention of the camping management strategy is not to ban bush camping (i.e. camping around the lake outside approved caravan parks), but to ensure that it is undertaken in a manner which measurably minimises negative environmental and health impacts. It may, however, be appropriate for campers to be excluded from some sensitive areas around the lake.

A move towards a total “take in – take out” approach to camping activities is proposed. This means that all equipment, including fuel for fires, chemical toilets and litter collection facilities, would need to be provided by campers themselves. Similarly all equipment and all rubbish generated, including refuse and human waste, would need to be removed by campers and disposed of in an approved manner.

Extensive consultation between management agencies, campers and the local community is required in order to develop an appropriate management strategy for camping at Lake Mulwala. A socio-economic analysis would be undertaken to provide important background information to the development of this strategy.

The implementation of such a strategy should include an awareness-raising campaign to educate campers as to appropriate camping behaviour.

4.1.6 Action 6: Implement fuel storage policy

The provision of fuel is necessary for the operation of both boats and pumps at Lake Mulwala. This Plan seeks to minimise the potential for leakage of fuel and lubricants leading to water pollution. To this end underground fuel tanks and fuel lines will be removed from the lake foreshore and existing aboveground fuel tanks, and domestic and irrigation pump sites will be secured and bunded where necessary. These will need to comply with the relevant Environmental Protection Authority requirements in each state. No new fuel tanks or fuel lines will be permitted on Goulburn-Murray Water foreshore lands at Lake Mulwala.

 Appropriately designed, commercially operated refuelling facilities would be permitted around the lake providing they meet Environment Protection Authority guidelines. In particular, the development of appropriately designed and located facilities enabling boat owners to refuel and pump-out waste would be encouraged.

Refer also to Outcome C, Action 6 regarding the assessment of environmental risks.
4.1.7 **Action 7: Develop and implement guidelines for boating**

Boating is a popular recreational pastime at Lake Mulwala but has the potential to impact on the ecological values of the lake and in particular water quality.

The Waterways Authority of NSW is responsible for the on-water management of boating, commercial vessels and associated regulations at Lake Mulwala. This is through a joint arrangement between the states. The *Marine Safety Legislation (Lakes Hume and Mulwala) Act 2001* provides the basis for rationalising the management of boating in Lake Mulwala. The *Marine Act 1988* regulates all boating on the lake, including zones, safety requirements and the timing of boating. Waterways NSW is also an authorised regulatory authority under the *Protection of the Environment Operations Act 1997* and is able to investigate any breaches of this Act.

Waterways NSW is in the process of developing comprehensive guidelines for boating on the lake, as well as increasing their presence at the lake in order to educate boat users and enforce rules as necessary.

Extensive consultation with users will ensure that the guidelines for boating are adopted by the community. Waterways NSW has established a Boating Users Group as an initial step for consultation on these issues. Meetings are open for any interested people to attend. It may be appropriate for this Users Group to become a working group recognised under the Community Reference Group (refer to Outcome E, Action 2)

The guidelines for boating on the lake will incorporate the following:

- licensing arrangements;
- management of fuel including fuel storage;
- review of the type of vessels permitted on the lake;
- possible zoning of on-water activities;
- review of speed zones;
- management of dead standing and floating timber;
- boat ramps and jetties; and
- signage.

There are licensing requirements and regulations controlling the operation of all vessels including personal watercraft (e.g. Jet Skis, Waverunners, Sea Doos) with which users must be familiar.

Fuel for powering boats used on the lake needs to be managed so as to protect the aquatic environment from pollution due to leaks and spillage.

**Houseboats**

In accordance with Goulburn-Murray Water and Murray-Darling Basin Commission policy, houseboats will not be permitted on Lake Mulwala. The useable area of the lake is not sufficient to permit their use as there is potential for conflict with other on-water activities. Wave action on the lake poses a potentially dangerous situation for houseboats. There are also concerns about the potential impact of grey water discharge on water quality. There are no mooring licences for vessels on the lake and no appropriate mooring facilities for houseboats.
Wake-enhancing devices
Boat wash, which is the turbulence created by a vessel as it moves through the water, has the potential to capsize other watercraft, damage moored boats and contribute to foreshore erosion. In areas of Lake Mulwala where bank erosion is significant, wash restrictions have been introduced by Waterways NSW.

The use of boats fitted with wake-enhancing devices is popular at Lake Mulwala. Concerns about the impact of these boats on the safety of other water users will be addressed in the review of the safe use of Lake Mulwala.

Refer also to Outcome D, Action 1 regarding safe use of the lake.

Dead standing and floating timber
Lake Mulwala contains extensive dead trees and other snags which provide valuable fish habitat and should be preserved. In limited cases, consideration will be given to relocation of specific snags to assist in the maintenance of navigable areas.

Refer also to Outcome C, Action 5 regarding the management of fish habitat in the lake.

Boat ramps and jetties
Existing boat ramps must be licensed and built to an appropriate standard with adequate parking. No further individual boat ramps will be permitted on Goulburn-Murray Water land on the Victorian side of the lake. Community boat ramps will be encouraged as they enable foreshore impacts to be contained and appropriately managed. Existing jetties must also be licensed and their owners will be required to have public liability insurance. No new individual jetties will be permitted on Goulburn-Murray Water land on the Victorian side of the lake.

On the New South Wales side of the lake, new jetties and boat ramps located on private land require the approval of the Corowa Shire Council. The construction of jetties and boat ramps on public land on the New South Wales side of the lake requires the approval of the Department of Infrastructure, Planning and Natural Resources. These facilities must also be licensed.

The location, adequacy and ongoing management arrangements of boat access facilities will be considered in the development of boating guidelines.

Public events
Lake Mulwala is used for a number of boating and waterskiing events each year. Such events must be planned and licensed through Waterways NSW to ensure they are conducted in a manner that does not compromise the ecological health of the lake and the safety of those using it.

Refer also to Outcome A, Action 2 regarding public events on the foreshore.
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<td></td>
<td>3 Monitor effluent disposal systems and upgrade where necessary</td>
<td>▪ Management of effluent pollution&lt;br&gt;Operations Act 1997&lt;br&gt;Victorian Environment Protection Act 1970</td>
<td>NSW Environmental Planning and Assessment Act 1979&lt;br&gt;NSW Protection of the Environment&lt;br&gt;Shire of Corowa&lt;br&gt;Shire of Moira</td>
<td>Shire of Corowa&lt;br&gt;NGW&lt;br&gt;DIPNR&lt;br&gt;North East Water&lt;br&gt;Waterways NSW</td>
<td>EPA (Victoria)&lt;br&gt;DIPNR&lt;br&gt;DEC&lt;br&gt;North East Water&lt;br&gt;Waterways NSW</td>
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<td></td>
<td>4 Implement foreshore buffer management policy</td>
<td>▪ Garden plantings of native flora encouraged on foreshore land&lt;br&gt;Reduction in amount of phosphorus flushed into the lake from surrounding lands</td>
<td>Murray River Regional Environmental Plan No.2&lt;br&gt;Corowa Local Environment Plan&lt;br&gt;Shire of Moira Planning Scheme&lt;br&gt;NSW Rivers and Foreshores Improvement Act 1948&lt;br&gt;NSW Native Vegetation Conservation Act 1997</td>
<td>GMW&lt;br&gt;Shire of Corowa</td>
<td>River Murray Water&lt;br&gt;Shire of Corowa</td>
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<tr>
<td></td>
<td>5 Develop camping management strategy</td>
<td>▪ Social, economic and environmental analysis of camping&lt;br&gt;Bush camping managed to minimise ecological impacts and human health concerns</td>
<td>Corowa Local Environment Plan&lt;br&gt;NSW Environmental Planning and Assessment Act 1979&lt;br&gt;Murray River Regional Environmental Plan No.2&lt;br&gt;Victorian Environment Protection Act 1970</td>
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### Table 3 Outcome B Improved water quality in Lake Mulwala

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<th>Priority</th>
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</table>
| Reduce impacts on water quality in Lake Mulwala | 6 Implement fuel storage policy | ▪ Underground fuel tanks and fuel lines removed from foreshore  
▪ Aboveground fuel tanks and pumps secured and bunded  
▪ No new fuel tanks or pumps on foreshore | NSW Protection of the Environment Operations Act 1997  
Victorian Water Act 1989  
Goulburn-Murray Water By-laws | GMW  
Shire of Corowa | EPA (Victoria)  
DEC  
Waterways NSW  
DIPNR | M |
| 7 Develop and implement guidelines for boating | | ▪ Clear boating guidelines developed in partnership with boat owners and operators  
▪ All watercraft and users meet NSW marine legislation and watercraft operated in accordance with this legislation  
▪ Boat ramps and jetties to be licensed and community boat ramps encouraged | NSW Marine Safety Legislation (Lakes Hume and Mulwala) Act 2001  
Corowa Local Environment Plan  
Victorian Water Act 1989  
Goulburn-Murray Water By-law No. 7 | Waterways NSW  
GMW  
DIPNR  
Shire of Corowa | | H |

DIPNR: Department of Infrastructure, Planning and Natural Resources, NSW  
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EPA: Environment Protection Authority  
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NECMA: North East Catchment Management Authority  
NSW DPI (Fisheries): Department of Primary Industries (Fisheries), NSW
Outcomes C
Improved ecological health of Lake Mulwala

The sustainability of Lake Mulwala will be secured through the preservation and enhancement of its ecological health.

5.1 Strategy: Improve management of Lake Mulwala’s biodiversity

5.1.1 Action 1: Implement biodiversity management actions

Although Lake Mulwala is an artificial water storage, in the six decades since its construction the lake has become important for the conservation of biological diversity.

Biodiversity may be valued for many different reasons: for its own sake (i.e. the intrinsic worth of an organism), for the ecosystem services it provides (e.g. water oxygenation) or for other assets that humans value (e.g. an aesthetically pleasing place to camp).

Biodiversity management needs to consider the various biodiversity components within the lake (bacteria, viruses, fungi, algae, aquatic flora, riparian flora, zooplankton, invertebrate fauna, vertebrate fauna), habitat management, weed and pest management, and threatened species, as well as provide a catchment perspective to management.

The Draft Goulburn–Murray Water Biodiversity Strategy identifies the value of ecosystem services to those areas managed by Goulburn-Murray Water and aims to identify priorities for management, conservation and restoration of biodiversity on and in Goulburn-Murray Water’s assets.

The Integrated Catchment Plan for the Murray Catchment 2002 - Murray Catchment Blueprint recognises environmental, social and economic benefits arising from healthy and functioning ecosystems and has established targets to protect and effectively manage remaining native vegetation and undertake long-term restoration of depleted ecosystems.

Only a comprehensive approach to management will maintain these biodiversity values. It will help to ensure that potentially conflicting activities do not compromise the lake’s ecological integrity.

This Plan addresses those actions in and around Lake Mulwala which are necessary to contribute to the ecological health of the lake and downstream. In this context, the Plan should be seen as just one small part of an integrated catchment management approach being adopted throughout the Murray-Darling Basin.

Grazing and cropping
Grazing and cropping will be progressively phased out on the foreshore lands around Lake Mulwala, subject to consultation with the affected landholders and the catchment management authorities.

29 GMW (2002)
On the foreshore land managed by Goulburn-Murray Water on the Victorian side of the lake, grazing licences will be replaced by short-term permits by June 2005. Controlled grazing will continue as an appropriate land use. Grazing permits will only be granted where there is no harm to the foreshore or to water quality.

In New South Wales, negotiation between the government agencies and landholders will work towards the phasing out of grazing and cropping on privately-owned foreshore lands.

**Feral animals**

Feral animals, particularly cats, foxes and rabbits, are a threat to native wildlife either as predators or competitors. Partnerships between agencies, landholders and community groups are needed to effectively manage feral animals around Lake Mulwala.

### 5.1.2 Action 2: Implement management plan for riparian vegetation

Riparian vegetation has a critical role in determining water quality and providing habitat for fauna. Its management thus requires specific consideration, with a riparian vegetation management plan to complement overall biodiversity management.

At the time of European settlement, three ecological vegetation classes were present around Lake Mulwala: riverine mosaic, plains grassy woodland and pine-box woodland. Small remnant areas of each remain around the lake and they must be retained and protected. Strategic rehabilitation of foreshore areas around the lake will target areas with poor existing native vegetation cover in order to improve riparian values.

The management plan for riparian vegetation should build upon the *Lake Mulwala Aquatic Vegetation Management Plan*[^30] (see the executive summary in Appendix D).

**Revegetation**

Strategic restoration of riparian zones will be undertaken where little or no native vegetation cover is present. The lake foreshore will predominantly be revegetated using local native plant species.

The creation of native vegetation zones on the New South Wales side of the lake will be encouraged, including cost sharing by the Murray-Darling Basin Commission where appropriate, through partnerships with landholders.

On the Victorian side of the lake, landscape management plans will be required which incorporate the use of native vegetation (refer to Outcome A, Action 1).

**Fencing**

In Victoria, the boundary between public and private land in residential areas requires clear delineation and this will generally be in the form of non-intrusive line-of-sight markers. In high public use areas on the Victorian side of the lake, fencing may be required for safety, security and protection of the environment.

In New South Wales, the long-term aim of the Plan is to fence the foreshore to achieve a buffer zone and prevent stock watering in the lake. This will be achieved though individual

[^30]: Water EcoScience (2001)
agreements with landholders. In the residential areas on the New South Wales side of the lake, most of the boundaries between public and private land are under water so this component of the Plan has no influence. Where this is not the case the approach to delineating the boundary between public and private land will be the same as in Victoria.

**Weeds**

Weeds pose a major environmental concern on the foreshore lands around Lake Mulwala. They aggressively compete with local native plants, produce different leaf litter and use up nutrients and moisture. An integrated weed control program is required, involving both public and private land managers.

**Willows**

Given their capacity for environmental damage, particular consideration should be given to the management of willows (*Salix* species) in the lake. Willow replacement will be undertaken on a carefully considered site-by-site basis. The highly invasive crack, basket and black willow will be removed from the islands within the lake and the publicly owned foreshore lands.

Where weeping willows are helping to stabilise the bank they will be retained and maintained until an effective natural and indigenous alternative can be found and proven.

**Landscape management plans** *(refer to Outcome A, Action 1)*

5.1.3 **Action 3: Implement management plan for aquatic vegetation**

The *Lake Mulwala Aquatic Vegetation Management Plan* provides the basis for management of the aquatic vegetation in Lake Mulwala (see the executive summary in Appendix D). Key actions in relation to the management of aquatic vegetation include:

- control of weeds such as leafy elodea (*Egeria densa*) and arrowhead (*Sagittaria graminea*);
- retention of edge-stabilising reeds and rushes; and
- enhancement of native aquatic vegetation.

5.1.4 **Action 4: Implement fish management policy**

As a popular recreational activity at Lake Mulwala for locals and tourists, fishing has the potential to impact upon the sustainable values of the lake either directly through depletion of breeding stocks of native fish or indirectly through damage to the environment, such as littering or habitat removal.

As of 1 September 2004, the NSW Department of Primary Industries (Fisheries) will be responsible for the management of recreational fishing in Lake Mulwala, thereby enabling uniform seasonal closures and bag, size and gear regulations to apply for the entirety of the lake. This arrangement between New South Wales and Victoria has been implemented through an agreement under the *Victorian Fisheries Act 1995* and the *NSW Fisheries Management Act 1994*. However, Victoria will continue to manage recreational fishing in the Oven’s River upstream of the Bundalong boat ramp.

Management of fish populations at Lake Mulwala will be undertaken in accordance with the *Native Fish Strategy for the Murray-Darling Basin 2003 – 2013*.  

31 MDBC (2004)
5.1.5 **Action 5: Implement fish habitat protection policy**

Lake Mulwala is an important site for native fish species, which in turn draws recreational anglers to the lake. The lake is one of the primary nurseries for Murray cod within the Murray-Darling system and fish habitat must be protected in order to maintain and enhance the native fish stocks within the lake. Habitat for native fish is primarily submerged or partially submerged dead trees and fallen timber, along with areas of aquatic vegetation and overhanging riparian vegetation. These features are at odds with many water-related recreational activities which require extensive stretches of open water.

Goulburn-Murray Water storages, including Lake Mulwala, are managed to ensure that fisheries and fishing related activities are sustainable in the long term. An important component of this is habitat restoration for fish populations. The relocation of dead trees (standing or fallen) from Lake Mulwala will only be permitted in clearly justified operational or safety circumstances. Wherever practical, any woody debris causing a navigational hazard will be relocated within the lake.

Fisheries legislation in New South Wales and Victoria regards floating timber which gets lodged in jetties or boat ramps as fish habitat. Relocation requires consultation with Fisheries authorities. The practical difficulties associated with this approach are acknowledged. This Plan is designed to promote discussion between the agencies responsible for fish management (NSW Department of Primary Industries (Fisheries) and the Victorian Department of Sustainability and Environment), the boating authority (Waterways NSW) and the community to achieve an appropriate outcome to dealing with this issue and others relating to habitat generally.

5.1.6 **Action 6: Identify and remedy unacceptable environmental risks**

A number of things pose a significant risk to the ecological health of Lake Mulwala. These include the potential for:

- pollution of the water from fuel spills;
- damage to fish habitat;
- invasion by exotic weeds;
- invasion by introduced animals; and
- erosion due to wave action from boats.

A comprehensive environmental risk assessment study, following Goulburn-Murray Water’s Environmental Management System, is required to identify potential risks. This will enable an objective determination of the level of risk associated with particular structures or activities and highlight those that need to be modified to reduce risks to acceptable levels. It will also help determine the effectiveness of the policies outlined in other parts of this Plan.
5.1.7 **Action 7: Improve local knowledge and understanding of biodiversity**

Education and awareness-raising are critical to the successful management of Lake Mulwala’s biodiversity and ensuring the lake’s sustainability. When individuals become aware that their actions may lead to a detrimental effect on biodiversity, resulting in a loss of values, then more often than not changed behaviour and appropriate actions ensue.

Outcome E contains further information in relation to increasing community awareness of the importance of biodiversity.
## Table 4 Outcome C Improved ecological health of Lake Mulwala

<table>
<thead>
<tr>
<th>Outcome C</th>
<th>Improved ecological health of Lake Mulwala</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Actions</strong></td>
<td><strong>What this will mean</strong></td>
</tr>
<tr>
<td>1</td>
<td>Implement biodiversity management plan for riparian vegetation</td>
</tr>
<tr>
<td>2</td>
<td>Rehabilitation of riparian vegetation</td>
</tr>
<tr>
<td>3</td>
<td>Native water plants preserved</td>
</tr>
<tr>
<td>4</td>
<td>Implement fish management policy for aquatic vegetation</td>
</tr>
<tr>
<td>5</td>
<td>Implement fish habitat protection policy</td>
</tr>
<tr>
<td>6</td>
<td>Identify and remedy unacceptable environmental risks</td>
</tr>
<tr>
<td>7</td>
<td>Improve local knowledge and understanding of biodiversity</td>
</tr>
</tbody>
</table>
Outcome D
Safe use of Lake Mulwala

A safe environment is essential for everyone using the lake.

6.1 Strategy: Undertake a risk-based approach to safety management at Lake Mulwala

6.1.1 Action 1: Identify and remedy unacceptable safety risks

**Boating**
The development and implementation of guidelines for the management of boating on Lake Mulwala (Outcome B, Action 7) will include a consideration of concerns relating to boating safety.

The risks from boating that have been identified at Lake Mulwala include concerns about:

- the number, size and type of boats on the lake;
- the potential for collisions between craft as boat numbers increase;
- the large wash from larger craft putting smaller boats at risk; and
- boats fitted with wake enhancing devices which can create a wave capable of capsizing smaller craft and endangering swimmers.

Through the Boating Users Group established by Waterways NSW, the safety issues associated with boating in the lake can be addressed with the input of local boat users and other members of the community.

**Submerged timber**
Submerged debris pose a risk to people undertaking water-based recreational activities, in particular waterskiing. Submerged timber will be retained as fish habitat, so obstacles that are potentially dangerous to lake users will be realigned or lopped where possible. In limited cases, consideration should be given to relocation of specific snags to assist in maintaining navigable channels or areas. Waterskiing areas will also be clearly delineated. Signs warning of navigational hazards, including submerged objects, will be located at authorised public boat ramps and launching locations around the lake.

*Refer also to Outcome B, Action 7 concerning navigational hazards and Outcome C, Action 5 regarding the management of fish habitat.*

**Falling trees**
Falling tree limbs are a known risk in areas where public access is permitted. Attention to potentially dangerous situations and use of appropriate warning signs is required.

**Structures on public land**
Unsafe structures on public land have been also been identified as a risk to users of the foreshore. These will either need to be removed (rope swings, slides and foreshore equipment) or be licensed and meet appropriate standards (jetties, boat ramps, retaining walls).

*Refer also to Outcome B, Action 7 in relation to the requirements for boat ramps and jetties.*
**Risk assessment**

A comprehensive risk assessment study is required to identify potential risks to the safety of people using the lake. This will enable an objective determination of the level of risk associated with particular structures, hazards or activities and highlight those that need to be modified to reduce risks to acceptable levels.

The results of the risk assessment study should be incorporated into the management of:

- stormwater (see Outcome B, Action 2)
- foreshore land (see Outcome B, Action 4)
- camping (see Outcome B, Action 5)
- fuel storage (see Outcome B, Action 6)
- boating (see Outcome B, Action 7)
- access to the foreshore (see Outcome A, Action 2)
- cultural heritage (see Outcome A, Action 3)
- traffic management (see Outcome A, Action 4)
- riparian vegetation (see Outcome C, Action 2)
- aquatic vegetation (see Outcome C, Action 3)
- fish habitat (see Outcome C, Action 5).

### 6.1.2 Action 2: Improve awareness of the need for safe use

Greater awareness of the guidelines for the activities on and around the lake will lead to increased safety of all users of the lake and its surrounding lands. This awareness-raising campaign will be an important part of Outcome E, Action 1.
<table>
<thead>
<tr>
<th>Strategies</th>
<th>Actions</th>
<th>What this will mean</th>
<th>Implementation mechanism responsibility</th>
<th>Coordinating organisations</th>
<th>Partner</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undertake risk-based approach to safety management at Lake Mulwala</td>
<td>1 Identify and remedy unacceptable safety risks</td>
<td>▪ Unacceptable safety risks addressed ▪ Maintenance of navigable areas within Lake Mulwala</td>
<td>Lake Mulwala Management Plan</td>
<td>GMW</td>
<td>River Murray Water DIPNR DSE/DPI, Parks Victoria Waterways NSW Shire of Corowa Shire of Moira</td>
<td>H</td>
</tr>
<tr>
<td>2 Improve awareness of the need for safe use</td>
<td>Users of the lake consider the safety of themselves and others</td>
<td></td>
<td>Lake Mulwala Management Plan</td>
<td>GMW</td>
<td>River Murray Water DIPNR DSE/DPI, Parks Victoria Waterways NSW Shire of Corowa Shire of Moira</td>
<td>H</td>
</tr>
</tbody>
</table>

DIPNR: Department of Infrastructure, Planning and Natural Resources, NSW  
DSE/DPI: Department of Sustainability & Environment/Department of Primary Industries, Victoria  
DEC: Department of Environment and Conservation, NSW  
EPA: Environment Protection Authority  
GBCMA: Goulburn Broken Catchment Management Authority  
GMW: Goulburn-Murray Water  
NECMA: North East Catchment Management Authority  
NSW DPI (Fisheries): Department of Primary Industries (Fisheries), NSW
Outcome E
A community committed to the sustainable use of Lake Mulwala

Everyone who uses and values Lake Mulwala should be aware of the way in which their activities on and around the lake may affect its sustainability. This is the only way to balance the potentially competing values of Lake Mulwala for the benefit of all users. There is widespread community support for ensuring that existing users are made aware of actions that may negatively affect the social, economic and environmental values of the lake.

7.1 Strategy: Engage the community in the management of Lake Mulwala in order to enhance its values

7.1.1 Action 1: Develop and implement community awareness-raising program

A comprehensive, integrated community awareness-raising program can provide an important part in achieving meaningful management of Lake Mulwala. The actions of people, whether they are locals or visitors, play an important role in determining impacts upon the sustainability of the lake. Those actions are the consequences of attitudes which are in turn the result of knowledge and understanding.

An awareness-raising campaign should carefully explain the way in which activities on and around the lake affect its value as an environmental, economic and recreational resource. The decisions that people make while camping, fishing and boating, or as property owners fronting the lake, can make a positive difference to the sustainability of Lake Mulwala.

This Plan concurs with the NSW Council of Environmental Education’s31 recognition that “quality environmental education promotes changes in personal behaviour, and social and organisational practices to deliver changes in broad social, economic and physical infrastructure.”

Lake users should be aware of the regulation of activities and development associated with Lake Mulwala. An important part of this will be an understanding of the roles of the various agencies and organisations involved in the management of Lake Mulwala and to whom users should go for advice about their activities.

7.1.2 Action 2: Establish Lake Mulwala Community Reference Group

The establishment of a Community Reference Group is proposed as an important step in engaging the community in the management of Lake Mulwala. This group will assist in building and establishing partnerships between the community, special interest groups and governments.

The role of the Lake Mulwala Community Reference Group will be to:

- provide advice to the Manager, Murray Headworks, Goulburn-Murray Water;
- help prioritise the implementation of the actions in the Lake Mulwala land and On-water Management Plan;
- advise on community engagement activities, such as informing and raising community awareness on the importance of environmental issues in the local area;
- provide feedback to community interest groups;
- identify other environmental initiatives in the Lake Mulwala region and work collaboratively where possible;
- provide advice on consultation strategy and play an active role in on-going consultation;
- help to develop a framework for evaluating progress;
- monitor and evaluate the implementation of the Plan; and
- assist the review of the plan every five years.

Membership of the Community Reference Group will consist of:

- an impartial and respected Chair;
- a representative from both Corowa and Moira Shire Councils; and
- 4 – 5 community representatives with specific skill sets and broad representation across the community.

There will be a call for Expressions of Interest for membership of the Community Reference Group in conjunction with the release of the Plan.

In addition to the Manager, Murray Headworks, Goulburn-Murray Water being in attendance at all meetings, a representative from the NSW Department of Infrastructure, Planning and Natural Resources will attend as a standing observer. Representatives of other agencies will be invited to attend meetings either as observers or in an advisory capacity as appropriate.
<table>
<thead>
<tr>
<th>Strategies</th>
<th>Actions</th>
<th>What this will mean responsibility</th>
<th>Implementation mechanism organisations</th>
<th>Coordinating partners</th>
<th>Partner</th>
<th>Priority</th>
</tr>
</thead>
</table>
| Engage the community in the management of Lake Mulwala in order to enhance its values | 1 Develop and implement community awareness-raising approach | ▪ A community that recognises how their activities affect the lake’s sustainability  
▪ A community that understands the role of agencies and knows where to go for advice | Lake Mulwala Management Plan  
Living Murray  
Water Sharing Plan for NSW Murray - Lower Darling Regulated River water Source  
Integrated Catchment Plan for the Murray Catchment 2002 - Murray Catchment Blueprint | GMW | River Murray Water  
Shire of Corowa  
Shire of Moira  
DIPNR, Parks Victoria  
DSE/DPI, GBCMA  
NECMA  
Murray Catchment Management Board | H |
| 2 Establish Lake Mulwala Community Reference Group | | ▪ A community working in partnership with agencies to manage Lake Mulwala | Lake Mulwala Management Plan | GMW | Shire of Corowa  
Shire of Moira  
DIPNR, Parks Victoria  
DSE/DPI  
River Murray Water  
Waterways NSW  
NSW DPI (Fisheries)  
Local community representatives | H |

DIPNR: Department of Infrastructure, Planning and Natural Resources, NSW  
DSE/DPI: Department of Sustainability & Environment/Department of Primary Industries, Victoria  
DEC: Department of Environment and Conservation, NSW  
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GMW: Goulburn–Murray Water  
NECMA: North East Catchment Management Authority  
NSW DPI (Fisheries): Department of Primary Industries (Fisheries), NSW
References


### Members of the Lake Mulwala Steering Committee

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Organisation</th>
<th>Period of membership on Steering Committee</th>
<th>Number of meetings attended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stuart Gemmill</td>
<td>Project Manager</td>
<td>Goulburn-Murray Water</td>
<td>2001 - 2004</td>
<td>6*</td>
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<tr>
<td>David Jeffery</td>
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<tr>
<td>Liz Symes</td>
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<td>2*</td>
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<td>David Dreverman</td>
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<tr>
<td>Roy Cornwall</td>
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<td>1</td>
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<td>Scott Kidd</td>
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<tr>
<td>Neville Fowler</td>
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<tr>
<td>Joy Sloan</td>
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<td>3*</td>
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<tr>
<td>Gavin Cator</td>
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<td>2001</td>
<td>1</td>
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<tr>
<td>Bill Hayward</td>
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<td>2001</td>
<td>1</td>
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<tr>
<td>Michael Byrne</td>
<td>Manager Assets and Infrastructure</td>
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<tr>
<td>Keith Kan</td>
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<tr>
<td>Peter Carroll</td>
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<tr>
<td>Gary Arnold</td>
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<tr>
<td>Bob Parr</td>
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<tr>
<td>Gordon O'Brien</td>
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</tr>
<tr>
<td>Leah Smith</td>
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</tr>
<tr>
<td>Peter Adrian</td>
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<tr>
<td>Stefan Press</td>
<td>Environmental Planning Officer, Riverina and South East</td>
<td>Department of Infrastructure, Planning and Natural Resources, NSW</td>
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<tr>
<td>Sarah Fairfull</td>
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<tr>
<td>Alison King</td>
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<tr>
<td>Adam Vey</td>
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<tr>
<td>Mark Bailey</td>
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<tr>
<td>Sue Grau</td>
<td>Water Quality Officer</td>
<td>Murray-Darling Basin Commission</td>
<td>2002</td>
<td>1</td>
</tr>
</tbody>
</table>
Appendix B

Water Management Authorities

**Goulburn-Murray Water**
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**River Murray Water**
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CANBERRA ACT 2601
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E-mail: info@mdbc.gov.au

**North East Water**
PO Box 863
WODONGA VIC 3689
Phone: 02 6022 0555
Fax: 02 6024 7454
E-mail: nerwa@nerwa.vic.gov.au

Catchment Management Authorities

**Goulburn Broken Catchment Management Authority**
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**North East Catchment Management Authority**
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**Murray Catchment Management Authority**
C/- Department of Infrastructure, Planning and Natural Resources
PO Box 205
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State Government – Victoria

**Department of Primary Industries**
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WODONGA VIC 3690
Phone: 13 61 86 / 02 6055 6111
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**Department of Sustainability and Environment**
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BENALLA VIC 3672
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**Environment Protection Authority Victoria**
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**Parks Victoria**
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State Government – New South Wales

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http://www.dipnr.nsw.gov.au

Agencies involved in the management of Lake Mulwala

[The text following the agencies' information is not included in the natural text as it is not legible.]
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Phone: 02 6022 0600
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Roads and Traffic Authority, NSW
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Councils

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**AHD**  Australian Height Datum, a standard basis for measuring height relative to mean sea level in Australia.

**Best practice**  The practice of discovering better ways of managing performance, adopting procedures and measuring performance against the best standard available. Best practice goes beyond compliance and is where real benefits are found.

**Blue-green algae**  Naturally occurring, microscopic, primitive photosynthetic bacteria. Under certain conditions (including high nutrients, warm still water, strong sunlight into the water) they can bloom into a dense and visible growth and may become toxic.

**Biodiversity**  Abbreviation of biological diversity. The variety of life forms: the different plants (flora), animals (fauna) and micro-organisms. It includes the genes they contain and the ecosystems they form. Biodiversity is often considered at three levels – genetic diversity, species diversity and ecosystem diversity.

**Buffer**  A vegetated strip of land that functions to absorb sediment and nutrients.

**Catchment**  The area of land determined by topographic features (e.g. hills, valleys and plains), within which rainfall will contribute to stormwater runoff at a particular point.

**Cultural heritage**  Includes architectural works, inscriptions, buildings, and works of humans important from a historical, aesthetic, ethnological or anthropological point of view.

**Ecological health**  A measure of ecological integrity.

**Ecological integrity**  Native components intact, including physical elements, biodiversity, and processes such as fire, flooding, and predation.

**Ecological value**  A quality of the environment that has worth, utility or importance.

**Ecosystem**  A dynamic complex of plant, animal, fungal and micro-organism communities and the associated non-living environment, considered as a total unit.

**Ecosystem services**  The beneficial outcomes, for the natural environment, or for people, that result from the functioning of an ecosystem.

**Effluent**  Waste, usually liquid, released or discharged to the environment. Generally, the term refers to discharges of sewage or contaminated wastewaters.

**Environmental flows**  Flows, or characteristics of the flow pattern, that are either protected or created to supply the needs of the environment. The timing, volume and quality of environmental flows are all critical aspects and, like the natural flow of rivers, different combinations will provide a different range of benefits for each ecosystem. Appropriate environmental flows ensure that the key chemical, geomorphological and ecological processes necessary for healthy river ecosystem keep functioning.

**Floodplain**  Relatively flat land beside a river that is inundated when the river overflows its banks during a flood.

**Foreshore**  Strip of land adjoining a water body. At Lake Mulwala, the foreshore land on the Victoria side of the lake is owned and/or managed by Goulburn-Murray Water. On the New South Wales side of the lake, the majority of the foreshore land is privately owned.

**Full supply level**  The nominal maximum design operating level of a water storage. At Lake Mulwala the full supply level is 124.90 m AHD.

**Habitat**  The structural environment where an organism lives for all or part of its life.

**Integrated management**  Refers to using a mix of methods or variety of practices. This will involve bringing together the perspectives of all managers and users so as to develop an agreed approach to management.
**Invertebrate**  Animal without a backbone (e.g. zooplankton, worms, insects, shellfish, shrimps, yabbies and snails). Invertebrates are important indicators of water quality.

**Native vegetation**  Indigenous trees, understorey plants, groundcover and wetland plants.

**Navigable channel**  Sufficiently deep or wide to provide passage for vessels.

**Nutrients**  Substances, such as phosphorus and nitrogen, that are necessary for plants (and algae) to grow.

**Nutrient loads**  The total amount of a nutrient entering a water body during a given time (e.g. tons of phosphorus per year).

**Planning instrument**  A document which describes the current planning status and/or future developments of an area. It may be a Local, State or Federal policy document.

**Rain rejection**  When local rain and a temporary reduction in irrigation demand results in a rise in water levels in a lake.

**Ramsar**  Convention on Wetlands of International Importance, adopted following an international conference, held in Ramsar, Iran, in 1971.

**Rehabilitation**  Involves improving the most important aspects of the environment. This is usually the common goal for groups and individuals undertaking waterway improvement projects.

**Revegetation**  Re-establishing native vegetation species to an area from which they have previously been removed.

**Restoration**  Involves returing the environment of an area to its pre-European condition.

**Riparian**  Any land that adjoins or directly influences a body of water, including areas surrounding lakes, wetlands and floodplains, land immediately alongside small creeks and gullies and depressions in which water runs.

**Risk assessment**  A review of those activities likely to impact negatively on the issues being considered.

**Risk-based approach**  Consideration of injury, damage or loss that could be caused by some activity.

**Snags**  Large woody debri such as logs and branches that fall into water bodies.

**Stormwater**  Technically, all runoff is stormwater. However the term is generally used in reference to urban runoff in stormwater drainage systems.

**Sustainable**  Using, conserving and enhancing the community’s resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased.

**Threatened species**  Generic term for a plant or animal generally considered as vulnerable or endangered under various threatened species conservation laws. It is used to indicate that there is some level of threat as to the species’ viability in the wild.

**Wake-enhancing device**  A piece of equipment designed to increase the weight of a boat. A heavier boat creates a larger wake, allowing wakeboarders to jump higher. The most common form of wake-enhancing device is known as a ‘fat sack’, which is a tubular bag that is filled with water and placed at the rear of the boat or along the sides.

**Waste**  Any discarded, surplus or abandoned matter that, if discharged to the environment causes pollution.

**Waste management**  Action of controlling and processing waste, including refuse from humans and animals.
Lake Muwala is the impoundment formed by Yarrawonga Weir. The lake provides for a range of social, economic, agricultural and recreational uses. Tourism brings substantial economic benefit to the region, whilst agricultural activities resourced by the irrigation system are economically significant to the local and national economy. Over time the ecology of the waterbody has changed appreciably, so too has the proliferation of the aquatic vegetation. From a social perspective, community concern has been expressed and from a management viewpoint the increase in the number of species and their quantity presents a considerable challenge. Similarly, environmental concerns have been raised regarding the presence of exotic and invasive aquatic species. Inasmuch as there are problematic species within the lake there are also a number of endemic and desirable aquatic species. These plants provide for a range of habitat requirements for aquatic vertebrates and macro invertebrates, i.e. food, shelter, breeding grounds and protection. Therefore, whilst some aquatic vegetation may interfere with recreational activities, there is a need to manage the aquatic vegetation to ensure the positive values that comprise water quality and aquatic ecosystem health are assured.

The objectives of the management plan were to produce a framework for aquatic and riparian vegetation management, broadly defined as:

- the retention of water quality, quantity, recreational and environmental characteristics; and
- a strategic approach for management of recognised problematic aquatic species.

In the development of the management plan, stakeholder concerns and legislative requirements were considered and subsequently integrated into the overall process. A number of strategies have been developed for the effective management of both exotic and native species.

Strategies include:

- short term actions for control of species such as *Egernia densa* and *Sagittaria graminea*. Briefly the actions entail measures such as survey at the time of drawdown and the subsequent evaluation of recruitment once the lake is refilled;
- research and documentation of exotic species to understand the conditions and triggers for growth;
- greater knowledge of the wider implications such as catchment inputs to the system as well as downstream implications;
- revegetation and rehabilitation of the riparian zone with native endemic vegetation;
- long term actions to provide the community with a greater awareness of issues;
- monitoring of vegetation;
- enhancement of all native aquatic vegetation;
- removal of non-indigenous and hazardous vegetation from the riparian zone (*Salix* sp.)
- control of active erosion on sites immediately adjoining the lake;
- assess high risk areas and produce actions based on prioritisation list; and
- ongoing community education program advocating the need for retention of edge-stabilising reeds and rushes.