Lake Eildon

Land and On-Water Management Plan 2012

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Cover Photography:
Image of wakeboarder courtesy of Tony Herridge.

Executive Summary

Vision for Lake Eildon:

Lake Eildon is valued as Victoria's premier inland water storage. By providing essential water resources to downstream communities it enables widespread economic benefit, while its outstanding natural features, through a coordinated management approach, provide world class recreation, tourism and lifestyle opportunities.

Lake Eildon is one of Victoria's most popular holiday destinations. It has over 500 kilometres of shoreline and stores six times as much water as Sydney Harbour at full supply level. Abutting the lake is the Lake Eildon National Park. The park manages 27,750 ha of rugged hills with open woodlands through to dense forest.

Construction on what is now Lake Eildon began in 1915 by the flooding of rivers and valleys within Victoria's high country. Lake Eildon is an important supplier to downstream irrigation and environmental users as well as urban water authorities. The lake has also been a popular holiday destination for many years and is home to a substantial houseboat fleet. There are also a number of camping grounds and caravan parks surrounding the lake. Water sports are very popular at Lake Eildon due to its large surface area and extensive shoreline. Other popular activities include boating, bushwalking, trail bike riding, swimming and fishing.

Planning, management and resourcing of land and on-water issues has in the past tended to be reactive rather than proactive with no integrated overarching plans for the management of land and on-water issues.

Land and On-Water Management Plans are being developed for all of the Goulburn-Murray Water storages through an extensive process of engagement with communities to ensure the Plans have strong community support for their implementation.

The Lake Eildon Land and On-Water Management Plan aims to increase communication, consistency, coordination and cooperation between agencies, stakeholder groups and the community to protect the lake's values and attributes.

Management of water levels in Lake Eildon and operational issues, including lake levels and the management of releases, are questions beyond the scope of this Plan.

The Plan is a dynamic document and will continue to evolve as the various actions and strategies that it identifies are developed and implemented.

It is proposed that the Plan will be reviewed every five years.

Acknowledgement of the Traditional Owners of the Lake Eildon catchment:

This Plan acknowledges and pays its respect to the Taungurung people as the Traditional Owners of the Lake Eildon catchment. The Plan recognises and acknowledges that the Traditional Owners and their Nations have a deep cultural, social, environmental, spiritual and economic connection to their lands and waters. The Plan understands the need for recognition of Traditional Owners' knowledge and cultural values during the implementation of actions set out in this Plan.

1. Objectives of the Plan

The main objectives of the **Lake Eildon Land and On-Water Management Plan** are to:

- Identify and enhance Lake Eildon's environmental, social (including recreational) and economic values by outlining key actions to be implemented during the next five years.
- Provide for safe public access for recreational users, whilst ensuring protection of operational requirements and long term water quality as a resource for local and downstream users.
- Improve formal and informal processes and planning instruments to manage the lake and surrounding foreshore and improve the management of development pressures around the lake.
- Enhance natural and cultural values by obtaining broad-scale agreement between agencies on principles for sustainable use and development of the lake and surrounding foreshore.

2. Context

2.1 Lake Eildon Development

Construction on what is now Lake Eildon began in 1915 by the flooding of rivers and valleys within Victoria's high country. This resulted in the relocation of Bonnie Doon, a number of landowners and the redevelopment of road systems and other infrastructure, establishing the lake in an existing, mixed use catchment.

There has been subsequent and widespread subdivision of rural living style allotments as well as the growth of existing townships. There is a flourishing residential community around the lake, particularly on the eastern side. A proportion of this population (up to 48% of Mansfield Shire ratepayers) divide their time between Lake Eildon and other locations, often Melbourne.

2.2 Lake Eildon as a Water Supply

The second largest inland water storage in Victoria, Lake Eildon is one of the state's most important waterways. Water released from Lake Eildon is diverted for irrigation purposes and supplies approximately 60% of water used in the Goulburn Murray Irrigation District (GMID). At full supply the storage has a water area of 13,840 ha and a shoreline extending 515 kilometres. Storage levels are affected by weather conditions and by climate change.

Approximately 96% of the water diverted from the GMID is delivered to water entitlement holders for irrigation or environmental purposes. The remaining 4% is supplied to urban water authorities for domestic water supply. Water from Lake Eildon is not potable and is treated by urban water authorities before being supplied to customers.

2.3 Storage Operations

Lake Eildon's primary purpose is to provide water to downstream communities and consumptive users. Storage operations, including water levels and release patterns are primarily driven by this imperative. This has implications for recreational users, who cannot be assured of consistent high water levels, especially during periods of low rainfall when irrigation and environmental users rely heavily on the storage.

The Lake Eildon Land and On-Water Management Plan cannot make specific recommendations regarding the management of water levels in Lake Eildon. Operational issues including lake levels and the management of releases are questions beyond the scope of this Plan. Further information about the operation of water releases from Lake Eildon and the Eildon Pondage can be found in Appendix A.

2.4 Land Status

Goulburn–Murray Water manages the lake bed and the immediate foreshore land. This land is a mixture of freehold land held in title and Crown Land with vested management. The land is managed for the State Government on behalf of the people of Victoria and the general management arrangements treat the freehold land as public land

Approximately 50% of the foreshore is bounded by the Lake Eildon National Park. The remaining area of the foreshore is bounded by private land. Lake Eildon's western shore was declared as Fraser National Park in 1957 and in 1980 the forest to the south and north was declared as Eildon State Park. The two parks were joined in June 1997 to create the 27,500 ha Lake Eildon National Park. State Forest and private plantations, primarily owned by Hancock Victorian Plantations (formerly Victorian Plantations Corporation), also surround the lake.

The Howqua River feeding into Lake Eildon is listed under the *Commonwealth Heritage Rivers Act* 1992.

2.5 Legal Status

The Lake Eildon Land and On-water Management Plan has no legal status. It will not impose any new legal or statutory requirements but may influence policy, leading to legislation changes to help meet the objectives of this Plan.

The Plan does not override any Local Government planning schemes or legislation.

2.6 Study Area

The geographic scope of this Plan is limited to the lake and pondage foreshore and the surrounding areas. Direct management control of water authorities is limited to areas of lake bed and foreshore public land. While the Plan focuses on the lake and foreshore areas it also aims to positively influence activities throughout the broader catchment.

3. A Plan for the Management of Lake Eildon

3.1 Plan Implementation

During the development of the Lake Eildon Land and On-Water Management Plan, participants involved in the consultation expressed support for the formation of a Plan Implementation Group for the lake. An Implementation Group can be used as a vehicle to enhance communication between Implementation Group members, increase understanding about issues relating to the lake and most importantly guide the implementation of the Plan.

For this Plan, it was agreed that an Implementation Group would be established that would include community representatives, business owner/industry representatives and key agency representatives.

Mansfield and Murrindindi Shire Councils formally support the Lake Eildon Land and On-Water Management Plan, seeing the Plan as an important step in communication and cooperation between agencies, stakeholder groups and community to ensure the long term sustainability of Lake Eildon as one of Victoria's most important inland waters.

3.1.1 Lake Eildon Plan Implementation Group

The Lake Eildon Plan Implementation Group will play an important role in enabling the Lake Eildon community and various user groups to have ongoing input into the implementation of the actions identified in this Plan. It will also help to identify and manage any new issues arising.

The Implementation Group will:

- Assist with the implementation and monitoring of actions in the Plan.
- Engage representatives from community groups including the Indigenous community, houseboat and other recreational users, adjacent landowners and licence holders to provide input into the implementation of actions.
- Provide a forum for agency representatives and the community to exchange ideas in relation to management of the lake, and to discuss policy and regulatory changes relevant to the management of the lake.
- Discuss infrastructure planning, media issues and management.

The Lake Eildon Plan Implementation Group should include but not be limited to:

- A Goulburn-Murray Water General Manager or their nominee.
- An independent chairperson.
- One Councillor from each Council (Murrindindi and Mansfield Shire Council), or their nominee.

- One community representative from each Municipality.
- One business representative from each Municipality.
- Key agency representatives (e.g. a Regional Director or their nominee from Department of Sustainability and Environment and Parks Victoria, Department of Primary Industries, and Goulburn Broken Catchment Management Authority (CMA)).

Objectives

To establish a Lake Eildon Plan Implementation Group to advise on the implementation of the Plan and to ensure that activities on and around the lake are consistent with Council strategies, policies and plans.

To encourage the Implementation Group to take ownership of the vision for Lake Eildon.

Action

1. Establish a Lake Eildon Plan Implementation Group to guide the implementation of the Plan and communicate priorities in the Plan.

Stakeholders

Goulburn-Murray Water, Parks Victoria, Department of Sustainability and Environment, Department of Primary Industries, Goulburn Broken Catchment Management Authority, Goulburn Valley Water, Murrindindi and Mansfield Shire Councils and community groups.

3.2 Education and Awareness

Improved education and awareness programs are important to help protect water quality and the surrounding environment, and raise awareness of how different activities can impact on the lake. Education and awareness programs are also required to help the community understand how the lake operates, disseminate information on forecast water levels and demands, and the destination (use) of water discharged from the storage. With a better appreciation of the operating constraints, the impacts of activities and role of the storage, communities will be informed and better prepared for changing water levels in the lake.

Various mechanisms can be used to increase education and awareness including interpretive signage, websites and fact sheets. Enhancing the Goulburn-Murray Water website and encouraging greater use will improve awareness and understanding of how the lake operates and the impacts of activities on the lake and its surrounds.

3.2.1 Education and Awareness Programs

Lake users and visitors, local residents and surrounding landowners play an important role in sustainable management of the lake. All those who interact with the lake have a duty of care to maintain the health of the lake and its surrounds. The choices people make while boating, camping or as property and business owners in the vicinity of the lake can potentially affect the health and long term sustainability of the lake and its surrounds. Education and awareness campaigns can play a large part in changing attitudes towards the lake and illustrating how different activities can impact negatively on the health of the environment.

During the development of the Plan, a Code of Conduct was recommended to provide relevant information and a useful set of guidelines to enhance the health and safety of users and minimise the impacts of recreational activities on the lake and its surrounds. It was suggested that the Code of Conduct should be displayed at strategic locations around the lake.

During the development of the Plan, people were invited to submit an online survey to direct input into the consultation process. Over 335 responses were received for Lake Eildon (G-MW, 2012). A large proportion of the online responses illustrated the need for further information relating to how the lake operates and forecasting of water levels in the lake. In addition to further information about forecasts and operation of the lake, the online responses indicated that people would clearly benefit from further information about how the seasonal allocations for irrigation water work.

Key Issues

- Lack of understanding about how the lake operates.
- Lack of awareness and understanding about the impacts of activities on the lake and its surrounds.

Objectives

To increase awareness and understanding of how the lake is operated including forecasting of water levels in the lake.

To increase awareness and understanding of the need to minimise impacts on the environment.

Actions

2. Develop a single Code of Conduct for the lake which includes information about user and agency responsibilities relating to boating and boating safety, camping, solid waste, wastewater and emergency management. The Code of Conduct should include information about the importance of designated public access in minimising impacts on the environment.
3. Develop an education and awareness program to increase understanding of the value of riparian frontages and the impacts of recreational activities, including camping and houseboats on the foreshore environment.
4. Develop a coordinated blue-green algae communication strategy to enhance business and community understanding of how to respond to blooms.
5. Develop a communication and awareness campaign with simple communication tools describing how the lake operates including forecasting of water levels in the lake and the destination (use) of water discharged.
6. Promote the use of interactive communication tools to disseminate information about the lake, its operation, management arrangements and by-laws.

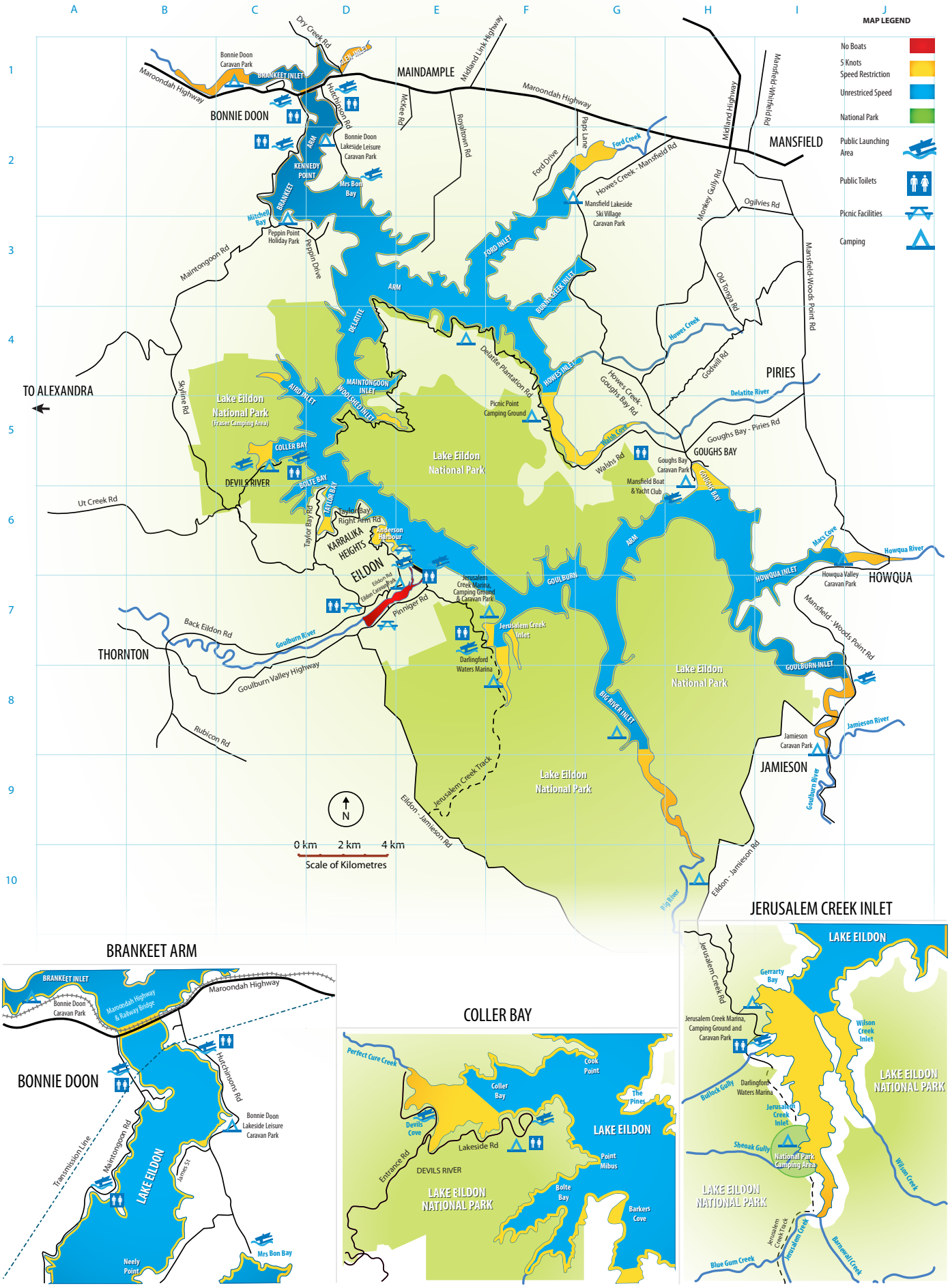
Stakeholders

Goulburn-Murray Water, Department of Sustainability and Environment, Parks Victoria, Country Fire Authority, Victoria Police and Transport Safety Victoria.

3.2.2 References

G-MW, 2012, Website, **www.g-mwater.com.au**

Lake Eildon Boating and Facilities Map



BRANKEET ARM

COLLER BAY

JERUSALEM CREEK INLET

3.3 Recreation and Tourism

Lake Eildon is the gateway to the Victorian High Country and with over 500 kilometres of shoreline it rates as one of Victoria's most popular holiday destinations. At six times the size of Sydney Harbour, Lake Eildon is the only reservoir in Victoria where houseboats are permitted to operate.

Recreational activities at Lake Eildon need to be carefully balanced against the lake's primary role as an irrigation water supply storage and to ensure impacts on the environment are minimised.

Goulburn-Murray Water's role as manager of public recreational facilities is a legacy from when past State Authorities provided these services, which were funded by government. Currently there is no sustainable revenue stream to provide ongoing or enhanced recreational experiences at Goulburn-Murray Water storages. As a Water Corporation, operating costs are recovered through irrigation water charges, which does not include management of public recreation facilities. Limited funding is obtained from urban water charges and commercial leases and licences to offset the cost of public recreational management. Work is continuing with state agencies to develop appropriate funding mechanisms for the ongoing management of recreation and public access at the storages.

This Plan aims to recognise the current funding constraints and identify opportunities for shared management responsibility between stakeholder agencies. The Plan will help prioritise works and services and identify improvement opportunities to enable the most effective and appropriate application of resources.

3.3.1 Boating

Lake Eildon is one of the most popular inland water storages for high-speed boating, fishing, canoeing/kayaking and the use of other personal watercraft, such as jet skis. It is also the only inland water storage in Victoria on which the use of houseboats is permitted.

Boating Zones for Lake Eildon and the Eildon Pondage are gazetted by Transport Safety Victoria under the *Marine Safety Act* 2010, and are listed in Schedule 90 of Vessel Operating and Zoning Rules for Victorian Waters. The *Marine Safety Act* 2010 also appoints Goulburn-Murray Water as the Waterway Manager for Lake Eildon and the Eildon Pondage (G-MW, 2002).

Boating regulations for Lake Eildon include a five knot speed restriction within 50 metres of the water's edge, swimmers and fixed or floating structures in or on the water (G-MW, 2002). Enforcement of the boating regulations is undertaken by the Victorian Water Police, and is relatively effective in terms of minimising breaches of boating regulations, however the limited resources make policing of such a large and popular boating area difficult.

Increased water levels in 2010/2011 following a decade of severe drought resulted in the inundation of vegetation that had grown on the lake bed exposed by the reduction of water in the storage. As a result boat operators experienced some difficulty in accessing previously popular mooring areas around the lake. Management of native vegetation in these areas is a key issue for Lake Eildon. A large section of the lake between Howqua inlet and Jamieson has a temporary five knot zone in place to minimise impacts of boating activities on the vegetation and minimise risks to health and safety posed by woody debris, timber and trees surrounding the lake.

High speed boating and jet skiing can present safety issues for smaller craft and passive users, having the potential to swamp or capsize other watercraft or collide with swimmers in close to shore areas. The danger posed to swimmers is of particular concern as swimming is most popular around boat ramps, even though the *Marine Safety Act* 2010 prohibits swimmers from entering the water within 50 metres of an operational boat ramp (G-MW, 2002).

Noise from some personal water craft and high powered craft is considered by some visitors to be a nuisance, and fuelling for power boats should to be managed to protect the aquatic environment and water quality. Boat fuel is available from floating barges at the Lake Eildon Marina and Jerusalem Creek at all water levels.

The lake has a number of designated public boat ramps around the foreshore. The Delatite Arm of the lake is one of Lake Eildon's most popular camping locations although public boating access points at this location are limited. There are three public ramps available in the Eildon township area, as well as at Kennedy Point, Bonnie Doon, Hutchinson's Road, Goughs Bay and Jamieson. When the lake is at low levels public boat access becomes restricted to only a few formed concrete ramps, mainly in the Eildon area, including Coller Bay, Eildon Alliance Boat Ramp (at Point Dethridge), Jerusalem Creek and Goughs Bay. These ramps have been extended during recent 2009 dry periods to enable greater access to the lake.

In some areas around the lake, boats are often launched away from designated boat ramps and cars are parked on the lake bed. Parking away from designated parking areas can have significant impacts on the lake bed and the vegetation.

Parking, even at designated boat ramps, becomes limited when the lake rises above 80% capacity.

At some boat ramps, laneways have been established in order to manage traffic and minimise safety risks during the peak season. Management of boat ramps is carried out by various agencies including Goulburn-Murray Water, Parks Victoria, Mansfield Shire Council and Murrindindi Shire Council. However, a unified approach to traffic management on and around the boat ramps surrounding the lake has not been established.

Key Issues

- Impacts of boating activities on the vegetation.
- Risks to health and safety posed by woody debris and timber in the lake.
- Dangers posed to swimmers by high speed boating and jet skiing.

- Noise from personal water craft and high powered craft.
- Access to the lake when the lake levels are low.
- Limited parking at designated boat ramps.

Objective

A safe, accessible lake for boating.

Actions

7. Conduct an audit of existing boat ramps, reviewing access at different supply levels, location, safety and parking availability.
8. Establish consistent signage at all boating access points to improve awareness of boating safety issues, location of ramps and public access options.
9. Educate users and enforce the five knot zone within 50 metres of the shore around the entire perimeter of the lake.
10. Goulburn-Murray Water, Parks Victoria, Mansfield Shire Council and Murrindindi Shire Council to develop a unified approach to traffic management at boat ramps to improve traffic flow and improve safety.
11. Develop an agreed and acceptable position of management relating to the vegetation on the foreshore that addresses risks to human health and safety.

Stakeholders

Goulburn-Murray Water, Transport Safety Victoria, Victoria Police, Parks Victoria and Councils.

3.3.2 Houseboats

Lake Eildon has been the home of a substantial houseboat fleet since the early 1960s. The first houseboat regulations were proclaimed in 1971 with licensing being introduced in the same year. Lake Eildon is the only inland waterway in Victoria where houseboats are permitted to operate. Currently the number of houseboats licensed to operate on Lake Eildon is restricted to approximately 700 (G-MW, 2008).

Goulburn-Murray Water is responsible for the licensing of houseboats on the lake. The operation of houseboats is regulated by the Water (Lake Eildon Recreational Area) (Houseboats) Regulations 2003 (G-MW, 2008). On July 2012 the *Marine Safety Act* 2012 (Vic) replaces the *Marine Act* 1988. The waterway rules and appointment of Goulburn-Murray Water as a Waterway Manager transitioned with the new Act.

The houseboat industry at Lake Eildon plays a vital role in supporting local industry and regional economies. One of the key management issues is the regulation of effluent generated by houseboats. The new Point Worner Mooring Head provides access for four vessels at any one time and all effluent including greywater can be moved from 'ship to shore' for further treatment. In order to further reduce risks associated with management of houseboat sewage, investigations are underway to replace the current Jerusalem Creek Sewage Barge with a new mooring head with similar capabilities to that of the new Point Worner Mooring Head.

The existing Jerusalem Creek Barge currently operates with a transfer vessel which needs to travel to Point Worner on a regular basis to transfer sewage to the Point Worner system. The aim is to eliminate the potential risk of water contamination during the double handling and transport by constructing a new Mooring Head within the Jerusalem Creek Marina area. The proposed system will pump sewage directly from houseboats via protected pipelines that will link with the Jerusalem Creek Camping Ground's new sewerage system. The camping ground's new sewerage system is being developed with pipeline linkage to the Eildon Township's sewage treatment facility by the end of 2014.

To ensure that houseboats comply with regulations and are not a threat to water quality, they must undergo routine slipping for inspection as part of the Compulsory Houseboat Inspection Program. Boats are scheduled for inspection on a cyclic program that sees each houseboat slipped every five to seven years.

The management of greywater is also a key issue created by houseboats. As of 1 September 2010 all new houseboats approved to operate on Lake Eildon must contain all greywater or have an on-board greywater treatment unit that achieves the discharge standards required by the AS 4995-2009 Greywater Treatment Systems for Vessels Operated on Inland Waters (G-MW, 2011). In addition, there is currently a process to revise the houseboat regulations to provide for the management of greywater on houseboats licensed before 1 September 2010.

The large size of Lake Eildon means the lake is able to accommodate additional houseboats. Current market demand is also for vessels larger than those allowed under the current regulations.

Other issues that arise as a result of house boating activities on the lake include:

- Safe transport and slipping of houseboats.
- Appropriate disposal of maintenance waste.
- The capacity of the slipways to deal with the required number of inspections and size of the houseboats.
- Disposal of domestic houseboat rubbish and 'hard' rubbish (including renovation materials, carpets, television sets, lounge suites and mattresses).
- Arrangements for fairly allocating licences among competing users.
- Safe operation of on-water refuelling facilities

Increased water levels in 2010/2011 resulted in the inundation of vegetation on the previously dry lake bed. As a result, houseboat operators experienced some difficulty in accessing previously popular mooring areas around the lake. Management of native vegetation in these areas is a key issue for Lake Eildon.

Key Issues

- Management of wastewater.
- Protection of storage water quality.
- The demand for more houseboats on the lake and vessels larger than those allowed under current regulations.
- Disposal of maintenance material and domestic waste.
- Capacity of slipping facilities.
- Safe operation of on-water refuelling.
- Access to foreshore mooring sites around the lake.

Objective

To ensure the houseboat industry at Lake Eildon continues to support local and regional economies and has well managed, modern, 'best practice' marina and maintenance infrastructure that supports safety and environmental protection of the lake and surrounding land.

Actions

12. Revise the houseboat regulations to allow additional licences and larger houseboats to be considered.
13. Work with relevant agencies to assess slipping facilities for:

- Environmental and WorkSafe compliance of maintenance facilities.
- The ease and impact of removal of vessels from the waterway.
- Safety of on-road houseboat transport.
- The capacity of the slipways to deal with the size of the houseboats and the number of inspections required.

14. Continue investigations and implementation of new effluent disposal facility for Jerusalem Creek.
15. Review facilities and procedures for the management of on-water fuel supply and waste management.
16. Continue to implement measures to minimise the impacts of greywater discharge from houseboats.
17. Implement measures to protect native vegetation from the impacts of houseboat mooring.

Stakeholders

Goulburn-Murray Water, Department of Sustainability and Environment, Environmental Protection Authority, WorkSafe and VicRoads.

3.3.3 Public Access

There are a number of designated access points around Lake Eildon, including numerous boat ramps and roads. However, there are a number of issues associated with access including the quality of the roads and the availability of facilities and infrastructure (including parking) during peak season.

Access to public foreshore and lake bed land is subject to compliance with various agency by-laws relating to boating, vehicle access, camping and fires, shooting, management of dogs and other animals. Of particular note are provisions which prohibit unauthorised vehicle access to areas other than roads and tracks, and provisions prohibiting camping in non designated areas.

Access issues vary with changing water levels, further complicating the management of access to the lake. While there are a number of public boat ramps located around the lake, they are only operational to a given supply level thereby limiting access at low storage levels. The Delatite Arm Reserve is one of Lake Eildon's most popular boating locations but public access to this area is limited.

Illegal vehicular access occurs across the dry lakebed during times of low water. At times when water levels are low, many trail bikes and four wheel drives (4WDs) use the lakebed as a recreational area causing erosion and damage to the surrounding vegetation.

The entire perimeter of Lake Eildon is bound by a strip of public land above the full supply level and can be accessed via boat. The public land boundary is not well defined and trespass onto private land has been a concern.

Key Issues

- Poor quality access roads.
- Limited facilities at access points.
- Illegal vehicle access across the dry lake bed when water levels are low.
- Camping in non designated areas.

Objective

Increase awareness of the reasons for controlled and well managed access and increase inter-agency cooperation to manage access issues and recreational uses of the lake.

Actions

18. Undertake regular audits of public access points to assess the safety, infrastructure and environmental issues associated with access at varying lake levels.
19. Consider upgrading or rationalising access points based on the audit findings to improve the overall quality of public infrastructure and facilities.
20. Establish an inter-agency agreement for the management of recreational uses of the lake (including managing camping, access points and use of the exposed lake bed when water levels are low).
21. Ensure there is consistent signage at specified access points with a specific Lake Eildon brand.
22. Develop a Plan for the management of exposed areas of lake bed during periods of low water levels.

Stakeholders

Goulburn-Murray Water, Councils, Parks Victoria and Department of Sustainability and Environment.

3.3.4 Fishing

Fishing is one of the most important and popular activities at Lake Eildon. This activity is regulated by Fisheries Victoria (Department of Primary Industries) under the *Fisheries Act* 1995 and Fisheries Regulations 2009 in conjunction with Specific Management Plans such as the Goulburn-Broken Fisheries Management Plan. The goal of this Plan is to "manage recreational fishing in a manner that is consistent with the principles of ecological sustainable development" (DPI, 2011).

The Victorian Government is committed to providing high quality opportunities for recreational fishing through facilitating sustainable development of fisheries resources. Fisheries management in Victoria focuses on securing a long-term, high quality natural resource base generating jobs and other socioeconomic benefits in and for the State's communities.

The long-term vision for Lake Eildon is a high quality mixed species fishery which will give anglers a range of opportunities and species to choose from. Between 2010 and 2013 over one million Murray Cod will be stocked into Lake Eildon in addition to the annual stocking of Golden Perch and Rainbow and Brown Trout (DPI, 2011). Regular monitoring will measure the status of the fishery over future years and determine the need for any change in management regimes.

To ensure Eildon Pondage provides accessible year round trout fishing opportunities Rainbow and Brown Trout will be stocked throughout the year at peak visitation times.

Key Issue

- Demand on both the lake and Pondage by anglers.

Objective

To maintain and enhance native and salmonoid fisheries in Lake Eildon and Eildon Pondage.

Action

23. Implement recommendations within the Goulburn-Broken Fisheries Management Plan that relate to sustainable recreational fishing in Lake Eildon.

Stakeholder

Department of Primary Industries.

3.3.5 Hunting

Lake Eildon has a long history of hunting, particularly for deer and, in season, wild ducks.

Deer stalking without dogs in Lake Eildon National Park is permitted on a seasonal basis in the Big River area. Deer are by Victorian government legislation a declared 'Game Species' and as such enjoy this status over and above other imported species. Hunters must hold a current Game Licence for deer and a current Firearms Licence (Parks Victoria, 2000).

Stalking is also known to occur in the 200 metre wide buffer adjacent to the lake and adjacent forest. This area is not covered by the National Park. Regulations in these areas vary from those that apply in the National Park and hunters can easily cross into areas where hunting is not permitted.

The Park is considered to be an important area for deer stalking because of the large numbers of Sambar deer and proximity to Melbourne. There is little conflict between deer stalkers and other users of the Park because the deer hunting season is in winter, while summer is the preferred time of year for other Park users.

Duck hunting is permitted at Lake Eildon on a seasonal basis. Hunting from powerboats is not permitted when the motor is running, whether the vessel is in motion or not. Firearm regulations apply to shooting near dwellings and restrictions apply within a kilometre of any Goulburn-Murray Water structure.

Shooters should make themselves familiar with Country Fire Authority fire regulations and restrictions, particularly during hot and dry weather. Duck hunters must also be aware of the proximity of hunting to residents and recreational uses of the lake, the requirement to camp within designated areas and to take rubbish home with them.

Key Issues

- Hunters crossing into areas where hunting is not permitted.
- Camping outside designated camping areas and impacting on the environment.
- Hunters not complying with shooting and hunting regulations.

Objective

Increased education and awareness to improve hunting behaviour and provide clarity about management roles and responsibilities between agencies.

Actions

24. Develop agency management agreements that provide hunters with clear and easily understood information about areas where hunting is permitted.
25. Improve education and awareness to encourage protection of the environment and compliance with firearm and hunting regulations.

Stakeholders

Goulburn-Murray Water and Parks Victoria.

3.3.6 Camping

Lake Eildon is a very popular camping destination. Although there are a number of designated camping areas around the lake, bush camping is common in many areas. Concerns relating to uncontrolled bush camping include:

- Rubbish and waste management issues.
- Illegal vehicle access to the lake bed.
- Impacts on foreshore vegetation.
- Increased fire risk.
- Lack of adequate toilet facilities.
- Trespass onto adjacent private land and interference with legitimate grazing activity.
- Trail bike riding and 4WD vehicle use outside of formed roadways, noise and damage to vegetation.
- Noise and general anti-social nuisance behaviour impacting on other users and communities.

There have also been problems with boat-based camping, illegal camp fires in non-designated areas and fires during fire restricted periods. Overcrowding at camping sites, particularly during the holiday season, is an emerging issue.

In particular areas around the lake such as the Delatite Arm Reserve, people often camp in undesignated areas on the dry lake bed when water levels are low. Camping at the Delatite Arm is managed by Department of Sustainability and Environment, however the Department of Sustainability and Environment has no direct authority over the foreshore and lake bed areas which are managed by Goulburn-Murray Water. More generally, camping restrictions are difficult to enforce due to the extent of the shoreline, limited resources and poorly defined management arrangements.

Both Parks Victoria and Goulburn-Murray Water carry out management activities on the land between the National Park and the lake. The shared management creates the potential for duplication of enforcement activities and the risk of different messages being conveyed to recreational users.

Key Issues

- Camping in non-designated areas.
- Overcrowding and lack of toilet facilities at designated camp sites.
- Illegal fires and fire risk during times of hot dry weather.
- Illegal vehicle access to the lake bed.
- Trespass onto private land.
- Impacts, noise and anti-social behaviour.

Objectives

To manage impacts of camping on water quality, public safety and the foreshore environment.

To promote designated and well managed areas for camping.

Actions

26. Estimate current and future levels of demand for camping to inform camping management, including the possible establishment of new camping areas.
27. Explore the introduction of new camping areas and options to fund the development and maintenance of camping sites.

28. Review the adequacy of current designated areas for camping, including an evaluation of amenities at each camp site.
29. Provide dedicated safe areas for motorbikes away from the designated camping areas.
30. Develop an agreed approach to management of the 200 metre strip of land between the National Park and the full supply level.

Stakeholders

Goulburn-Murray Water, Parks Victoria, Councils and Department of Sustainability and Environment.

3.3.7 Facilities and Infrastructure

Much of the public infrastructure around Lake Eildon is aging and in need of maintenance, upgrade or replacement. Most of the infrastructure around the lake is related to recreational activity and is in close proximity to boat ramps or the designated camping areas. Public boat launching areas, picnic areas and public toilets are located around the northern section of the Brankeet Arm, along the western edge of the Delatite Arm and at Goughs Bay. Public boat fuelling facilities are located at Jerusalem Creek and Lake Eildon Marina. Other facilities on the Eildon side of the lake include the Fraser camping area and the Jerusalem Creek camping area (G-MW, 2012). There are sanitation stations for pumping out sewage from the holding tanks of houseboats. Sanitation barges are located at Point Worner and Jerusalem Creek.

In some areas there is a lack of infrastructure, particularly public toilets, shelters and seating, particularly around the foreshore.

There is a number of privately licensed jetties and boat ramps around the lake and a small number of unlicensed jetties and slipways (See Section 3.6.1).

In relation to new facilities and infrastructure, throughout the consultation lake users expressed the desire for additional walking tracks above the full supply level as access to the lake is limited when full.

The roles and responsibilities for development, upkeep and maintenance of infrastructure and facilities around the lake are not clearly defined. More work is required to assess facilities in detail to determine priorities for investment which should be closely aligned with population and visitor forecasts and demand.

Key Issues

- Aging infrastructure in need of update and maintenance.
- Lack of toilets, seating and shelters around the foreshore.
- Confusion about roles and responsibilities for development, upkeep and maintenance of infrastructure.
- Demand for new walking tracks above the full supply level.

Objective

To improve public infrastructure and clearly define roles and responsibilities for upgrade and maintenance.

Actions

31. Audit existing infrastructure and service provision in and around Lake Eildon in order to prioritise infrastructure investment.
32. Identify the scale and type of infrastructure upgrades and additional infrastructure and services required.
33. Clarify and formalise the roles and responsibilities for upgrade and maintenance of infrastructure incorporating levels of service.
34. Estimate the long-term resident and visitor demand on and around the lake and ensure that infrastructure provision is aligned with estimated demand.
35. Investigate the potential for the development of new walking tracks above the full supply level.

Stakeholders

Goulburn-Murray Water, Councils, Department of Transport, Parks Victoria and Department of Sustainability and Environment.

3.3.8 Solid Waste

Management of solid waste is a concern in many areas of the lake frequented by the visiting public. Inappropriate disposal of rubbish and litter presents aesthetic, water quality and public health and safety issues.

Goulburn-Murray Water provides bulk bins at marinas for the removal of domestic houseboat rubbish (G-MW, 2012). There have been some concerns with the management of solid waste associated with houseboats and illegal dumping into the lake. Currently some bins are being used to dispose of "hard" rubbish in the form of renovation materials, carpets, television sets, lounge suites and mattresses.

Rubbish on roadside reserves around the lake has also been identified as a significant issue.

There are no bins for rubbish disposal at the camping areas managed by Parks Victoria or Department of Sustainability and Environment within the National Park or the Delatite Arm Reserve. Parks Victoria and Department of Sustainability and Environment has a 'carry in carry out' approach to litter so campers must take their rubbish to either a local waste disposal location or home with them. The 'carry in carry out' approach should be explored at other areas surrounding the lake.

The Mansfield Shire Council provides some bins for rubbish disposal on the northern side of the lake. Increased education and awareness can play a large role in minimising inappropriate disposal of solid waste on the lake bed and the lake surrounds.

Key Issues

- Inappropriate use of existing bins.
- Illegal dumping of solid waste into the lake.
- Increased rubbish on roadside reserves.

Objective

To establish an effective and efficient approach to waste management among responsible agencies, commercial marina operators and the community.

Actions

36. Ensure that the approaches to waste management around the lake are effective and efficient.
37. Explore where the 'carry in carry out' approach to waste management can be implemented at other areas around the lake.

Stakeholders

Goulburn-Murray Water, Parks Victoria, Councils and the community.

3.3.9 Emergency Management and Safety

A number of issues relating to emergency management and safety at and around the lake have been identified. An example is a lack of clear and adequate signage on the foreshore regarding the risk of on-water collisions, including the risk of striking submerged objects such as dead trees and stumps. This is a particular concern when lake levels are low and the likelihood of striking submerged objects increases. Other issues include power boats or other personal water craft travelling too close to swimmers and failure to adhere to boating regulations such as speed limits, especially the five knot zone around the lake edge and boat ramps. Road traffic safety around high-use areas such as boat ramps is a concern, particularly during the peak season.

G-MW maintains and regularly updates a risk register of public facilities on its land, which incorporates a prioritised list of management actions required to manage public safety. A high priority for Goulburn-Murray Water is the implementation of a best practice risk management approach for the management of public safety in publicly accessible areas of the lake.

Victoria Police coordinates the response to emergency incidents on Lake Eildon. The Country Fire Authority, Victorian SES and Ambulance Victoria have a support role in response to emergency incidents. The Country Fire Authority operates the Eildon Fire and Rescue Boat crewed by volunteers from the Eildon Fire Brigade.

The Lake Eildon Emergency Management Plan was created to assist with coordination of emergency management around the lake. The Plan emphasises the importance of all the four principles relating to emergency management: prevention, preparedness, response and recovery.

Due to the size of the lake, the capacity to cover emergencies is limited and there is a perceived lack of inter-agency cooperation around emergency management. In the event of an on-water emergency it can be difficult for emergency services to locate lake users in a timely manner.

Key Issues

- Lack of clear and adequate signage warning of submerged objects.
- Boat operators not complying with the five knot speed limit around the lake edge and boat ramps.
- Road traffic safety around boat ramps.
- Lack of understanding about agency roles for emergency management.

Objective

Effective emergency management arrangements and improved safety of recreational lake users, and nearby residents.

Actions

38. Ensure emergency services and relevant agencies meet regularly to improve and coordinate emergency management/response.
39. Develop a Lake Eildon brochure to increase awareness of issues relating to emergency management and safety.
40. Engage media/communication resources to communicate safety and compliance messages to recreational lake users.
41. Investigate the potential for the introduction of traffic management in risk-prone areas, for example, around boat ramps.
42. Seek input from emergency services regarding methods for locating lake users in case of emergency.

Stakeholders

Victoria Police, Transport Safety Victoria, Sate Emergency Service, Ambulance Victoria, Country Fire Authority, Goulburn-Murray Water and Councils.

3.3.10 Tourism and Economic Development

Lake Eildon was built to supply water for irrigation, towns and cities and other downstream users. Economic benefits provided to regional economies by water supplied from the lake are estimated at billions of dollars annually. Dam operation and maintenance, lake and foreshore monitoring and management costs are funded from fees levied from downstream water users, predominantly irrigators, for the provision of a regulated water supply.

However, over many years a local recreation and tourism industry has developed around Lake Eildon, and the significant economic and social benefits to the local region that this provides are acknowledged. The value of recreation, tourism and irrigation generated by Lake Eildon to the local regional and national economies has not been adequately assessed.

Recreational and tourism ventures that are sustainable and that will not adversely impact on lake operations, water quality, environmental values or public safety and access are encouraged. Recreational and tourism developments which do not have a critical dependency on stable water levels but can adapt to fluctuating water levels are preferred.

Currently, there is no Tourism Strategy that has been specifically developed for Lake Eildon. A Tourism Strategy is required that includes information and strategic directions relating to how the lake operates and how businesses and commercial operators can best operate within any constraints imposed by fluctuating water levels. The strategy should include guidelines relating to preferred and appropriate commercial ventures. Studies are required to estimate the long term resident and visitor demand on and around the lake prior to the development of the strategy.

During the development of the Plan people who participated in the consultation also highlighted the benefit of developing an Event Management Strategy for the lake and the need for further information relating to commercial lease availability, tenure and opportunities.

Image courtesy of Tony Herridge.

Key Issues

- Lease tenure and conditions limiting development opportunities.
- Impacts of fluctuating lake levels on commercial operators.
- Lack of clear guidelines for approval and management of events.

Objective

Recreation and tourism ventures that will not adversely impact on lake operations, water quality, environmental values or public safety and access.

Actions

43. Develop a Tourism Strategy for Lake Eildon including guidelines outlining preferred and appropriate commercial ventures and opportunities (land and on-water).
44. Commission a study to estimate the long term resident and visitor demand on and around the lake in order to inform decisions about future tourism opportunities and developments.
45. Develop an Event Management Strategy for Lake Eildon.
46. Explore the feasibility of developing an economic development overlay to assist with commercial business lease availability, tenure and opportunities.

Stakeholders

Goulburn-Murray Water, Councils and commercial operators.

3.3.11 Caravan Parks and Accommodation

Twelve major, long established caravan parks are located at or near Lake Eildon. They service tens of thousands of visitors per annum and collectively play a major role in the regional economy. Many of the parks provide an extensive list of services and operate 365 days per year for water and land-based activities. There are also numerous smaller accommodation providers offering services such as B&Bs, cabins, lodges and farm stays.

Some of the caravan parks are located on and lease Goulburn-Murray Water land or a section of foreshore land adjacent to the lake. Securing long term lease tenure has been identified as an issue by park operators to ensure long term viability and investment in these facilities. Leases are discussed further in section 3.6.1 of the Plan.

Commercial operators are key stakeholders and benefit from a viable tourism industry, supported by public infrastructure that encourages visitors. In the past it has been difficult to gain the participation of commercial operators in strategies to improve tourism and facilities.

Key Issues

- Impacts of lease tenure on commercial investment.
- Lack of collective commercial operator participation.

Objective

A viable accommodation industry that provides contemporary facilities and services market expectations.

Actions

47. Seek accommodation industry participation/representation in the Plan Implementation Group to support plan actions.

48. Work with park operators to ensure lease tenure supports investment and commercial viability.

Stakeholders

Goulburn-Murray Water and commercial operators.

3.3.12 Eildon Township Land and Pondage

The Lake Eildon Pondage is operated as a regulating storage for AGL's Eildon Power Station. In addition to this operational function the Pondage provides an attractive setting for the township of Eildon and supports a number of popular recreational activities.

Much of the foreshore surrounding the Pondage has facilities to provide for visitors to Eildon, including fishing platforms, barbeque shelters and public toilets. The Eildon Caravan Park is also located on the Pondage foreshore. A 4 kilometre walking trail is located on the Lower Pondage, and is popular with walkers, joggers and bike riders.

A section of Upper Pondage foreshore beside the Jerusalem Creek Road regularly attracts unauthorised campers resulting in destruction of native vegetation and littering.

The Pondage is regularly stocked with large trout from nearby Snobs Creek Hatchery, making it a popular fishing venue.

Swimming and boating at the Pondage is not permitted due to rapidly fluctuating water levels and extreme cold water temperature. There has been demand from local adventure tour operators to have vessel zoning rules amended to allow non powered boats to operate on the Pondage. Currently applications for specific events, with appropriate safety and environmental management plans are considered for approval. There are no plans to make a permanent change to allow boating on the Pondage.

The Eildon Township is also surrounded by large areas of native forest, currently owned by Goulburn-Murray Water. Much of this land has been identified as surplus to that required for protection of water quality within Lake Eildon. The land in some residential areas has been developed as public parkland and nearby residents have a strong sense of ownership and expectations of how this land should be utilised.

North of the Eildon township an extensive network of mountain bike tracks has developed through regular casual use and organised mountain bike events. There is also an established downhill track which is used for events. Currently a local mountain bike group is seeking approval to create more permanent, marked and graded trails.

Key Issues

- The demand for non powered boats to operate on the pondage.
- Ad hoc development of mountain bike tracks.
- Camping and rubbish around Eildon Pondage.
- Opportunities for development of land around Eildon township.

Objective

To support the local Eildon community by managing recreational use of land adjoining Eildon township and the Pondage, including on-water activities, in a safe and sustainable way.

Actions

49. Develop a management plan for Eildon township land and the use of the Pondage in consultation with the community.

50. Continue to work with Council to identify best use, ownership and potential development opportunities on Goulburn-Murray Water land around the Eildon township.

Stakeholders

Goulburn-Murray Water, Murrindindi Shire Council and the community.

3.3.13 References

DPI, 2011, Goulburn-Broken Fishery Management Plan.

G-MW, 2002, Lake Eildon Public Liability and Asset Security Risk Assessment.

G-MW, 2008, Lake Eildon Houseboat Information Folder.

G-MW, 2011, December Newsletter – Houseboats.

G-MW, 2012, Website, **www.g-mwater.com.au**

3.4 Water Quality

Good water quality is critical for the communities that use water from Lake Eildon for irrigation, drinking, commercial, agricultural and recreational activities. Goulburn-Murray Water provides raw water from the lake to Goulburn Valley Water, which is then treated prior to use as the town water supply for Bonnie Doon. Some stock and domestic customers around the lake also draw water for domestic use. Other towns (including Eildon, Thornton, Alexandra, Seymour and Shepparton) are supplied by water drawn from the Goulburn River downstream of the lake.

Water authorities have an obligation to identify and, where possible, mitigate risks to water quality, in accordance with their responsibilities under the *Safe Drinking Water Act* 2003. The Act is aimed at protecting water quality intended for human consumption from the catchment to the tap (customer).

Recreational users of the lake have the potential to impact on water quality, but also in turn are impacted by the effects of poor water quality. Good water quality is also important for the preservation and health of aquatic habitat and ecosystems.

Residents and recreational users of the lake and its catchment also have a Duty of Care under the *Environment Protection Act* 1970 to minimise pollution.

Water quality within Lake Eildon can be influenced by a number of activities including land use, storage activities, in-storage processes and the water quality of inflows. Inflows from Eildon's tributaries including Brankeet Creek, Goulburn, Big, Delatite, Howqua and Jamieson Rivers can have poor water quality which can affect water quality in Lake Eildon.

Water quality may also be affected by point and diffuse sources within the immediate Eildon Catchment including runoff from agricultural activities, housing developments, forestry and native forest. There may be direct water quality issues within the storage including blue-green algae blooms and impacts from various human activities on the lake. A full assessment and identification of risks to water quality is being undertaken in Goulburn-Murray Water's Lake Eildon Risks to Water Quality Risk Assessment.

3.4.1 Water Quality Monitoring

Accurate water quality monitoring is important to improve our understanding of the trends in biophysical and chemical parameters in inland rivers, water storages and streams. Understanding these trends allows land and water resource managers to develop strategies, actions and frameworks to address water quality decline and any threatening processes impacting on the water resource. Significant works and investigations have preceded this document to identify priority areas, including sediment and nutrient modelling and the preparation of the Upper Goulburn Water Quality Protection Initiative – Implementation Prospectus (2011).

Water quality can be measured through chemistry and biology, for its suitability for specific uses such as drinking. The most common indicators used to assess water quality are salinity, turbidity, sediment, nutrient concentrations and temperature.

Water quality in Lake Eildon has been regularly monitored as part of the Major Storages Operation Monitoring Program which commenced in 1992. Basic physico-chemical factors and blue green algae are monitored monthly; major ions are monitored every six months. Results are summarised and analysed yearly (G-MW, 2011).

A number of other monitoring systems and strategies are in place for the lake. The Lake Diagnostic Monitoring System (LDS) gathers data such as temperature and wind direction to enhance the understanding of storage processes in the lake. Goulburn Valley Water monitors water quality at the town water offtake at Bonnie Doon. Strategies are being developed that review the direction and scope for monitoring water quality including Goulburn-Murray Water's Lake Eildon Risks to Water Quality Risk Assessment. Studies have also been done examining pathogen transport around the lake and levels of mercury in fish.

Gold mining was undertaken in the upper Goulburn River (above Lake Eildon), Big River and Howqua between the mid nineteenth and early twentieth centuries. Mercury has been deposited by these rivers into the southern parts of Lake Eildon. As a result, the bottom sediments and some long-lived and predatory fish species such as Brown Trout and Redfin may contain mercury. Fish from Lake Eildon and the rivers that flow into it are periodically tested for contaminants, including mercury. Pregnant women, women planning pregnancy and young children (up to six years of age) are most sensitive to the effects of high mercury intake and should follow the recommended intake of fish from these areas published by the Department of Health (DoH, 2011).

Key Issues

- Assurance that effective monitoring of water quality is being implemented.
- Mercury contamination of lake sediments and water quality from historical mining activity.
- Compliance with *Safe Drinking Water Act* 2003 obligations.

Objective

Targeted and effective water quality monitoring, modelling and reporting to improve our understanding of biophysical and chemical parameters and develop strategies and frameworks to address water quality decline.

Actions

51. Review existing water quality monitoring programs to ensure they identify water quality risk management measures and are consistent with the *Safe Drinking Water Act* Risk Management Plan.
52. Monitor mercury and arsenic level in fish to support health advice.
53. Consider a broad scale study into potential mercury contamination of lake sediments and water quality from historical mining activity.
54. Actively support partner agencies in the protection and enhancement of water quality within the upper catchment.

Stakeholders

Goulburn-Murray Water, Goulburn Valley Water, Environment Protection Authority, Department of Health, Department of Sustainability and Environment and Goulburn Broken Catchment Management Authority.

3.4.2 Wastewater Management

There are many small townships and rural residential areas in close proximity to Lake Eildon which do not have reticulated wastewater management systems. Human effluent from onsite wastewater management (e.g. septic tanks) and absorption trenches can impact on water quality in Lake Eildon, affecting recreational and other uses of the lake. The impact of onsite wastewater management can affect water quality individually, particularly from failing systems near the lake, or as diffuse source pollution from the cumulative effects of numerous failing wastewater management systems.

Guidelines for effluent management are set by Environment Protection Authority Victoria and are currently under review. This review recognises many onsite wastewater treatment systems installed in the 1970s and 1980s were permitted in relation to toilet wastewater only, without consideration of sullage wastewater, and therefore need upgrading. There is a two-tier approval process which applies to onsite wastewater treatment systems in which the Environment Protection Authority approves the type of onsite systems that may be installed in Victoria, via a 'certificate of approval system' (EPA, 2008). Local government operates a permit system, which controls the installation, maintenance and monitoring of individual units.

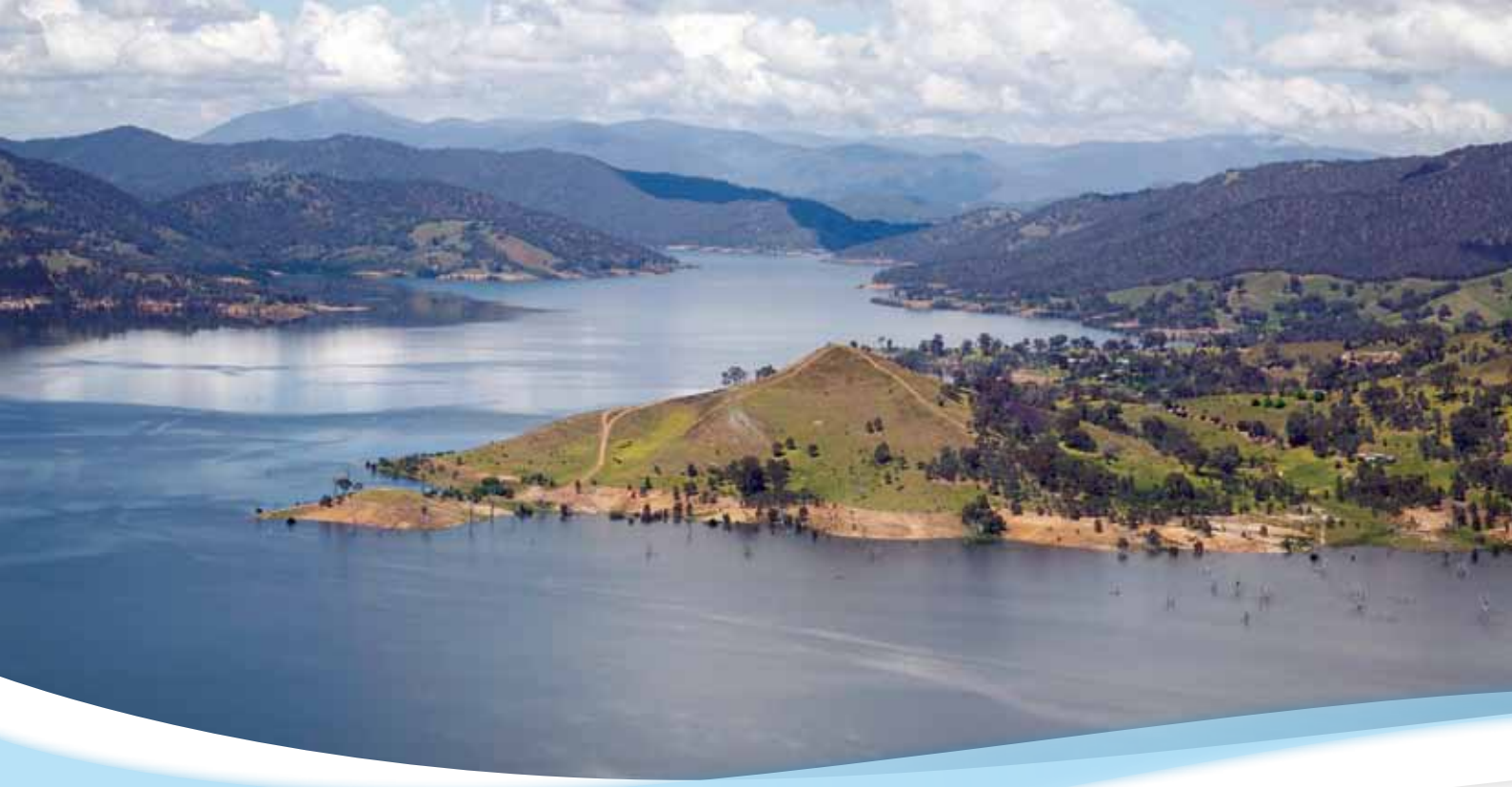
Some townships, including Mansfield, Bonnie Doon and Eildon, have reticulated sewerage.

Mansfield and Murrindindi Shire Councils are working towards finalising wastewater management plans and strategies with specific recommendations and management requirements for wastewater systems. Onsite wastewater management systems require regular inspections. Unfortunately, many systems are often badly maintained and prone to leakage. Inspection, monitoring and enforcement/compliance programs are yet to be developed.

Goulburn Valley Water is the urban water authority responsible for the provision of reticulated sewerage in the Eildon catchment. Some wastewater management facilities have the provision to irrigate land with treated wastewater and only discharge to waterways in emergencies. The disposal of treated wastewater to land can also impact upon water quality in the lake. Greywater from houseboats can also impact upon water quality in the lake (See Section 3.3.2).

Key Issues

- Some small townships and rural residential areas near Lake Eildon do not have reticulated wastewater management systems.
- Onsite wastewater management systems are often badly maintained and prone to leakage.
- Inspection and monitoring and enforcement/compliance programs are limited.
- Impacts of disposal of greywater from houseboats.
- Potential Impacts of disposal of treated wastewater to land.



Objective

Ensure wastewater systems are managed appropriately to protect the water quality in Lake Eildon.

Actions

55. Investigate the opportunity for reticulated sewerage and community wastewater management facilities to service townships and similar residential areas around Lake Eildon.
56. Investigate alternative technologies for wastewater treatment around Lake Eildon.
57. Adequately size and locate all onsite wastewater management facilities to minimise the risk to water quality from offsite discharge.
58. Develop a priority list for inspection and monitoring of wastewater systems.

Stakeholders

Goulburn-Murray Water, Goulburn Valley Water, Environment Protection Authority and Councils.

3.4.3 Stormwater Management

Stormwater runoff from roads and paved surfaces may contain oils, greases, other hydrocarbons, nutrients, organic matter, suspended solids, pathogens and other pollutants which can reduce aquatic diversity and threaten ecosystems. Stormwater runoff from urban areas can also cause erosion issues from increases in peak flows to the receiving waterways.

A significant source of stormwater within the immediate catchment to the lake is the Mansfield township which discharges into Ford Creek. Other small communities also have some smaller scale discharge of stormwater including Bonnie Doon, Jamieson, Goughs Bay, Macs Cove, Cummins Road and Howqua.

Murrindindi and Mansfield Shire Councils are responsible for managing urban stormwater runoff into Lake Eildon. Both Councils have Stormwater Management Plans.

New developments that drain into the lake are required to prepare a Stormwater Management Plan.

Goulburn-Murray Water is responsible for approving any direct stormwater discharges into Lake Eildon.

Key Issue

- The impact of stormwater runoff from surrounding townships upon aquatic diversity and water quality in the lake.

Objective

Improved stormwater design and management practices to protect and enhance Lake Eildon and its tributaries.

Action

59. All development must be in accordance with local government stormwater management plans, and Urban Stormwater Best Practice Environmental Management Guidelines (CSIRO, 2006).

Stakeholders

Goulburn-Murray Water, Environment Protection Authority and Councils.

3.4.4 Grazing

See Section 3.6.5

3.4.5 Blue-green Algae

Blue-green algae are naturally occurring cyanobacteria that have the potential to be harmful as they can make people and animals sick. Low levels of blue-green algae are present in Lake Eildon all the time. The Department of Sustainability and Environment and the Department of Health set a maximum algae level considered safe (G-MW, 2009). Warnings are issued by Goulburn-Murray Water when the level of blue-green algae exceeds the safe level.

A large number of factors can influence the growth of blue-green algae which are difficult to control. Factors include weather, light availability, flow/turbulence, algae food (nutrient) levels and algae predator numbers. Nutrients, particularly phosphorous and nitrogen, enter waterways attached to soil particles and sediments and from sewage and other industrial/commercial wastes that enter rivers and their tributaries. Rainfall is naturally high in nitrogen and storm events can bring dissolved nitrogen and phosphorous into Lake Eildon and increase algal growth.

Blue-green algae is monitored routinely by Goulburn-Murray Water to meet its obligations as a Local Water Manager, as directed by the Department of Sustainability and Environment and the Department of Health. As water is drawn from Lake Eildon for urban supplies, Goulburn-Murray Water has an obligation to notify Goulburn Valley Water of blue-green algae monitoring results.

Goulburn-Murray Water has an obligation to develop Blue-Green Algae Incident Response Plans for each water storage, which document all response procedures.

In the past it has been thought that warnings are more likely to be issued in the summer/autumn period, when storage levels are low. However, in 2011 warnings were issued despite Lake Eildon being at almost full capacity. When a warning is current, it is recommended not to undertake any activity that involves direct skin contact with lake water and alternative water supplies should be sought for both stock watering and domestic purposes.

Concern exists within some sections of the local community that communication from Goulburn-Murray Water and Department of Sustainability and Environment regarding blue-green algal blooms is inadequate. Conversely some people think that there is too much emphasis being placed on the risks of blue-green algae.

During the development of the Plan, some people requested more accurate reporting of blooms, specifically in relation to the location of blooms within the lake. This is rarely possible, however, due to the ease with which blue-green algae can develop and spread within the lake and the time lag between sample collection, results from the independent laboratory and public announcements about blooms.

Authorities involved in the management of the lake are concerned that the community does not take adequate notice of blue green algae warnings. Observations suggest that recreational users have been known to continue to use the lake during blue-green algae blooms and ignore signs which provide warnings relating to risks to human health.

Increased education and awareness is required to assist business and the community to better understand how to work and live with blue-green algae (See Section 3.2.1).

Key Issues

- Potential for blue-green algae to impact on recreational and human health values.
- The need for more accurate reporting of blue-green algal blooms specifically in relation to the location of blooms in the lake.
- Lack of awareness of risks to human health.

Objective

Inform users of the lake about the risks of blue-green algae with accurate and timely information.

Actions

60. Continue to monitor and manage blue-green algae in accordance with Lake Eildon Blue-Green Algae Incident Response Plan.
61. Investigate drivers of recent blue-green algae blooms in Lake Eildon.

Stakeholder

Goulburn-Murray Water.

3.4.6 Foreshore Erosion

See Section 3.6.3

3.4.7 Stream Bank Erosion

See Section 3.6.4

3.4.8 References

Department of Health (DoH), 2011, Mercury in fish — Lake Eildon (south) and the Upper Goulburn River, **www.health.vic.gov.au/environment/water/mercury_in_fish.htm**

EPA, 2008, Code of Practice – Onsite Wastewater Management.

G-MW, 2011, Goulburn-Murray Water Major Storages 2010 Water Quality Report.

G-MW, 2009, Blue-Green Algae Incident Response Plan Lake Eildon Part 2: Site Specific Information.

3.5 Healthy Ecosystems

Parts of the Lake Eildon environment have been significantly modified since early European settlement and the construction of the dam. However, the lake and its surrounds are recognised for the maintenance and conservation of biological diversity, recognised by the National Park status of much of the lake surrounds. Leafy Greenhood is listed as a threatened species under the *Victorian Flora and Fauna Guarantee Act* 1988. There is a population of this species at Woolshed Inlet.

Two main ecosystems under consideration at Lake Eildon are the aquatic and terrestrial ecosystems. Woodland vegetation around the lake provides important habitat for native species and protects water quality by filtering nutrients, reducing the inflow of sediment to the lake and stabilising the foreshore and stream banks of connecting tributaries. The body of water provides habitat for a range of aquatic species, including fish, macro invertebrates and a range of plants. It is also an important food source for an array of birds and other native fauna.

3.5.1 Native Flora and Fauna

Aquatic Flora and Fauna

Aquatic fauna in Lake Eildon include zooplankton, invertebrate fauna and vertebrate fauna. Vertebrate fauna are primarily fish. Native fish recorded in Lake Eildon include Golden Perch, River Blackfish and Australian Smelt as well as three threatened species including Murray Cod, Macquarie Perch and Murray Crayfish. Over the years Fisheries Victoria has stocked Lake Eildon and its tributaries with a number of both native and introduced species. These fish releases have two objectives: conservation, and the provision of recreational fishing opportunities (DPI, 2011).

Water quality, invasive pests such as Carp and loss of habitat are threats to aquatic fauna within the lake and its tributaries.

Where practical, Lake Eildon should be managed to protect fisheries and fishing related activities, biodiversity and the flora and fauna of the lake. Protection of fish habitat is a high priority, including protection of submerged and dead standing timber to provide important habitat for many fish species. Trees and dead standing timber provide areas for fish to shelter from predators and provide shade, feeding sites, spawning sites and nursery areas for juveniles. Many bird and invertebrate species also rely on trees and woody debris for roosting and breeding (DSE, 2007). While trees, dead standing timber and tree stumps provide important habitat, they have been identified as a public safety issue in Lake Eildon, especially during periods of low water levels. In particular, tree stumps have been commonly cited as a health and safety issue in areas where there is a high level of boating activity.

Generally, relocating dead trees (standing or fallen) from Lake Eildon will only be permitted if clearly justified for operational or safety circumstances.

In limited cases, consideration will be given to relocation of specific tree stumps to assist in the maintenance and enhancement of navigable areas. Wherever practical, any timber or large woody debris removed will be safely relocated within the lake. An important criterion for any approval of these proposals should be a net habitat enhancement.

It is the responsibility of the proponents and beneficiaries of any tree removal including boating and tourism operators, to facilitate discussion between representative fishing groups and responsible agencies. Planning permits may be required for the removal of both standing dead and live vegetation.

Terrestrial Flora and Fauna

The threatened orchid Leafy Greenhood (Pterostylis cucullata), listed as Vulnerable under the *Commonwealth Environment Protection and Biodiversity Conservation Act* 1999 and also listed under the *Victorian Flora and Fauna Guarantee Act* 1988, occurs within the 200 metre buffer between Lake Eildon and the National Park. The management of weeds and ad hoc camping and recreation in the vicinity of the Leafy Greenhood population is difficult because of the ambiguous land status and lack of clear legislative controls.

Little is known about the fauna in most of Lake Eildon National Park, however it is considered to be an area of high faunal diversity that supports many significant species (Parks Victoria, 1997), due to the large area of undisturbed dry sclerophyll forest as well as the presence of small areas of habitat typical of the fertile land that has mainly been cleared.

Two species recorded in the Lake Eildon area that are listed as endangered under the *Environment Protection and Biodiversity Conservation Act* 1999 and critically endangered under the Department of Sustainability and Environment Advisory List are the Spotted Tree Frog (Litoria spenceri) and Regent Honeyeater (Xanthomyza phrygia).

Both species have been adversely impacted by loss of habitat making remnant habitat such as that in Lake Eildon National Park increasingly valuable.

The Spotted Tree Frog is known to be present at Lake Eildon National Park, and is currently the subject of intense scientific study due to its rapidly shrinking habitat and endangered status. In December 2011 researchers released 1,000 tadpoles in the Lake Eildon National Park. This release of tadpoles is being carefully monitored (Zoos Victoria, 2011).

Management of terrestrial flora and fauna in the Lake Eildon National Park is the responsibility of Parks Victoria and will be covered by the Lake Eildon National Park Management Plan while Goulburn-Murray Water is responsible for the 200 metre buffer surrounding the lake.

Key Issues

- Impacts of Carp on aquatic fauna.
- Dead trees (standing or fallen) have created submerged hazards for recreational users, however they provide important habitat for many fish species.
- The Spotted Tree Frog and Regent Honeyeater have been adversely impacted by loss of habitat.

Objective

To manage the health of aquatic fauna in Lake Eildon by addressing threats to water quality and to preserve and maintain healthy habitat for aquatic and terrestrial flora and fauna.

Actions

62. Identify and implement consistent management strategies to monitor, protect and enhance habitat for native terrestrial and aquatic fauna.
63. Support existing research activities (including activities relating to the Spotted Tree Frog) to better understand biodiversity issues around the lake.

Stakeholders

Department of Sustainability and Environment and Department of Primary Industries.

3.5.2 Foreshore Vegetation Management

Much of the landscape around Lake Eildon was extensively modified through clearing and pasture improvement practices prior to the commencement of the construction of the lake. Today, the existing woodland vegetation around the lake provides important habitat for native species and protects water quality by filtering nutrients, reducing the inflow of sediment to the lake and stabilising the foreshore and stream banks of connecting tributaries.

The Lake Eildon foreshore is bounded by private property and national park. The foreshore of the lake is variously comprised of cleared or semi-cleared land with significant treed areas. Livestock grazing along waterways and riparian zones has had some impact on the quality and extent of vegetation. The extent to which vegetation is affected depends on livestock preferences, timing and intensity of grazing, the type of vegetative community and vegetative community composition. Some plant species would benefit from minimising grazing on parts of the lake that are infrequently inundated, although well-managed grazing can help control pest plants. Revegetation incentive programs may be effective in re-establishing native vegetation around the foreshore of the lake.

Recreational activities including houseboats and camping also have potential impacts on foreshore vegetation (See Section 3.3.2 and Section 3.3.6).

A key agency concern regarding the management of foreshore vegetation is the removal of vegetation from the foreshore without land manager approvals or works permits being sought.

Key Issues

- Impacts of livestock grazing along waterways and riparian zones.
- Impacts of recreational activities including houseboats and camping.

Objective

To implement improved management practices to protect and re-establish riparian vegetation.

Actions

64. Ensure there are consistent and agreed management arrangements between agencies responsible for management of the land around the national park foreshore, in particular critical habitat areas for threatened species such as the Leafy Greenhood population at Woolshed Inlet.
65. Conduct a detailed assessment of the lake foreshore zone to determine any areas grazing should be excluded to protect riparian vegetation, prevent erosion or re-establish important biodiversity values.
66. Investigate a revegetation incentive program for landholders.

Stakeholders

Goulburn-Murray Water, Department of Sustainability and Environment, Parks Victoria and Goulburn Broken Catchment Management Authority.

3.5.3 Pest and Nuisance Plants

If poorly managed, pest plants can impact on neighbouring private or public lands, compromise stock grazing and decrease biodiversity. Pest plants can also pose a fire risk if not appropriately controlled.

Significant pest plants in Lake Eildon National Park include St John's Wort, Tutsan, Blackberry, Gorse and English Broom. Blackberry, English Broom and Paterson's curse infestation around the full supply level and on the lake floor is an issue (Parks Victoria, 1997).

Within the broader Lake Eildon catchment, there exist records of thistles (variegated, spear, saffron, slender), Paterson's curse, Horehound, English Broom, Gorse, Spanish heath, Ivy, Bathurst Burr, Silverleaf nightshade, fruit trees, pines and other exotic species (G-MW, 2003).

Black Wattle is a native species which lake users often believe to be a nuisance due to the perceived fire risk created by its dense growth around the lake edge.

Blown-grass is another native grass which can be a nuisance species. When occurring in large populations on moist lake and swamp beds the detached, mature inflorescences are blown by the wind and mass against fences, in farm sheds and around houses and gardens.

During periods when the water levels in the lake are low, there is an increase in pest plants growing on the dry lake bed. Temporary grazing permits have been granted to some adjoining landowners to enable them to graze their cattle on the lake bed. This had the benefit of reducing the vegetation, including weed load on the lake bed.

Goulburn-Murray Water undertakes control programs targeting declared noxious weeds on the lake bed and perimeter foreshore areas. These programs are carried out by licensed contractors, using chemicals approved by Goulburn-Murray Water. Treated areas are mapped and inspected following treatment to ensure effective weed management.

Goulburn-Murray Water lease and grazing licence holders are required to manage weeds as part of their lease and licence conditions. Any chemical spraying must comply with the Agricultural and Veterinary Use (Control of Use) Regulations 2007.

Key Issues

- Significant pest plants in Lake Eildon National Park include St John's Wort, Tutsan, Blackberry, Gorse and English Broom.
- When the water levels in the lake are low, there is a significant increase in pest plants growing on the dry lake bed.
- Potential fire risk from pest plants.

Objective

To manage pest plants on the lake bed and surrounds to minimise impacts on native flora and fauna species, recreational and agricultural activities and minimise fire risk.

Action

67. Implement coordinated weed control programs with relevant agencies and landholders for the Lake Eildon foreshore and lake bed.

Stakeholders

Goulburn-Murray Water, Parks Victoria and Department of Primary Industries.

3.5.4 Pest Animals

Pest animals are a major concern for private landowners, water managers and government. They represent one of the most significant threats to economic productivity and to environmental values.

Known pest animals in the Lake Eildon region include rabbits, foxes, dogs, goats and invasive species such as cats. No formal assessment of pest animal numbers on Goulburn-Murray Water owned land has been conducted to date. Within the lake itself, Carp pose a serious threat to the health of Lake Eildon and surrounding tributaries and streams. Carp spread quickly and have been implicated in the decline of a number of native fish species in Australia. Carp are aggressive towards other aquatic fauna, are able to reproduce quickly, and can tolerate a broad range of environmental conditions.

At present there are no specific programs in place to control the Carp population at Lake Eildon.

Fisheries Victoria recently invited recreational fishers to a meeting with the Invasive Animals Cooperative Research Centre (IACRC) and CSIRO to discuss the status of Koi Herpes Virus (KHV) and the potential of this virus as a control for Carp in Victoria.

The Fish Diseases Laboratory at the high-security CSIRO Australian Animal Health Laboratory is examining KHV as a biological control agent by undertaking a rigorous assessment of KHV in the laboratory to make sure it does not impact Australian native species or trout. Fisheries Victoria will continue to work with the IACRC to control noxious Carp in Victorian waterways. The release of KHV will require extensive testing and approval from federal and state authorities before it can be considered as a control for Carp.

Key Issues

- Impacts of rabbits, foxes, goats and invasive species such as cats.
- Carp pose a serious threat to the health of Lake Eildon and surrounding tributaries and streams.

Objective

Minimise the impact of Carp in Lake Eildon on aquatic fauna and pest species on surrounding land.

Actions

68. Investigate the application of innovative Carp control for Lake Eildon.
69. Support Department of Sustainability and Environment and other agencies to minimise the impacts of pest animals on surrounding communities to the lake and the environment

Stakeholders

Department of Primary Industries and Department of Sustainability and Environment.

3.5.5 References

DPI, 2011, Goulburn-Broken Fishery Management Plan

DSE, 2007, Website, **www.dse.vic.gov.au**

G-MW, 2003, Lake Eildon Storage Management Plan: Water Quality and Biodiversity Management, Draft Version 1.

Parks Victoria, 1997, Lake Eildon National Park Management Plan.

Zoos Victoria, 2011, Website, **www.zoo.org.au**

3.6 Land Management

The entire perimeter of the Lake Eildon is bounded by a strip of public land above the full supply level. This land must be managed responsibly by the public land manager, so that it provides a buffer for the protection of the quality of the storage as an irrigation water supply and for the broader public interest.

Examples of land management issues include erosion control, grazing management and the impacts of grazing on water quality, pest plants and animals and the management of fire risk.

Distinguishing between private and public land around the lake is sometimes difficult and there are issues surrounding inadvertent trespass onto adjacent private land, as well as encroachment of private infrastructure onto public foreshore land.

3.6.1 Permits, Licences and Lease Arrangements

Licences were issued to landholders to graze the land immediately surrounding the storage when the land was originally acquired by the State Rivers & Water Supply Commission, establishing a long tradition of cattle grazing around water storages.

The current licence policy is to offer five year grazing licences which include conditions intended to improve environmental outcomes for the lake and its surrounds. To date there is only limited monitoring or inspection of compliance with licence conditions and their adequacy. Some areas are grazed which are not under licence. Further work is required to identify and control these activities.

During the consultation for development of the Plan, landowners expressed dissatisfaction with the fees and charges associated with a licence to graze their stock on land immediately surrounding the storage. Some landowners felt that the fees they paid to graze their stock were too high and did not take into account the fact that the land may be unavailable for grazing when water levels of the storage have increased or are at the full supply level. Generally licence fees are based on water level forecasts and the likelihood of the land being available for grazing. Increased information is required to assist landowners in making decisions about lease agreements.

Some landowners also possess occupational licences, which enables them to manage, but not undertake grazing activities on the land.

There are a number of caravan parks, club sites and marinas around the Lake Eildon foreshore, all of which lease land from Goulburn-Murray Water. There are a number of concerns regarding the lease application process, including length of the lease approval process, the lack of clarity and onerous nature of lease conditions.

Permits are required to undertake works on Goulburn-Murray Water managed land such as the removal of vegetation, construction of private jetties and construction of boat ramps.

At Lake Eildon, there is a lack of clarity about the requirements for permits and a need for the development of a policy or set of guidelines relating to the approvals process.

Key Issues

- Lack of information to assist landowners in making decisions about licence agreements.
- Concerns regarding the time to process lease applications.
- Lack of clarity and onerous nature of lease conditions.
- Lack of clarity about the requirements for permits to undertake works on Goulburn-Murray Water managed land.

Objective

A cooperative partnership between land managers, lease/licence holders and landowners to ensure that the land around Lake Eildon is well maintained.

Actions

70. Assess the lease renewal process to ensure it is timely, well-communicated and efficient, with major changes to lease conditions to be provided in writing.
71. Public land managers to spend more proactive time with licence holders talking about the conditions of their licence and, if necessary, enforcing compliance.
72. Ensure clear guidelines exist for the approval of native vegetation removal, foreshore works permits, jetties and moorings.
73. Ensure that all infrastructure on public land is appropriately and consistently licensed to protect water quality and the foreshore.
74. Review the grazing licence agreements to provide transparency in fee structures and charges.

Stakeholders

Goulburn-Murray Water and Councils.

3.6.2 Fire

Fire can have considerable effects on the environment including exposure of the soil cover leading to greater potential for erosion. Consequently long-term water quality can be impacted by increased sediment loads from burnt, erosion prone areas. Increased sediment and nutrient loads from fire affected areas can have a detrimental effect on water quality and the aquatic habitat. Ash can increase the soil pH, and new trees and re-growth typically reduce catchment yields because greater amounts of water are needed until they reach maturity.

The receding shoreline during drought years resulted in increased vegetation growth on the lake bed, creating a potential fire hazard. However, inundation following high rainfalls removed this risk (G-MW, 2010). During periods of low storage levels Goulburn-Murray Water granted short term grazing permits to landowners adjacent to the storage to reduce the vegetation load on the lake bed.

There is potential for vegetation around storages to become a fire risk to neighbouring properties and communities. Unregulated campfires pose a threat to water quality, surrounding communities and the environment. In order to manage this risk, fires and camping are not permitted in any area around Lake Eildon except in designated camping areas (see Section 3.3.6). Motorbikes and 4WDs on the lake bed pose significant fire risk and are not permitted.

Goulburn-Murray Water has implemented a range of programs including Fire Protection Plans in partnership with local Councils and other agencies to identify and address potential fire risks on and around storages and along the delivery network. Goulburn-Murray Water has also carried out slashing, mowing and weed spraying in selected foreshore and lake bed areas to minimise fire risk. Goulburn-Murray Water's weed control practices are described in more detail in Section 3.5.3. Goulburn-Murray Water also works with Department of Sustainability and Environment to undertake controlled burns around the Eildon township in order to minimise fire risk to the community. Department of Sustainability and Environment and Parks Victoria also coordinate a program of controlled burns in the Lake Eildon National Park each year. The Murrindindi Shire maintains the Eildon Firebreak Road and an emergency access road from Taylor Bay to Karrilika Heights. These roads are on Goulburn-Murray Water land and are not open to general public use (G-MW, 2012). Mansfield and Murrindindi Shire Councils both have a Municipal Fire Management Plan (MFMP).

Goulburn-Murray Water works with Parks Victoria, houseboat marinas and boat operators to ensure compliance with by-laws regarding camp fires. Club sites are required to have updated Fire Management Plans in place as part of their lease agreement.

The State Government has taken a number of steps to address and reduce the risk to the Victorian population of bushfire following the events of Black Saturday on 7 February 2009. One of these steps is the capacity of the Government to declare certain days as 'Code Red' days. On 'Code Red' days activities permitted on and around Lake Eildon, and its use by the public, will be guided by recommendations from the management agencies or the Country Fire Authority.

Key Issues

- The potential for vegetation around storages to become a fire risk to neighbouring properties and communities.
- Unregulated camping and camp fires, motorbikes and 4WDs on the lake bed.
- The need to ensure that key agency Fire Protection Plans are coordinated (MFMP).

Objective

To responsibly manage fire risk to protect communities and environment.

Actions

75. Ensure annual Lake Eildon Fire Protection Plans take account of supply levels within Lake Eildon and include a strategy for managing 'Code Red' days.
76. Identify areas of public land suitable for use as Neighbourhood Safer Places in consultation with relevant agencies.
77. Mansfield and Murrindindi Shire Councils to develop a coordinated Municipal Fire Management Plan (MFMP) identifying fire risks and mitigation strategies for Lake Eildon. Storage Fire Protection Plans should be linked with the MFMP.

Stakeholders

Goulburn-Murray Water, Department of Sustainability and Environment, Parks Victoria and Councils.

3.6.3 Foreshore Erosion

Foreshore erosion occurs where wave action erodes the banks, undercutting the toe of the slope, causing bank failure. Erosion of foreshore land is primarily a concern at full supply level.

The waves initiating this process may be generated by natural processes such as wind, or human activity, for example the use of powerboats close to the shore. However studies suggest areas of shoreline erosion do not necessarily correlate with areas of boating activity. This suggests either boating is not detrimental to shoreline stability or other factors such as wind generated waves, fluctuating water levels or loss of vegetation are more significant influences (Davis 1996).

Foreshore erosion has occurred at Lake Eildon to such a degree that there is no perimeter land remaining in some locations. Significant foreshore erosion was caused by the storage surcharge during a flood event in 1993, when significant volumes of water were stored in the lake in order to mitigate downstream flooding. Grazing and unauthorised foreshore works also impact on foreshore erosion.

Goulburn-Murray Water carries out erosion control work around the perimeter of the lake on an 'as needs' basis. Erosion control works carried out to date have mostly focused on areas where erosion was encroaching on private land threatening the structural integrity of private dwellings.

Goulburn-Murray Water has also acquired some sections of private land around the lake where significant erosion has occurred.

Key Issues

- Erosion of foreshore land when storage is at full supply level.
- Significant foreshore erosion caused by the storage surcharge during the flood of 1993.
- Impacts of grazing and unauthorised foreshore works on foreshore erosion.

Objective

To proactively monitor, prioritise and address erosion and erosion hazards around the Lake Eildon foreshore.

Actions

78. Develop and implement an erosion action plan, including monitoring and reporting, for Lake Eildon including a summary of threats, mapping of high risk areas and a prioritised works program.
79. Build on the forthcoming Goulburn Broken Regional Catchment Strategy (2012) to develop a whole of catchment water quality management plan.

Stakeholders

Goulburn-Murray Water, Goulburn Valley Water and Goulburn Broken Catchment Management Authority.

3.6.4 Stream Bank Erosion

Erosion of stream bed and bank processes can contribute a significant nutrient and sediment load from grazed catchments. Causes of stream bank erosion include modification of vegetation cover in riparian zones and across the catchment, regulation of river flows, mining, dredging, stock access and weed infestation of stream banks.

Significant erosion issues have also emerged in the upper Goulburn catchment following the wildfires of 2006 and 2009. Wildfires destroy vegetation, leaf litter and organic matter as well as changing soil properties. As a result, the soil becomes highly vulnerable to both wind and water erosion. The lack of vegetation and changes in soil properties in catchments following fires also increases the frequency and intensity of flooding.

The Goulburn Broken Catchment Management Authority as well as the Department of Sustainability and Environment have responsibility for the condition of the stream bank above the full storage level while G-MW have responsibility below the full supply level when water levels have receded.

The Goulburn Broken Catchment Management Authority Regional River Health Strategy (2005) outlines programs and activities that impact on Lake Eildon. The Strategy outlines actions to monitor and undertake stream bank erosion works on the Delatite River, upstream of the lake. Typical stream stabilisation techniques include bank stabilisation, rock chutes, channel shaping, fencing and revegetation.

Key Issues

- Impacts of river flows, mining, dredging, stock access and weed infestation of stream banks on bank erosion.
- Wildfire impacts on stream bank erosion in the upper Goulburn catchment.

Objective

Improve erosion management in the catchments to Lake Eildon to increase stream stability, improve the riparian zone and reduce the movement and transport of sediment and nutrients to Lake Eildon.

Action

80. Implement recommendations for stream bank erosion in the Goulburn Broken Regional River Health Strategy (2005).

Stakeholder

Goulburn Broken Catchment Management Authority.

3.6.5 Grazing

Grazing around Lake Eildon occurs mostly along the shorelines of the Delatite Arm and Brankeet Arm which is surrounded by improved pasture. Grazing licences provide control of lakeside vegetation to reduce weed infestations and reduce fire risk. Grazing near water storages and tributaries to the storages has the potential to impact upon water quality and the surrounding environment. Impacts include increased nutrients in the water storage contributing to potentially toxic algal blooms. Due to the tendency of cattle to graze the riparian zones when allowed access, phosphorous and nitrogen can either be washed into waterways through overland flow, enter via erosion actions of stream banks or be directly deposited into the water by the animals. Other impacts include erosion and increased turbidity, damage to riparian vegetation and habitat of native animals.

Of particular concern are the public health risks associated with cattle faeces entering waterways upstream of drinking water off-takes. While disinfecting drinking water with chlorine is effective in inactivating pathogenic bacteria, fungi and many human-infectious viruses, it is not effective against protozoa. Protozoa can cause serious gastrointestinal-type illnesses in humans. Of particular concern is the chlorine-resistant protozoan Cryptosporidium, which is a notifiable organism in Victoria, when isolated in food or from drinking water supplies. Cryptosporidium, including the human infectious species, Cryptosporidium parvum, are commonly present in high numbers in cattle and sheep faeces, especially in the faeces of newborn calves in the first few weeks after birth (G-MW, 2011b).

Due to these health-related impacts, stock grazing in and along waterways, particularly waterways upstream of urban drinking water off-takes, is of public health concern. Restricting access, especially of young cattle (pre-weaned), to these waterways can bring about a significant reduction in the concentrations of human infectious Cryptosporidium in the raw water.

Additionally, applying a multi-barrier treatment approach to drinking water treatment, including catchment to tap risk management, will also help minimise the risk of Cryptosporidium being present in the treated drinking water (G-MW, 2011b).

Grazing licences state that the licensee must provide fencing around the boundary of the land (neighbouring boundaries, not resumed land boundary). The licensee must also maintain any waterways in good repair. However, licences do not stipulate any detail on maximum stocking rates or restrictions relating to young cattle.

It is important to note that although grazing near water storages and tributaries to the storages has the potential to impact upon water quality, grazing will continue to be used as a land management tool to control weeds and nuisance vegetative growth in the lake bed and foreshore lands.

Key Issues

- Increase in storage nutrients and potential for algal blooms.
- Increased turbidity, damage to riparian vegetation and habitat of native animals.
- Public health risk from pathogens.
- Need to control weeds and fire risk.

Objective

Well managed, innovative grazing programs to manage and minimise the impacts of stock on riparian vegetation and water quality.

Actions

81. Develop a riparian revegetation incentive program for private landowners on the foreshore and surrounds which includes stock watering and fencing.
82. Clearly identify grazing licence responsibilities for Goulburn-Murray Water and the licence holder.
83. Investigate the introduction of additional and/or different conditions on grazing licences regarding the timing and intensity of grazing and age of stock in order to minimise impacts on water quality.
84. Reinforce compliance with licence conditions through adequate monitoring.
85. Investigate alternatives to grazing for weed control and fire fuel load reduction, for example crash grazing (where stock are allowed access for short intense periods), controlled burns in association with the Country Fire Authority, slashing or spraying.
86. Maintain, and where appropriate expand, existing vegetation in buffer zones along the Lake Eildon foreshore in order to protect water quality by acting as a filter for pathogens and other parameters.

Stakeholders

Goulburn-Murray Water, Goulburn Broken Catchment Management Authority, Goulburn Valley Water, Department of Sustainability and Environment, Country Fire Authority and Department of Primary Industries.

3.6.6 Fencing

Fencing existed on the bed of Lake Eildon and foreshore areas prior to the construction of the dam. This fencing is of cultural heritage significance. Current fencing types vary depending on stock type and topography. Most are simple post and wire fences, although many landowners now also use electric fences. Other innovative fencing solutions, such as 'virtual fencing', should be investigated to remove the need for permanent fencing on the lake bed. Virtual fencing uses satellite technology linked to collars fitted to the stock to confine cattle without using fixed fences.

Fencing is used for stock management by private land owners and grazing licence holders. As mentioned in Section 3.6.5, grazing licences issued by Goulburn-Murray Water state that the licensee must provide fencing around the boundary of the land (neighbouring boundaries, not resumed land boundary). Many licence holders/landowners experience difficulties managing fences due to fluctuations in water levels in the lake. Fencing below the full supply level should be removed when water levels rise. This is not always practicable, resulting in submerged fencing which poses a safety hazard to recreational users of the lake.

In some areas, fencing erected by landowners has the benefit of reducing unauthorised vehicle access to the lake bed. Traditional fencing methods are expected to remain at Lake Eildon for the foreseeable future. New innovative technologies such as virtual fencing should be explored as they are developed and commercially available to reduce the risks to public safety.

Key Issues

- Many licence holders/landowners experience difficulties managing fences due to fluctuations in water levels in the lake.
- Submerged fencing poses a safety hazard to recreational users of the lake.

Objective

To manage the impacts of fencing for protection of and the health and safety of recreational users of the lake.

Actions

87. Investigate possibilities for 'virtual fencing' and other innovative approaches to stock management on the lake bed to reduce the need for traditional fencing.
88. Develop a management plan to actively manage the dry lake bed which includes the management of fences during fluctuating water levels.
89. Minimise fencing below full supply level to the extent practicable and remove old fences.

Stakeholder

Goulburn-Murray Water.

3.6.7 Pest and Nuisance Plants

Refer to Section 3.5.3

3.6.8 References

Davis J (1996) Catchment Management for the Control of Sediment Delivery: the Case of the Eppalock Catchment, Victoria.

G-MW, 2010, Goulburn-Murray Water Major Storages 2009 Water Quality Report.

G-MW, 2011b, Managing Stock Access to G-MW Storages and Channels to Manage Water Quality Risks.

G-MW, 2012, Website, **www.g-mwater.com.au**

3.7 Planning and Development

Planning future urban and rural residential development around Lake Eildon is managed by Murrindindi and Mansfield Shire Councils. The Councils see the lake and its environs as a key attraction and opportunity for urban and rural residential development. Future urban and rural residential development must be balanced with protection of the lake and its surrounds. Future development must meet best practice planning standards and must not compromise the environmental, social and economic values of the lake. A consistent, cooperative approach between local governments bordering the lake is highly desirable.

The Lake Eildon environs are classified as a Declared Water Supply Catchment under the provisions of the *Catchment and Land Protection Act* 1994.

Mansfield and Murrindindi Shire Councils' planning schemes and other documentation address planning issues of relevance to Lake Eildon. Goulburn-Murray Water can influence planning through the referral process and is a referral authority for developments. If a permit is referred, Goulburn-Murray Water and other agencies take into account issues such as effects on water quality and bank stability.

In 2000, the North East Planning Referrals Committee (NEPRC) prepared an integrated set of guiding documents, policies and requirements to cover a wide range of development activities with a particular emphasis on water quality protection to provide local government, other agencies and the community with knowledge about water quality protection in land development assessment. In addition, the project is intended to provide some clarity towards streamlining referrals (North East Planning Referrals Committee, 2000). These guidelines are currently being reviewed and are a reference document in the local government planning schemes.

Currently, local government and other authorities are working towards improving and streamlining the referral process through the use of a consistent overlay and schedule to the overlay.

The impact of wastewater (human effluent) and stormwater are discussed in sections 3.4.2 and 3.4.3. Throughout the consultation for development of the Plan, the community expressed willingness for development that does not impact upon the visual amenity, environment or recreational values of the lake and its surrounds.

3.7.1 Coordination and Communication

Unified leadership and improved collaboration and cooperation between Mansfield and Murrindindi Shire Councils is desirable to ensure all future development is environmentally, socially and economically sustainable. Inconsistencies and differences in the interpretation and application of the provisions within the Murrindindi Shire and Mansfield Shire Planning Schemes were identified as an important issue relating to the management of development around the lake. Interpretation of planning scheme provisions may be aided by providing background information to the Councils, providing examples of applying provisions, or explaining connections with other legislation or between different parts of the planning scheme.

Key Issues

- Collaboration and cooperation between Mansfield and Murrindindi Shire Councils.
- Environmentally, socially and economically sustainable development.
- Protection of water quality and recreational values.

Objective

Coordinated development and land-use surrounding Lake Eildon, to protect water quality, visual amenity, recreational access and environmental values.

Actions

90. Encourage agencies and authorities to adopt agreed and consistent principles and processes to manage the impacts of planning and development around the lake.
91. Establish a Lake Eildon planners' forum to meet regularly to discuss and resolve planning issues specific to Lake Eildon ensuring the consistent application and interpretation of planning scheme provisions.

Stakeholders

Goulburn-Murray Water, Goulburn Valley Water, Councils and Department of Planning and Community Development.

3.7.2 Planning Tools, Guidelines and Strategies

Not all Declared Special Areas have been recognised through the use of Overlays available in the Victorian Planning Provisions (VPP). The Environmental Significance Overlay (ESO) is a preferred tool within the VPP to cover special water supply catchments. Mansfield Shire Council which covers Lake Eildon and Lake Nillahcootie has used an ESO to recognise Lake Eildon Environs. Murrindindi Shire Council also encompasses Lake Eildon on its southern side and has used a Significant Landscape Overlay (SLO) to protect the visual aspects of the lake.

An opportunity exists to strengthen catchment and water quality protection through the use of ESOs if deemed appropriate. These Overlays when produced as site specific documents can provide guidance where land use activities require further determination or scrutiny for the protection of water quality.

If the Overlay was to be introduced, agreements could be reached between water authorities and local government to further exempt some activities and also to provide a level of clarity through standard permit conditions. Importantly the overlay would provide guidance for development and subdivision where the land is in private ownership without the need for referral to other agencies.

Special Area Plans (SAPs) are also useful tools to specify where (location) various land uses may be undertaken and how (conditions of use) they should be undertaken, to minimise any adverse effects on water related values. SAPs identify drainage lines, streams, spring areas and storages, and indicate the buffer distances to be observed to ensure water quality is not compromised by adjacent land uses. A Special Area Plan represents land use policy for a particular catchment and can provide a strong basis for advice to land and water managers.

In June 1976, a Land Use Determination Plan (Special Area Plan) was prepared for part of Lake Eildon. The area covered 8,700 square kilometres immediately surrounding the lake and was the largest area to be the subject of a plan authorised by the Soil Conservation Authority at that time. The Plan appears not to have been revoked to date. An opportunity exists to build upon the Land Use Determination Plan and develop a detailed Special Area Plan for Goulburn Broken Catchment including Lake Eildon.

Authorities should also continue to support the review of the North East Planning Referrals Committee Guidelines for the Protection of Water Quality.

Key Issues

- Protection of water quality and environmental values.
- Unclear planning guidelines.
- Need for effective planning tools.

Objective

Improved planning tools, guidelines and strategies to guide development and ensure the protection of water quality, visual amenity, recreational access and environmental values in Lake Eildon.

Actions

92. Review the Environmental Significance Overlay (ESO) and Significant Landscape Overlay in the next planning scheme review and amendment with a view to developing an ESO which recognises the whole of the Lake Eildon Environs.
93. Explore the opportunity to develop a Special Area Plan (SAP) for Lake Eildon and its immediate surrounds.
94. Encourage agencies to continue to support the review of the North East Planning Referrals Committee Guidelines for the Protection of Water Quality.

Stakeholders

Goulburn-Murray Water, Goulburn Broken Catchment Management Authority, Goulburn Valley Water, Councils, Department of Planning and Community Development.

3.7.3 Wastewater Management

See Section 3.4.2

3.7.4 Stormwater Management

See Section 3.4.3

3.7.5 References

North East Planning Referrals Committee, 2000, Guidelines for the Protection of Water Quality.

Image courtesy of Tony Herridge.

3.8 Cultural Heritage

Lake Eildon and its surrounds has a long history of Aboriginal occupation. Material evidence of human subsistence and settlement includes sediments containing stone artifacts, trees scarred from the removal of bark for making canoes, shields and other artifacts. The region also has a rich and varied European history including former townships, homesteads, farming equipment and former mine sites.

There is an obligation and responsibility for all government agencies in control of land management activities to protect significant Aboriginal and European heritage sites.

3.8.1 Aboriginal Cultural Heritage

In Victoria the *Aboriginal Heritage Act* 2006 and *Aboriginal Heritage Regulations* 2007 protect Aboriginal cultural heritage, formalise Aboriginal community involvement in decision-making arrangements and provide a consistent approach to managing Aboriginal cultural heritage land-use and development proposals. In particular, the Act enables all relevant interests to be easily identified and consulted on development issues. In addition, the *Commonwealth Aboriginal & Torres Strait Islander Heritage Protection Act* 1984 is designed to provide protection when it is not adequately provided at the state or territory level.

Prior to European settlement, the Goulburn River Valley supported hundreds of members of the Taungurung Aboriginal people. The Taungurung (Daung wurrung) people occupied much of central Victoria including the area between the upper reaches of the Goulburn River and its tributaries north of the Dividing Range. The various clan groups migrated on a seasonal basis dependent upon the seasonal variations of weather and the availability of food (Eildon Community, 1986). The Taungurung people continue to have an important presence in the Lake Eildon area, their knowledge of the local landscape, flora, fauna and land use practices being an integral asset to the management of this resource.

There are a large number of Aboriginal heritage sites within Lake Eildon and surrounding land. Sites include scatters (stone artefact assemblages), sometimes with hearths, stone artefacts and scarred trees. Of key importance is the need for substantive consultation between public land managers, relevant Aboriginal organisations and individuals in developing protocols for identifying and protecting Aboriginal cultural heritage at Lake Eildon.

Key Issue

- Identification and protection of Aboriginal cultural heritage sites.

Objective

To protect, conserve and raise community awareness about the importance of Aboriginal cultural heritage and knowledge of the Lake Eildon area.

Action

95. Support initiatives to enhance protection of Aboriginal cultural heritage.

Stakeholders

Goulburn-Murray Water, Aboriginal Affairs Victoria, local Aboriginal representatives and groups.

3.8.2 European Cultural Heritage

Early European settlers took up land in and around Lake Eildon in the 1840s and ran sheep and cattle. Later in the century farms were formally developed which grew crops as well as grazing animals. Eildon station was established in 1839 and named after Eildon Hills in Roxburghshire, Scotland (Eildon Community, 1986). The station was purchased by Archibald Thom and his wife, was 25,500 hectares in size and was located in the area between Darlingford and Thornton.

Darlingford was situated on the Big River near its junction with the Goulburn. It had seven hotels, five policemen, a log gaol, blacksmith, butchery, bakery and post office. There were also three slaughter yards and a state school. It is thought that in excess of 3,000 people lived in and around Darlingford. Darlingford was flooded by the construction of the Sugarloaf Reservoir which commenced in August 1914.

Other pioneers in the district were Stephen Beever-Jones and his wife Jane who moved from Taggerty to Dry Creek and erected a bark-roofed shanty. Later another building was erected and this was to become The Full Belly Hotel, later known as The Old House at Home and later still as The Harvest Home Hotel (Eildon Community, 1986).

Before the building of Sugarloaf Reservoir, the area from Snobs Creek to Jerusalem Creek was known as Upper Thornton. Sir John Robert Barnewall (Bart) was born in the district in 1850. His parents came to Australia from Ireland in 1839. The last Barnewall property is today known as 'Crickstown' after the castle which the first family had been given in Ireland in 1170.

Mrs Margaret Nichol is reported to be the first white woman to have lived in the now Eildon area. Mrs Nichol camped under a tree in 1853 (Eildon Community, 1986). Before she died she appealed to the State Rivers and Water Supply Commission to spare the tree during the construction of the Reservoir. After camping under the tree, the Nichol family moved about a mile further up the river and eventually built a fourteen-roomed house there. The house was formally named Seek and Find, but later changed to Glen Craik.

Gold was discovered in the Upper Goulburn region by Noland and Dempsey in 1857 however the Darlingford area was not invaded by a large numbers of prospectors until 1859. The remains of old alluvial gold mines can still be seen today. At Wilson Inlet off the Jerusalem Creek arm, a crusher, outbuildings, railway line and the old mine can be found. Today the remains of many family homes, shearer's sheds and farming equipment including log skidders areas can be seen when the water levels in the lake are low. Of particular significance is the Wappan homestead built in 1863. The homestead was situated on the banks of Brankeet Creek, northwest of Chinaman's Hill. Parts of the homestead were removed to a new residence. Remnants of the homestead are now submerged by the lake. Other structures built before the expansion of Lake Eildon including the Big River Bridge are now submerged. It is thought that some of these structures are still in very good condition. Agencies in control of land management activities should protect these significant European heritage sites.

Key Issue

- Protection and conservation of European cultural heritage sites.

Objective

To protect, conserve and raise community awareness about the importance of European cultural heritage at Lake Eildon.

Action

96. Support initiatives to enhance protection of European cultural heritage.

Stakeholders

Goulburn-Murray Water and the community.

3.8.3 References

Eildon Community, 1986, Eildon, the Whole Dam Story.

Appendix A - Overview of Storage Operations

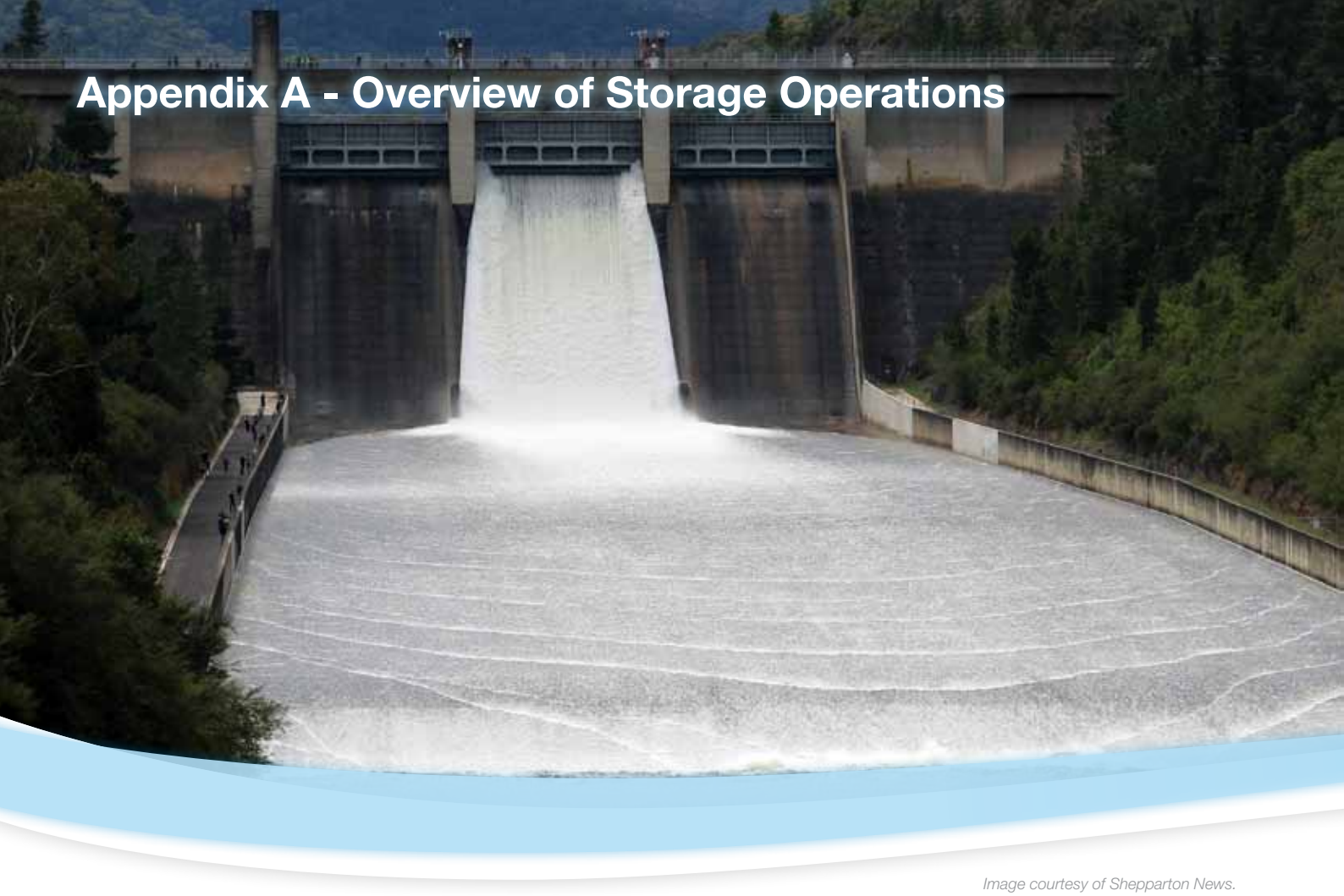


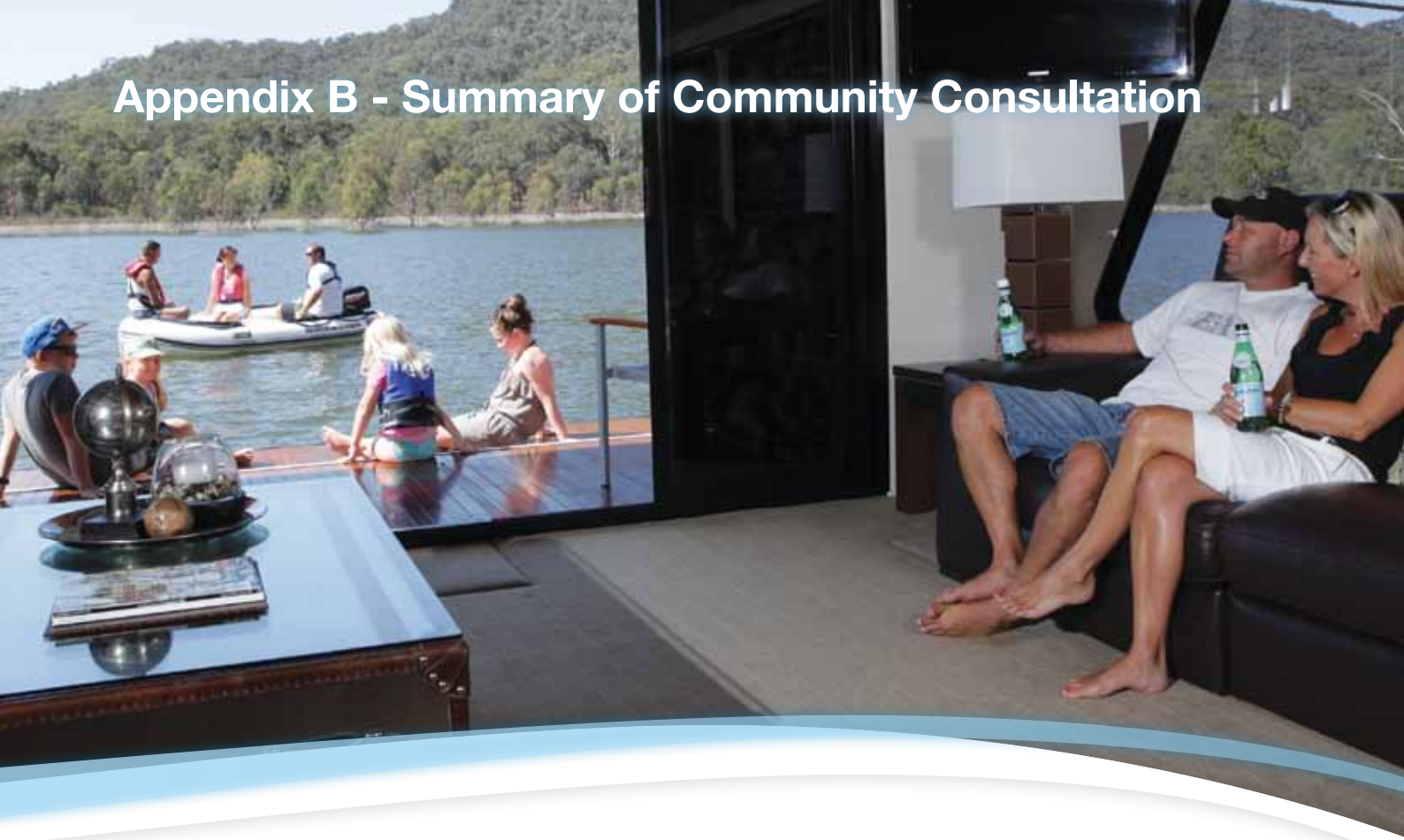
Image courtesy of Shepparton News.

Lake Eildon is primarily an irrigation supply storage, and 91% of water from the storage is used for irrigation. The lake supplies approximately 60% of water used in the Goulburn Murray Irrigation District (GMID). Since construction of Dartmouth Dam, the Goulburn and Murray components of the GMID have been operated separately with regard to water allocations for irrigators. Lake Eildon's capacity of 3,334,158 megalitres has been designed to allow for irrigation supplies to be provided over at least two drought seasons (G-MW website, 2011). A minimum daily flow of 250 megalitres per day is released from the pondage to the river, unless a 24-month low inflow trigger is met and the daily flow requirement is reduced to 120 megalitres per day.

The Lake Eildon pondage is a re-regulation storage facility constructed to contain flows released from the Dam to within the capacity of the Goulburn River channel. The pondage has a surface area of 150 ha with a capacity of 5,200 megalitres. Water levels within the pondage fluctuate in response to demands for hydro-electricity and irrigation water released from the Eildon Dam. The township of Eildon (population 600) borders the northern side of the pondage and relies heavily upon tourism, including tourism generated from fishing.

The main hydro-electric plant located on Lake Eildon is supplied by water released for irrigation from August to May. Flood releases during winter and spring can also be used to generate electricity. The power station can also meet short term emergency power needs resulting from industrial disputes or plant breakdowns elsewhere in the State's power grid. In 1995 a small hydro-electric station with 4.5 megawatt output was installed on the pondage, and is operated by a separate authority.

Appendix B - Summary of Community Consultation



Consultation activities to develop this draft Plan aimed to identify key issues, suggestions for tackling those issues, and ideas for the development of a vision.

A variety of consultation activities were undertaken, including:

- A **workshop** with a Project Guidance Group including representatives of the Mansfield and Murrindindi Councils, Parks Victoria, community and Goulburn-Murray Water (5 present).
- **Place-based community meetings** at Alexandra, Eildon, Macs Cove, Goughs Bay and Bonnie Doon (41 present).
- **Business and tourism meetings** in Mansfield and Eildon (22 present).
- **Government agencies workshop** (22 present representing 15 agencies).
- **Have-a-Say** community drop-in sessions at Mansfield, Goughs Bay, Alliance Boat Ramp (Eildon) and Bonnie Doon (67 interviewed).
- **One-on-one focused interviews** conducted with targeted stakeholders/community representatives/ landholders/businesses either in person or via telephone (21 participants).
- An **on-line questionnaire** was developed for people who were unable to attend the consultation activities to provide them with an opportunity to have direct access into the consultation process. The survey link was distributed by Goulburn-Murray Water's e-storage update newsletter, media releases, Goulburn-Murray Water website and to people who indicated they were unable to attend meetings and interviews (325 respondents).

In summary this consultation collected the views of 177 people and 18 separate agencies directly and 325 by questionnaire.

Qualitative data was collected by a range of methods including:

- Facilitator/interviewer notes.
- 'Six Thinking Hats' exercise (used to explore the topic from a range of perspectives).
- 'Flags on Map' exercise (used to identify issues and solutions).
- Questionnaire written responses.

Information gathered throughout these consultation activities has informed the development of this draft Plan.

A second round of consultation tested the draft Plan. The Lake Eildon Project Guidance Group were consulted to help guide the second round of consultation. Participants in the first round of consultation were provided with the opportunity to make comment on the draft to confirm that the document captured the issues raised and that the actions were appropriate. The draft document was also available for anyone who did not have an opportunity to participate in the first round of consultation, to have input into the final Plan.

Appendix C - Agency Roles and Responsibilities

Aboriginal Affairs Victoria

www.aboriginalaffairs.vic.gov.au/
http://taungurung.info/

Aboriginal Affairs Victoria (AAV) is the Victorian Government's central point of advice on all aspects of Aboriginal affairs in Victoria.

Taungurung Clans Aboriginal Corporation is responsible for Aboriginal cultural heritage management for a large proportion of Lake Eildon, including foreshore areas.

The *Victorian Aboriginal Heritage Act* 2006 recognises Aboriginal people "as primary guardians, keepers and knowledge holders of Aboriginal cultural heritage". Registered Aboriginal Parties play a leading role in administering the new Act and have well defined responsibilities at a local level.

Bureau of Meteorology

www.bom.gov.au

Bureau of Meteorology (BoM) is the main provider of weather forecasts, warnings and observations to the Australian public and is responsible for issuing flood alerts in Australia.

Country Fire Authority

www.cfa.vic.gov.au

Country Fire Authority (CFA) is a volunteer and community based fire and emergency services organisation and is responsible for fire and related emergency coordination in rural and regional areas.

Council

www.mansfield.vic.gov.au
www.murrindindi.vic.gov.au

Under the *Planning and Environment Act* 1987, local government is responsible for ensuring that land is used and developed in an environmentally, economically and socially responsible manner, to provide a sustainable future for the community.

Mansfield and Murrindindi Shire Councils are the authorities with responsibility for statutory planning matters, wastewater management, stormwater management, waste management services, onsite wastewater management tanks, management of public facilities and reserves, management of animals and local law enforcement.

Department of Health

www.health.vic.gov.au

The Drinking Water Regulatory Section within the Department of Health (DoH) has responsibility for the implementation and oversight of the *Safe Drinking Water Act* 2003 and the *Safe Drinking Water Regulations* 2005 on behalf of the Secretary to the Department of Human Services. The primary functions of this section are to oversee the implementation of, and monitor compliance with, the Act and Regulations. The functions of the Department of Health are to:

- Protect public health in relation to the supply of drinking water.
- Monitor and enforce compliance with this Act and the Regulations.

- Report on the performance of water suppliers and water storage managers in relation to the requirements imposed on them under this Act.
- Investigate and report on any aspect of drinking water quality in Victoria.
- Make recommendations to the Minister for Health on any matter relating to drinking water or regulated water.
- Promote industry and public awareness and understanding of drinking water quality issues.

The Drinking Water Regulatory Section works with the Victorian water industry, other units within the Department of Health, key stakeholders and other government departments to deliver the regulatory objectives of the Act.

Department of Planning and Community Development

www.dpcd.vic.gov.au

The Department of Planning and Community Development (DPCD) has a central role in managing Victoria's growth and development and building stronger communities. DPCD works collaboratively with local government and other key public and private stakeholders to lead state and metropolitan development, strategic and statutory planning, development regulation, and environmental assessment. The municipal council is usually the responsible authority for issuing planning permits and administering the planning scheme and should be contacted for local and property specific planning advice. DPCD regional offices work in partnership with councils and stakeholders to deliver State Government policies and programs. They assess planning scheme amendments and provide planning advice and guidance. The regional offices are the local 'shopfront' for a wide range of the Department's services including statutory and strategic planning information.

Department of Primary Industries

www.dpi.vic.gov.au

Department of Primary Industries (DPI) promotes the sustainable development of primary industries within Victoria. Fisheries Victoria is part of the Department of Primary Industries and regulates the taking of fish species and advocacy across all natural resource management agencies.

Department Sustainability and Environment

www.dse.vic.gov.au

Department Sustainability and Environment (DSE) leads the Victorian Government's efforts to sustainably manage water resources and catchments, climate change, bushfires, parks and other public land, forests, biodiversity and ecosystem conservation.

The Department provides leadership in conservation, water management, state-wide planning, urban development and public land management including forests, coasts, alpine resorts, Crown Land reserves and parks. The Department delivers its policy and professional operations through five principal organisational groupings, each headed by a Deputy Secretary or General Manager and each reflecting portfolio themes. These are Built Environment, Land Stewardship and Biodiversity, Strategic Policy and Projects, Water Sector and Resources and Regional Services.

Environment Protection Authority

www.epa.vic.gov.au

Environment Protection Authority (EPA) is a statutory authority established under the *Environment Protection Act* 1970. It exists to ensure the protection of beneficial uses of air, water and land from the adverse impacts of waste and unwanted noise The EPA also jointly administers the *Pollution of Waters by Oils and Noxious Substances Act* 1986 (POWBONS Act) and the Pollution of Waters by Oil and Noxious Substances Regulations 2002 with the Department of Transport. The EPA also oversees the State Environment Protection Policy (Waters of Victoria). State environment protection policies (SEPPs) are subordinate legislation made under the provisions of the *Environment Protection Act*. Under the Act the requirements in environmental regulations, works approvals, licences and other regulatory tools, must be consistent with SEPPs.
The SEPP (Waters of Victoria) applies to all surface waters of Victoria and aims to provide a coordinated approach for the protection and, where necessary, rehabilitation of the health of Victoria's water environments. This policy protects the environmental values, beneficial uses and associated social and economic values of the water environment to ensure that the needs of current and future generations are met. Specific schedules to SEPP (Waters of Victoria) deal with specific individual catchments.

Goulburn-Murray Water

www.g-mwater.com.au

Goulburn-Murray Water (G-MW) maintains and manages the water supply operations, maintenance and safety of Lake Eildon. Goulburn-Murray Water manages lake bed and public foreshore land, and is responsible for licensing and approving structures on the Lake Eildon foreshore and houseboats operating on the lake. Goulburn-Murray Water also has statutory responsibilities in coordination of the blue-green algae monitoring and response program, and as a storage manager under the *Safe Drinking Water Act* 2003.

Goulburn Broken Catchment Management Authority

www.gbcma.vic.gov.au

The Goulburn Broken Catchment Management Authority (GBCMA) is a statutory authority responsible for coordinating integrated catchment management and sustainable land and water use in northern Victoria. The Goulburn Broken Catchment comprises the catchments of the Goulburn and Broken Rivers and part of the Murray River valley. This is primarily achieved through the preparation, coordination and implementation of the Goulburn Broken Regional Catchment Strategy, where the Catchment Management Authority has operational responsibility for waterway and floodplain management in priority areas.

Goulburn Valley Region Water Corporation

www.gvwater.vic.gov.au

Goulburn Valley Region Water Corporation (GVW) is a statutory body established under Division 2 of Part 6 of the *Water Act* 1989, providing urban water and wastewater services to towns in the Goulburn Valley. The Corporation's Statement of Obligations (SoO) is the key accountability mechanism between GVW and the Minister. The purpose of the SoO is to formalise the Corporation's obligations for the provision of water related services to customers to provide greater accountability to Government in terms of the level and standard of service provision and improved business efficiencies by specifying service obligations.

Parks Victoria

http://parkweb.vic.gov.au

Parks Victoria is a statutory authority, created by the *Parks Victoria Act* 1998 and reporting to the Minister for Environment and Climate Change. They are responsible for managing an expanding and diverse estate covering more than 4 million hectares, or about 17%, of Victoria. Parks Victoria is committed to delivering works on the ground across Victoria's park network to protect and enhance park values.

At Lake Eildon, Parks Victoria is primarily responsible for management of Lake Eildon National Park, including camping facilities within the Park.

Transport Safety Victoria

www.transportsafety.vic.gov.au

Transport Safety Victoria (TSV) is the integrated safety regulator for bus, maritime and rail transport. This regulatory function is exercised through the establishment of the independent statutory office of the Director, Transport Safety (Safety Director) under the *Transport Integration Act* 2010 (TI Act). TSV exists to support the statutory object and functions of the Safety Director.

Transport Safety Victoria is responsible for determining standards and procedures for navigation and maritime safety on state waters, including all inland waters such as, rivers, creeks, canals, lakes and reservoirs. Responsibilities also include qualification, crewing and construction standards for commercial vessels and boating safety, licensing and registration for recreational vessels.

Victoria Police

www.police.vic.gov.au

Victoria Police is the primary law enforcement agency of Victoria. Victoria Police is responsible for the enforcement of Victorian laws in relation to land and on-water uses of Lake Eildon.

VicRoads

www.vicroads.vic.gov.au

VicRoads supports Victoria's liveability and economic prosperity by planning, developing and managing the arterial road network and delivering registration and licensing services.

Victorian State Emergency Service

www.ses.vic.gov.au

Victorian State Emergency Service (SES) works to ensure the safety of Victorian communities by responding to emergency disasters across the state. The Victorian State Emergency Service is the control agency during emergency responses to floods, storms, earthquakes and tsunamis in Victoria, and is the largest provider of road crash rescue in the state.

WorkSafe

www.worksafe.vic.gov.au

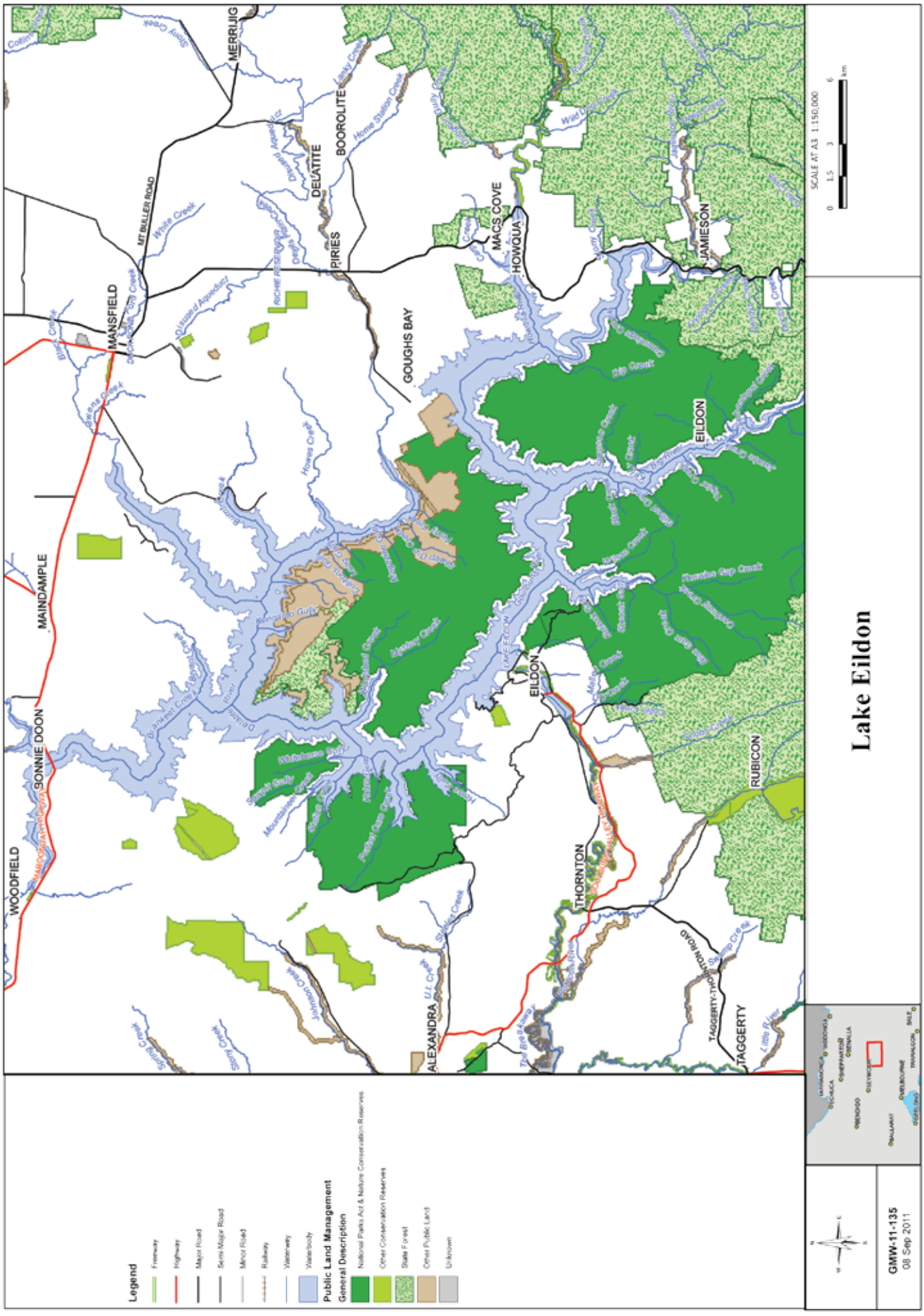
WorkSafe is responsible for enforcing Victoria's work place safety laws and helping to prevent work place injuries.

Appendix D - Agency Quick Reference Guide

Issue	Agency*
Aboriginal cultural heritage	**AAV**
Animal management (e.g. dogs)	**Council**, G-MW
Aquatic vegetation and weeds	**G-MW**, DSE, DPI
Boating management—zones, buoys, signage	**G-MW**, TSV
Boating management—policing and enforcement	**Victoria Police**, G-MW, TSV
Blue-green algae	**G-MW**, DSE
Camping	**G-MW**, Council
Commercial operations, developments and events	**Council**, G-MW
Dam operations (lake level and storage releases)	**G-MW**
Emergency management	**Victoria Police**, CFA, SES
Environmental incident (pollution, spills, noise, reportable, incidents, etc.)	**EPA**
Erosion (public foreshore land)	**G-MW**
Event licensing—on water	**G-MW**, TSV
Event licensing—on foreshore land	**G-MW**
Event planning approval	**Council**
Fishing information, stocking, licensing and enforcement	**DPI**
Fish habitat management	**DPI**, G-MW
Fish deaths	**EPA**, G-MW, DPI
Flood warnings	**BoM**
Foreshore works approval and licensing (jetties, moorings, etc.)	**G-MW**, Council
Grazing (licensed)	**G-MW**
Houseboat licensing	**G-MW**
Houseboat transport	**VicRoads**, Council
Illegal activity and anti-social behaviour	**Victoria Police**
Pest plants and animals (public foreshore and lakebed)	**G-MW**, DPI
Planning and development	**Council**, DPCD
Public reserves and facilities (e.g. boat ramps, toilets, playground equipment, BBQs, roads, etc.)	**G-MW**, Parks Victoria, Council
Rail Trail	**Council**
Rubbish and litter	**G-MW**, Council, EPA
Trees and foreshore (riparian) vegetation	**DSE**, G-MW, GBCMA
Timber (lake bed standing and remnant dead timber)	**G-MW**, DPI
Tourist information (general)	**Council Tourist Information Centres**
Water quality (blue-green algae)	**G-MW**, DSE
Water supply and water quality (urban, potable drinking and household use)	**GVW**, DoH
Water supply (non-reticulated, non-potable stock and domestic licensing and use)	**G-MW**
Water supply (downstream storage releases)	**G-MW**
Weed management (public land)	**G-MW**, DPI, Council

* Primary contact in **bold** font

Appendix E - Storage Maps and Overlays



Appendix F - Summary of Action Items

Note: The lead agency principally responsible for each action is highlighted in bold text in the table below alongside key supporting agencies. The lead agency does not have a statutory or legal obligation to carry out the action. The lead agency is responsible for initiating and coordinating the action in collaboration with other agencies.

Action No.	Action	Lead Agency
	Plan implementation	
1	Establish a Lake Eildon Plan Implementation Group to guide the implementation of the Plan and communicate priorities in the Plan.	**G-MW**
	Education and awareness	
2	Develop a single Code of Conduct for the lake which includes information about user and agency responsibilities relating to boating and boating safety, camping, solid waste, wastewater and emergency management. The Code of Conduct should include information about the importance of designated public access in minimising impacts on the environment.	**G-MW**, DSE, Parks Victoria, CFA, Victoria Police, TSV
3	Develop an education and awareness program to increase understanding of the value of riparian frontages and the impacts of recreational activities, including camping and houseboats on the foreshore environment.	**G-MW**
4	Develop a coordinated blue-green algae communication strategy to enhance business and community understanding of how to respond to blooms.	**G-MW**
5	Develop a communication and awareness campaign with simple communication tools describing how the lake operates including forecasting of water levels in the lake and the destination (use) of water discharged.	**G-MW**
6	Promote the use of interactive communication tools to disseminate information about the lake, its operation, management arrangements and by-laws.	**G-MW**
	Recreation and tourism	
7	Conduct an audit of existing boat ramps, reviewing access at different supply levels, location, safety and parking availability.	**G-MW**
8	Establish consistent signage at all boating access points to improve awareness of boating safety issues, location of ramps and public access options.	**G-MW**, TSV
9	Educate users and enforce the five knot zone within 50 metres of the shore around the entire perimeter of the lake.	**TSV**, Victoria Police, G-MW
10	Goulburn-Murray Water, Parks Victoria, Mansfield Shire Council and Murrindindi Shire Council to develop a unified approach to traffic management at boat ramps to improve traffic flow and improve safety.	**G-MW**, Parks Victoria, Council
11	Develop an agreed and acceptable position of management relating to the vegetation on the foreshore that addresses risks to human health and safety.	**G-MW**
12	Revise the houseboat regulations to allow additional licences and larger houseboats to be considered.	**G-MW**, DSE
13	Work with relevant agencies to assess slipping facilities for: ■ Environmental and WorkSafe compliance of maintenance facilities. ■ The ease and impact of removal of vessels from the waterway. ■ Safety of on-road houseboat transport. ■ The capacity of the slipways to deal with the size of the houseboats and the number of inspections required.	**G-MW**, WorkSafe, Vic Roads, EPA
14	Continue investigations and implementation of new effluent disposal facility for Jerusalem Creek.	**G-MW**
15	Review facilities and procedures for the management of on-water fuel supply and waste management.	**G-MW**, EPA
16	Continue to implement measures to minimise the impacts of grey water discharge from houseboats.	**G-MW**, EPA
17	Implement measures to protect native vegetation from the impacts of houseboat mooring.	**G-MW**
18	Undertake regular audits of public access points to assess the safety, infrastructure and environmental issues associated with access at varying lake levels.	**G-MW**, Council, Parks Victoria, DSE

Action No.	Action	Lead Agency
19	Consider upgrading or rationalising access points based on the audit findings to improve the overall quality of public infrastructure and facilities.	**G-MW**, Council, DSE
20	Establish an inter-agency agreement for the management of recreational uses of the lake (including managing camping, access points and use of the exposed lake bed when water levels are low).	**G-MW**, DSE
21	Ensure there is consistent signage at specified access points with a specific Lake Eildon brand.	**G-MW**, Council
22	Develop a Plan for the management of exposed areas of lake bed during periods of low water levels.	**G-MW**
23	Implement recommendations within the Goulburn Broken Fisheries Management Plan that relate to sustainable recreational fishing in Lake Eildon.	**DPI**
24	Develop agency management agreements that provide deer hunters with clear and easily understood information about areas where hunting is permitted.	**G-MW**, Parks Victoria
25	Improve education and awareness to encourage protection of the environment and compliance with firearm and hunting regulations.	**G-MW**, Parks Victoria
26	Estimate current and future levels of demand for camping to inform camping management, including the possible establishment of new camping areas.	**G-MW**, Parks Victoria, Council, DSE
27	Explore the introduction of new camping areas and options to fund the development and maintenance of camping sites.	**G-MW**, Parks Victoria
28	Review the adequacy of current designated areas for camping, including an evaluation of amenities at each camp site.	**G-MW**, Parks Victoria, DSE
29	Provide dedicated safe areas for motorbikes away from the designated camping areas.	**G-MW**, Council
30	Develop an agreed approach to management of the 200 metre strip of land between the National Park and the full supply level.	**G-MW**, Parks Victoria, DSE
31	Audit existing infrastructure and service provision in and around Lake Eildon in order to prioritise infrastructure investment.	**G-MW**, Council, Parks Victoria, DSE
32	Identify the scale and type of infrastructure upgrades and additional infrastructure and services required.	**G-MW**, Council, Parks Victoria, DSE
33	Clarify and formalise the roles and responsibilities for upgrade and maintenance of infrastructure incorporating levels of service.	**G-MW**, Council, Parks Victoria, DSE
34	Estimate the long-term resident and visitor demand on and around the lake and ensure that infrastructure provision is aligned with estimated demand.	**G-MW**, Council
35	Investigate the potential for the development of new walking tracks above the full supply level.	**G-MW**, Council
36	Ensure that the approaches to waste management around the lake are effective and efficient.	**G-MW**, Parks Victoria, Council
37	Explore where the 'carry in carry out' approach to waste management can be implemented at other areas around the lake.	**G-MW**, Parks Victoria
38	Ensure emergency services and relevant agencies meet regularly to improve and coordinate emergency management/response.	**Victoria Police**
39	Develop a Lake Eildon brochure to increase awareness of issues relating to emergency management and safety.	**G-MW**, TSV, Victoria Police, CFA, Council
40	Engage media/communication resources to communicate safety and compliance messages to recreational lake users.	**G-MW**, TSV, Victoria Police, CFA, Council
41	Investigate the potential for the introduction of traffic management in risk-prone areas, for example, around boat ramps.	**G-MW**, Council
42	Seek input from emergency services regarding methods for locating lake users in case of emergency.	**Victoria Police**
43	Develop a Tourism Strategy for Lake Eildon including guidelines outlining preferred and appropriate commercial ventures and opportunities (land and on-water).	**Council**, G-MW, commercial operators

Appendix F - Summary of Action Items (Continued)

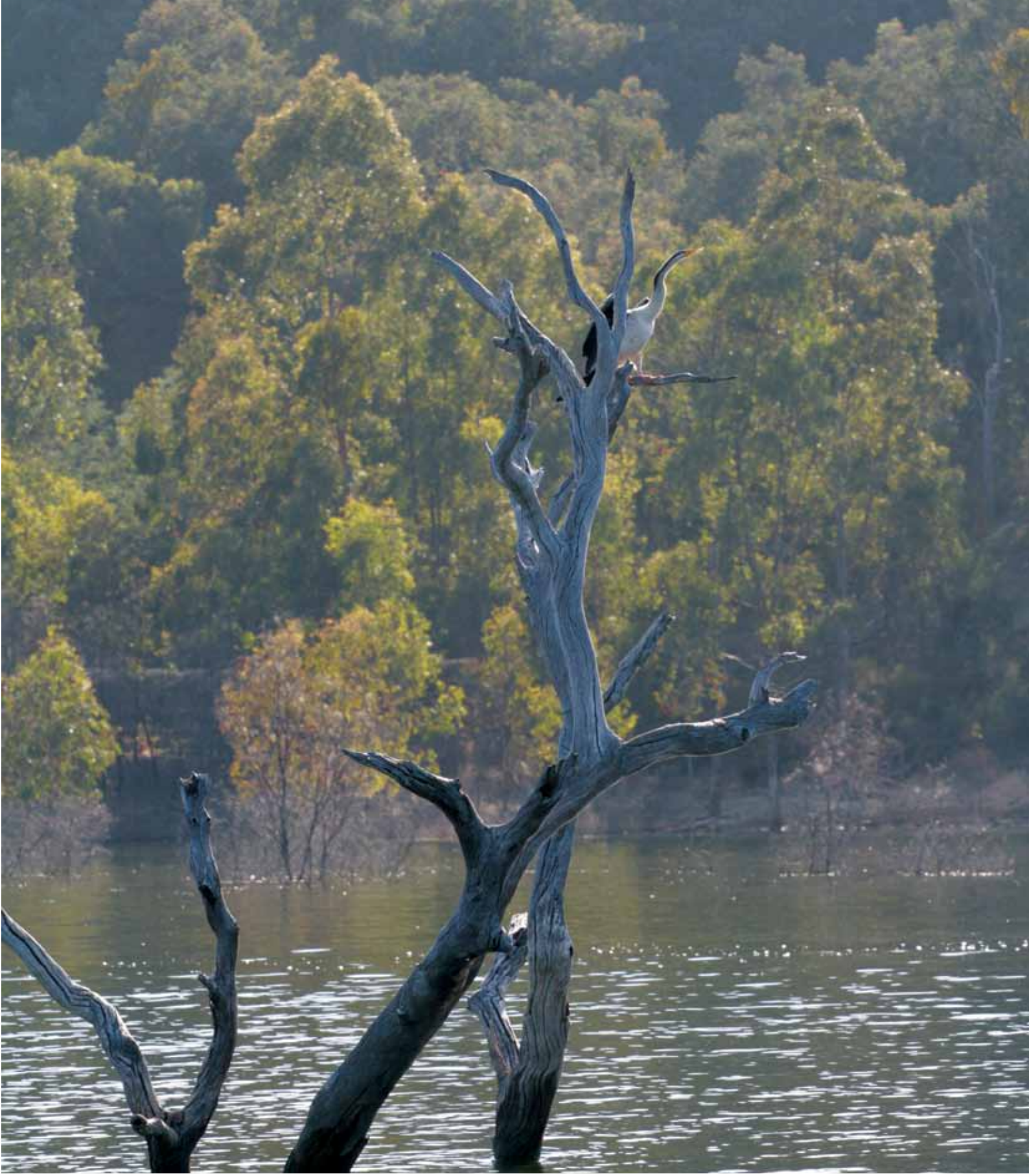
Action No.	Action	Lead Agency
44	Commission a study to estimate the long term resident and visitor demand on and around the lake in order to inform decisions about future developments.	**G-MW**, Council
45	Develop an Event Management Strategy for Lake Eildon.	**G-MW**, Council
46	Explore the feasibility of developing an economic development overlay to assist with commercial business lease availability, tenure and opportunities.	**G-MW**, Council
47	Seek accommodation industry participation/representation in the Plan Implementation Group to support plan actions.	**G-MW**, commercial operators
48	Work with park operators to ensure lease tenure supports investment and commercial viability.	**G-MW**, commercial operators
49	Develop a management plan for Eildon township land and the use of the Pondage, in consultation with the community.	**G-MW**, Council, community
50	Continue to work with Council to identify best use, ownership and potential development opportunities on Goulburn-Murray Water land around Eildon township.	**G-MW**, Council, community
	Water quality	
51	Review existing water quality monitoring programs to ensure they identify water quality risk management measures and are consistent with the *Safe Drinking Water Act* Risk Management Plan.	**G-MW**, DoH
52	Monitor mercury and arsenic level in fish to support health advice.	**EPA**, G-MW, DoH
53	Consider a broad scale study into potential mercury contamination of lake sediments and water quality from historical mining activity.	**G-MW**, DPI, EPA
54	Actively support partner agencies in the protection and enhancement of water quality within the upper catchment.	**G-MW**, DSE, GBCMA
55	Investigate the opportunity for reticulated sewerage and community wastewater management facilities to service townships and similar residential areas around Lake Eildon.	**EPA**, G-MW, Council, GVW
56	Investigate alternative technologies for wastewater treatment around Lake Eildon.	**EPA**, G-MW, Council, GVW
57	Adequately size and locate onsite wastewater management facilities to minimise the risk to water quality from offsite discharge.	**EPA**, G-MW, Council
58	Develop a priority list for inspection and monitoring of wastewater systems.	**EPA**, G-MW, Council
59	All development must be in accordance with local government stormwater management plans, and Urban Stormwater Best Practice Environmental Management Guidelines (CSIRO) 2006.	**Council**, G-MW, EPA
60	Continue to monitor and manage blue-green algae in accordance with Lake Eildon Blue-Green Algae Incident Response Plan.	**G-MW**
61	Investigate drivers of recent blue-green algae blooms in Lake Eildon.	**G-MW**
	Healthy ecosystems	
62	Identify and implement consistent management strategies to monitor, protect and enhance habitat for native terrestrial and aquatic fauna.	**G-MW**, DSE, DPI
63	Support existing research activities (including activities relating to the Spotted Tree Frog) to better understand biodiversity issues around the lake.	**DSE**
64	Ensure there are consistent and agreed management arrangements between agencies responsible for management of the land around the national park foreshore, in particular critical habitat areas for threatened species such as the Leafy Greenhood population at Woolshed Inlet.	**G-MW**, DSE, Parks Victoria
65	Conduct a detailed assessment of the lake foreshore zone to determine any areas grazing should be excluded to protect riparian vegetation, prevent erosion, or re-establish important biodiversity values.	**G-MW**
66	Investigate a revegetation incentive program for landholders.	**G-MW**, GBCMA

Action No.	Action	Lead Agency
67	Implement coordinated weed control programs with relevant agencies and landholders for the Lake Eildon foreshore and lake bed.	**G-MW**, Parks Victoria, DPI
68	Investigate the application of innovative Carp control for Lake Eildon.	**DPI**
69	Support Department of Sustainability and Environment and other agencies to minimise the impacts of pest animals on surrounding communities to the lake and the environment.	**DSE**
	Land management	
70	Assess the lease renewal process to ensure it is timely, well-communicated and efficient, with major changes to lease conditions to be provided in writing.	**G-MW**
71	Public land managers to spend more proactive time with licence holders talking about the conditions of their licences, and if necessary enforcing compliance.	**G-MW**
72	Ensure clear guidelines exist for the approval of native vegetation removal, foreshore works permits, jetties and moorings.	**G-MW**, Council
73	Ensure that all infrastructure on public land is appropriately and consistently licensed to protect water quality and the foreshore.	**G-MW**
74	Review the grazing licence agreements to provide transparency in fee structures and charges.	**G-MW**
75	Ensure annual Lake Eildon Fire Protection Plans take account of supply levels within Lake Eildon and include a strategy for managing 'Code Red' days.	**G-MW**, DSE, Parks Victoria, Council, CFA
76	Identify areas of public land suitable for use as Neighbourhood Safer Places in consultation with relevant agencies.	**G-MW**, DSE, Parks Victoria, Council
77	Mansfield and Murrindindi Shire Councils to develop a coordinated Municipal Fire Management Plan (MFMP) identifying fire risks and mitigation strategies for Lake Eildon. Storage Fire Protection Plans should be linked with the MFMP.	**Council**, G-MW, CFA
78	Develop and implement an erosion action plan, including monitoring and reporting, for Lake Eildon including a summary of threats, mapping of high risk areas and a prioritised works program.	**G-MW**, Council
79	Build on the forthcoming Goulburn Broken Regional Catchment Strategy (2012) to develop a whole of catchment water quality management plan.	**Council**, G-MW, GBCMA, GVW
80	Implement recommendations for stream bank erosion in the Goulburn Broken Regional River Health Strategy (2005).	**GBCMA**
81	Develop a riparian revegetation incentive program for private landowners on the foreshore and surrounds which includes stock watering and fencing.	**G-MW**, GBCMA
82	Clearly identify grazing licence responsibilities for Goulburn-Murray Water and the licence holder.	**G-MW**
83	Investigate the introduction of additional and/or different conditions on grazing licences regarding the timing and intensity of grazing, and age of stock in order to minimise impacts on water quality.	**G-MW**, DSE
84	Reinforce compliance with licence conditions through adequate monitoring.	**G-MW**
85	Investigate alternatives to grazing for weed control and fire fuel load reduction, for example crash grazing (where stock are allowed access for short intense periods), controlled burns in association with the Country Fire Authority, slashing or spraying.	**G-MW**, DPI, CFA
86	Maintain, and where appropriate expand, existing vegetation in buffer zones along the Lake Eildon foreshore in order to protect water quality by acting as a filter for pathogens and other parameters.	**G-MW**, GVW
87	Investigate possibilities for 'virtual fencing' and other innovative approaches to stock management on the lake bed to reduce the need for traditional fencing.	**G-MW**
88	Develop a management plan to actively manage the dry lake bed which includes the management of fences during fluctuating water levels.	**G-MW**
89	Minimise fencing below full supply level to the extent practicable and remove old fences.	**G-MW**

Appendix F - Summary of Action Items (Continued)

Action No.	Action	Lead Agency
	Planning and development	
90	Encourage agencies and authorities to adopt agreed and consistent principles and processes to manage the impacts of planning and development around the lake.	**G-MW**, Council, DPCD, GVW
91	Establish a Lake Eildon planners' forum to meet regularly to discuss and resolve planning issues specific to Lake Eildon ensuring the consistent application and interpretation of planning scheme provisions.	**G-MW**, Council, DPCD, GVW
92	Review the Environmental Significance Overlay (ESO) and Significant Landscape Overlay in the next planning scheme review and amendment with a view to developing an ESO which recognises the whole of the Lake Eildon Environs.	**Council**, G-MW, DPCD, GVW
93	Explore the opportunity to develop a Special Area Plan (SAP) for Lake Eildon and its immediate surrounds.	**GBCMA**, G-MW, DPCD, GVW
94	Encourage agencies to continue to support the review of the North East Planning Referrals Committee Guidelines for the Protection of Water Quality.	**Council**, G-MW, DPCD, GVW
	Cultural heritage	
95	Support initiatives to enhance protection of Aboriginal cultural heritage	**AAV**, G-MW, local Aboriginal representatives and groups
96	Support initiatives to enhance protection of European cultural heritage	**G-MW** and the community

* Lead Agency in **bold** font



GOULBURN-MURRAY WATER

GOULBURN VALLEY WATER

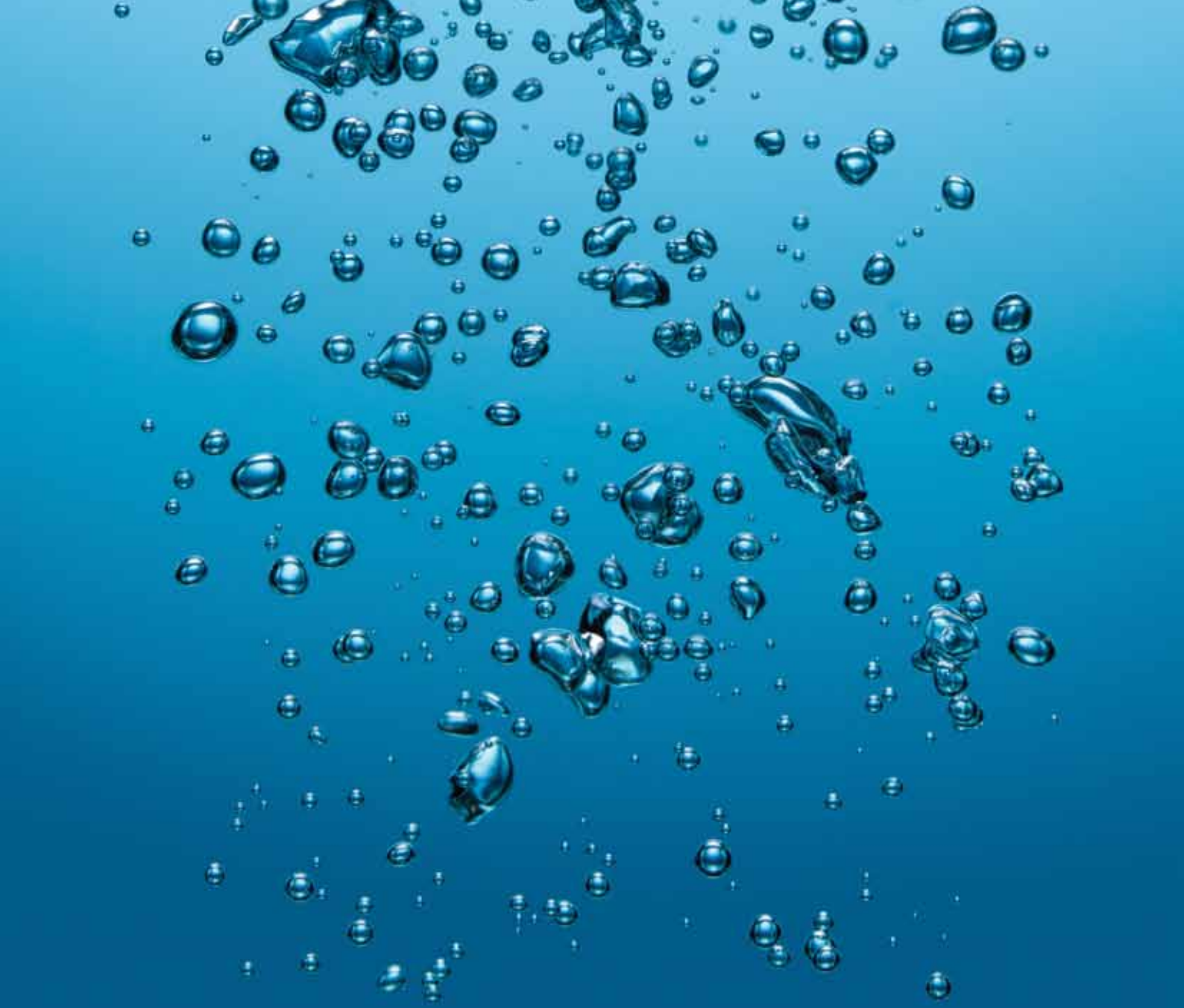
MANSFIELD SHIRE

Murrindindi Shire Council

TRANSPORT SAFETY VICTORIA

State Government Victoria Department of Primary Industries

Department of Sustainability and Environment State Government Victoria



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