Vision

This Plan is based on the long term vision for Waranga Basin, which resulted from input from participants in the community consultation process, and endorsed by the community workshop.

In 2021, Waranga Basin will be a well-known, accessible and safe recreation area that can be enjoyed by everyone.

It will be appreciated for its environmental and heritage significance and the economic benefits it provides, while serving its important role as a water storage.

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1. Executive Summary

Over the last decade there has been a growing realisation that many of the most difficult issues faced by managers of dams with a high public use arise from interactions with local communities and recreational water users, rather than the operation and maintenance of the dam itself.

Managers of dams have resources and expertise available to ensure dams are managed appropriately in terms of operation and maintenance. They have plans, procedures and resources in place to ensure dams are managed in a safe, efficient and proactive manner.

In contrast the 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. Owners and/or operators responsible for management of large dams must manage the many and varied risks created by public use of its storages.

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

The development of the Waranga Basin Land and On-Water Management Plan (the Plan) has been supported and informed by a well planned and well delivered program of consultation and stakeholder engagement.

In 2008 the Waranga Basin Community Reference Group was formed. The purpose of this group was to provide advice and community feedback to Goulburn-Murray Water and to assist with development of the Land and On-Water Management Plan for Waranga Basin. The group has continued to meet regularly and has assisted with community consultation related to this Plan.

While Goulburn-Murray Water has facilitated the development of this Plan, it has involved a wide range of stakeholders and the input of many people and organisations. The Plan is intended to be a community document that will guide the future actions of management agencies, stakeholders, community groups, residents and visitors in relation to Waranga Basin.

2. Objectives of this Plan

The main objectives of the Waranga Basin Land and On-Water Management Plan are to:

- Identify and protect Waranga Basin’s environmental, social (including recreational) and economic values by outlining key actions to be implemented during the next five years.
- Support safe public access for recreational users, whilst ensuring that operational requirements and environmental values are protected.
- Support long-term protection of water quality for local and downstream users.
- Improve formal and informal processes in place to manage the lake and surrounding foreshore.
- Protect natural and cultural values by obtaining broad-scale agreement between agencies on principles for sustainable use and development of the lake and surrounding foreshore.
Waranga Basin is located between the Goulburn and Campaspe River basins, approximately eight kilometres north-east of Rushworth and twelve kilometres south west of Tatura. It is the fourth largest inland waterway in Victoria.

Waranga Basin was formed on the site of a natural wetland (Waranga Swamp or Gunn’s Swamp) which was located on Waranga Creek.

As one of the largest storages in Victoria, Waranga Basin is a very popular angling location. Facilities along the foreshore include a Caravan Park and picnic areas with electric barbeques. Four club sites adjoin Waranga Basin (Waranga Boat Club, Victorian Water Skiers and Kite Flyers Club, Tatura Angling Club and Tatura/Kyabram Pony Club).

Boats can be launched from concrete boat ramps at a number of locations around the Waranga Basin. Conditions at Waranga Basin are also ideal for sailing and windsurfing. Normal boating operations apply when water levels are at 114.38m Australian Height Datum (AHD) and above. Below this level boating is still permitted, however a 5 Knot speed restriction applies. See Map 1. Boating Zones (p.10).

3.1 Storage Operations

Throughout the consultation process for development of this Plan, many stakeholders and community members commented on water levels and storage operational issues, in particular the desirability of higher water levels in the lake. The primary purpose of the storage is to provide water to downstream communities and consumptive users. Storage operations, including water levels and release patterns are primarily driven by this imperative.

The Waranga Basin Land and On-Water Management Plan cannot make any specific decisions regarding the management of water levels in Waranga Basin. Operational issues including lake levels and the management of releases from Waranga Basin and Goulburn Weir are ‘bigger picture’ questions beyond the scope of this Plan. For reference, a brief overview of storage operations is included as Appendix 1.

3.2 Legal Status

The Waranga Basin Land and On-Water Management Plan has no legal status. The Plan does not impose any new legal or statutory requirements, but through influencing policy, may lead to future changes in legislation that will assist in meeting the objectives of the Plan. The Plan does not override any Local Government planning schemes or legislation.

3.3 Land Status

Goulburn-Murray Water owns and manages the majority of the lake bed and immediate foreshore land around Waranga Basin. This land is public land, existing as either freehold title vested Crown Land or Crown Land reserved for water supply purposes. In a small number of areas where privately owned freehold land extends onto the lake bed water supply management easements on title allow flooding of the land at times of high storage levels. See Map 2. Waranga Basin Land Status (p. 31).

3.4 Area of Plan

The geographic scope of this project is limited to the lake, the foreshore and surrounding areas. See Map 2. Waranga Basin Land Status (p. 31). 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.

3.5 Management Roles and Responsibilities

A number of agencies have some role in the management of land and on-water activities at Waranga Basin. Current management roles and responsibilities are summarised in Appendix 3.
3.6 Relevant Previous Studies and Strategies

The following National, State and Catchment strategies were in place at the time of writing this report (July 2011) and are relevant to water quality and biodiversity at Waranga Basin.

Goulburn-Broken Catchment:
- Goulburn Broken Catchment Management Authority Regional Catchment Strategy, 2003-2009
- Goulburn Broken Native Vegetation Management Strategy 2003

Water Quality:
- The Victorian Nutrient Management Strategy for Inland Waters, 1995
- State Environment Protection Policy - Waters of Victoria, 2003
- Goulburn Broken Catchment Water Quality Strategy, 1996

Biodiversity:
- National Strategy for the Conservation of Australia’s Biological Diversity, 1996-2010
- Victoria’s Biodiversity Strategy, 1997-2010

Other:
- Victorian Weed Strategy, 1999
- Australian Pest Animal Strategy, 2007

3.7 Current Issues of Concern

The key issues for Waranga Basin identified during the community consultation are listed below. These issues are in order of the priorities established at a community workshop by workshop participants.

- Access issues relating to boats.
- Fluctuating water levels (a desire for regulated levels).
- Better maintenance and standard of all facilities desired.
- Better picnic and BBQ facilities desired.
- Rubbish (overflowing from bins in picnic areas and household rubbish being dumped in the area).
- Access issues for cars and people (better maintained roads and more tracks for walking/cycling).
- Fishing (many issues including access).
- More toilets and better maintenance.
- Safety – general and specific issues.
- Lack of shade and shelter.
- Insufficient camping.
- Lack of promotion.
- Desire for more walking tracks and a Rail Trail.
- Weed control.
- More playgrounds.
- More vegetation.
- Swimming – desire for safe areas for non-boating activities.
- Fire – concerns regarding vehicle access and water supply.
- Noise and other amenity concerns regarding trail bikes.

4. Process

In August 2010 community and stakeholder consultation for the Waranga Basin Land and On-Water Management Plan was agreed upon.

The consultation commenced in October 2010 with a project inception meeting involving the Waranga Basin Community Reference Group. Input from this meeting provided direction for consultation activities, including how these would be most effectively carried out, and who they should engage.

The community and stakeholder consultation process concluded in June 2011 following a workshop to obtain feedback on the draft Waranga Basin Land and On-Water Management Plan.

4.1 Community and Stakeholder Consultation

Consultation for the Plan was undertaken with local community residents, as well as representatives of local Councils, Government agencies (Department of Sustainability & Environment; Department of Planning & Community Development), community interest groups such as anglers and boating organisations, tourist accommodation providers, local media and local businesses. See Appendix 2 for Summary of Consultation.

The community and stakeholder consultation aimed to:

- Provide a strategic approach to engaging communities and stakeholder groups to gain effective and targeted input into the development of the Waranga Basin Land and On-Water Management Plan.
- Identify and protect a range of the Waranga Basin’s key aspects both now and into the future.
- Develop a widely held vision for Waranga Basin.
- Identify key issues.
- Provide ideas on how to address key issues in ways that maximise positive outcomes for all users.
- Gather views on recommended land and recreational use.
- Obtain feedback on the draft Plan.

Consultation included various methods of engaging stakeholders including meetings, advertisements, signage, surveys, interviews and workshops.
5. Implementation
Actions and Strategies

The Waranga Basin Land and On-Water Management Plan aims to ensure sustainable use of the Waranga Basin area.

To achieve this, the Plan focuses on a number of key outcomes including:

• Safe use and improved access for recreational users.
• An improved standard of public infrastructure.
• Sustainable water quality and ecological health of the Waranga Basin and its surrounds.
• A consistent and coordinated approach to the management of Waranga Basin.
• A shared community-based approach to communication, information and education about Waranga Basin and its role as both an important water storage and a valued recreation facility.

The Plan has a five-year focus for the implementation of the key actions, underpinned by a long term vision for the future of the Waranga Basin.

Following adoption of the final Plan, an Implementation Plan will be prepared to execute key actions in the Plan. The Implementation Plan will allow for review and progress assessment, and changes in the planning as required. An Implementation Committee will be formed to coordinate the Plan’s actions.

A summary of action items and lead agencies responsible for coordinating these actions are described in Appendix 5.

6. Community
Awareness and Involvement

Local residents and those of nearby Shires use the Waranga Basin year-round for activities including fishing and boating, sightseeing, swimming, water skiing, picnics, bird-watching, bushwalking and camping. Other uses include non-powered boating activities, duck shooting, living near the water, exercise, relaxation and Pony Club activities.

Local workshop attendees emphasised their participation in non-water sport activities around the Waranga Basin. The Pony Club, walking and bike trails, picnics, Rail Trail, bird-watching and historical sites were seen as very important and worthy of promotion. Residents like the easy access to water, the relaxing environment, space, heritage and natural environment of the Waranga Basin.

Waranga Basin is a draw card for the area and is important for tourism and the local economy. However, people perceive that awareness should be raised and appropriate levels of tourism encouraged through greater promotion. People identified that the Waranga Basin would be better used if the facilities were improved, such as better picnic and barbeque facilities, cleaner toilets, improved accommodation and dining, and more facilities for children.

Community consultation identified the importance of better access for boats and cars, sufficient water in the Waranga Basin and more events to attract visitors. A “fishing classic”, festivals and fire protection areas were highlighted as potential uses for the Waranga Basin.
While the recreation aspects of the Waranga Basin are widely known, the importance of the Waranga Basin and its role in rural (and urban) water supply is less well known. Targeted education programs would help boost knowledge about the Waranga Basin’s primary role as a water supply, and hence its seasonal variation in water levels and need for water quality and fire protection areas were highlighted as potential uses for the Waranga Basin.

Key issues:
- Basin is used for various recreational activities beyond watersports and fishing.
- Role in tourism and contribution to the economy.
- Desire to raise awareness and promote the Basin.

Objectives
An engaged and coordinated community working in cooperation with agencies to preserve, enhance and promote Waranga Basin as a valued water resource and recreation asset.

Actions
1. Review the structure, membership and purpose of the Waranga Basin Community Reference Group as a basis for an ongoing, community-based approach to implementing this Plan.
2. Develop improved public information on recreation, water quality issues, other land and on-water issues, management issues, dam operations and water levels.
3. Develop an interactive website containing maps, plans, zones, FAQs, management arrangements and by-laws that can be used as a one stop shop for information about Waranga Basin.
4. Develop a strategy to promote Waranga Basin.
5. Increase the awareness of Waranga Basin by encouraging community-run events both on and off the water.
6. Establish event policies and guidelines to support community events.
7. Consider opportunities to provide tourist photo lookouts with interpretive signage about the area.

7. Recreation and Tourism

Further to its primary role as an important water supply storage, Waranga Basin is a significant asset for North Central Victoria due to its recreational and tourism opportunities. This Plan acknowledges that recreation and public access are an integral part of Waranga Basin, but also recognises the potential for these activities to adversely impact on the lake’s environmental and operational attributes if poorly managed.

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 our dams. 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 our dams.

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.

7.1 Recreation

Waranga Basin is popular for recreation activities such as boating, camping, swimming and water skiing. Duck hunting is also permitted in declared seasons. A public Caravan Park is located adjacent to the western shore of the storage, and barbeque/picnic facilities are situated at several locations. Boat ramps are situated at three locations around the lake shore. Camping is permitted only in Caravan Parks and camping grounds.

Public access for recreational purposes is available from the Minor Outlet Reserve, the Waranga Caravan Park Reserve, Sapling Point and Harriman Point boat launching facilities.
In addition to the Lake Waranga Caravan Park and Holiday Camp, the Waranga Boat Club and Victorian Water Skiers and Kite Flyers Club have facilities on Waranga foreshore, that allow members the benefits of camping, fishing and skiing under lease arrangements to Goulburn-Murray Water. Other lease sites are the Tatura/Kyabram Pony Club site and the Tatura Angling Club site.

Many issues related to recreation were raised by stakeholders during the consultation process.

These included:

- The removal of rubbish from the area.
- Boating facilities.
- The standard of recreation facilities such as picnic areas and barbecues.
- Poor standard of toilets in the main area (near Caravan Park).
- Control of weeds along the edge of the water.
- Protecting the history and cultural heritage.
- Desire for a minimum water level in the Waranga Basin to be maintained to encourage tourism and recreational use.
- Opportunities to develop further recreation facilities.
- Opportunities to link with existing trails for cycling, walking and canoeing.

Current figures are not available to measure the exact number of users of the Waranga Basin, with only observation or evidence such as user experience, rubbish collection and accommodation nights.

It would be useful to conduct a survey or lay a “road counter” in strategic places to determine the number of vehicles accessing roads or entry points. This data could then be used to assist in the prioritisation process and/or funding applications for facility upgrade and maintenance programs.

Key issues:

- Maintenance of facilities.
- Coexistence of active and passive recreation activities.
- Lack of data to support observations on visitor numbers and participation in activities.

Objectives

To provide a safe and accessible place for recreational activities.

Actions

8. Undertake a quantitative survey of users of the various infrastructure points at Waranga Basin in order to determine current usage numbers.
9. Develop a recreational infrastructure and landscape master plan to assist in prioritising capital investment and maintenance.
10. Consider opportunities for defined walking and/or cycling trails.
11. Consider separate designated areas for motorised trail bikes away from passive recreation areas.
12. Continue development of a Rail Trail between Rushworth and Murchison.
13. Explore potential for bird-watching activities and facilities such as bird hides and viewing platforms.
14. Investigate the potential for nature-based tourism activities and events.
7.2 Boating

Goulburn-Murray Water is the delegated Waterway Manager under the Marine Act 1988, with support from Transport Safety Victoria (TSV) and the Victorian Water Police.

Boating zones on the lake are gazetted by TSV under Schedule 97 of the Vessel Operating and Zoning Rules for Victorian Waters (2010). In practice, Goulburn-Murray Water’s resources to monitor and enforce boating rules are currently limited, and the Victorian Water Police take an active role in the monitoring and enforcement of regulations, particularly during the Waranga Basin’s busiest periods (Melbourne Cup weekend, Christmas/New Year and Easter). At times of higher water levels, better access to boat ramps results in marked increases in boating use.

Normal boating operations apply when water levels are at 114.38 metres (approximately 20% of capacity) Australian Height Datum (AHD) and above. Below this level boating is still permitted, however a 5 Knot speed restriction applies. Low water level hazards include submerged tree stumps and shallow water. See Map 1. Boating Zones (p.10).

The lake bed can be hazardous for vehicles and people should avoid driving on the lake bed. The low level boat ramp and lake access track, constructed at Harriman Point in 2008, now provides safe boating access at low storage levels.

The most popular activities on Waranga Basin are boating related. There were however many issues relating to boating activities, facilities and safety uncovered during the community consultation process.

Key issues:
- Conflicting activities on-water such as powerboating versus passive fishing from boats.
- Noise levels, speed and impacts on water quality from power boating.
- Boat ramp and road maintenance.
- High and low water level access.
- Safety issues.
- Parking.

Objectives
To provide a safe and accessible place for boating.

Actions
15. Review existing boat ramps in relation to access at all water levels, number, location, safety issues, road access and parking.
16. Review vessel operating and zoning rules for the Basin, with a view to considering options for safe zones to separate passive water based recreation from power boating.
17. Provide consistent and up to date boating safety information signage at all boating access points and information via brochures and internet.
18. Investigate suitability of the Basin for boating events, such as ski-racing and yachting.

7.3 Fishing

Fishing is one of the most important and popular activities/features of Waranga Basin. This activity is regulated by Fisheries Victoria (Department of Primary Industries) Goulburn-Broken Fisheries Management Plan (draft as at July 2011). The goal of this Plan is to “manage recreational fishing in a manner that is consistent with the principles of ecologically sustainable development”.

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 and generating jobs and other socio-economic benefits in and for the State’s communities.

Waranga Basin is a strong Redfin and Murray Spiny Crayfish fishery, with a small but quality Trout fishery. The potential for developing a strong native fishery is influenced by water management arrangements. Apart from Murray Cod and Golden Perch there are only two other native fish species recorded in Waranga Basin, the Flat Headed Gudgeon and Australian Smelt. Of the six introduced fish species that have been recorded in Waranga Basin, three are popular recreational species: Redfin, Brown Trout and Rainbow Trout. The remaining introduced pest fish species are Carp, Goldfish and Tench. Waranga Basin is recognised as an important resource for Murray Spiny Crayfish, a species listed for protection under the Flora & Fauna Guarantee Act 1988.

Waranga Basin has previously been stocked with Golden Perch and Murray Cod, however surveys suggest that these have not been successful in establishing a fishery. The Waranga Basin was stocked with Murray Cod in 2008 but stocking in 2009 was suspended pending a management review. Department of Primary Industries (Fisheries) rated the Waranga Basin a low priority for stocking during the drought due to low water levels. This may change in line with increased water levels.
Productive areas for aquatic fauna at Waranga Basin are near the inlets of the Cattanach and Stuart Murray Canals and the dam wall. Waranga Basin has low biological productivity, which limits the micro-organisms and small food items that are available to invertebrates and for sustaining the fishery. The inlets are preferred habitats of most fish species as the streamflow can be a source of food entering Waranga Basin. The shallow oxygenated waters offer refuge for small fish to avoid predators. The dam wall provides rocky substrate deep water habitat that is absent from most other areas of Waranga Basin. This habitat is favoured by large fish and can provide protection for crustacea. Areas that remain inundated from one year to the next are expected to be particularly important to the resident Murray Spiny Crayfish population. Much of the deep water areas of Waranga Basin lack woody debris and is of little value as aquatic habitat. There are few areas of aquatic vegetation habitat, mainly because establishment is restricted by seasonal water level fluctuations.

(Ref: Survey of Aquatic Fauna in Waranga Basin 2005)

Key issues:
- Inundation of vegetation that grew on the exposed fringes of Waranga Basin during the low water levels of 2003 provided a replenished food resource for aquatic biota.
- Lack of aquatic habitat to support fish stocking.
- Fish stocking including past success and future plans.

Objectives
Manage recreational fishing in a manner that is consistent with the principles of ecologically sustainable development and fisheries management arrangements. A sustainable habitat for fish that provides safe and accessible fishing opportunities.

Actions
19. Assess the current fish habitat and stocking situation.
20. Seek community input into the type of fishery preferred at Waranga Basin.
21. Promote the fact that the Waranga Basin is stocked with fish.
22. Establish monitoring programs.
23. Encourage fishing related events.
24. Advocate for the protection and enhancement of appropriate fish habitat.
25. Consider opportunities for accessible fishing places for all levels of ability.
26. Investigate the need for and feasibility of fishways in channels to promote fish breeding and migration.
27. Research current levels of Trout breeding in Channels.
7.4 Camping
Camping is currently permitted only in Caravan Parks and camping grounds. Some people have expressed a desire for camping in other areas of the Waranga Basin, including providing facilities for Caravan/RV effluent disposal. Many survey respondents, particularly residents, had witnessed illegal camping and held mixed views as to whether or not more camping sites should be opened.

Key Issues:
• Disposal of effluent.
• Illegal camping.

Objectives
Review management of camping on public land adjoining Waranga Basin.

Actions
28. Review the demand and adequacy of current facilities for camping, including effluent disposal facilities.
29. Evaluate the potential for future camp sites and develop a camping strategy based on the principles established in the Lake Hume strategy.

7.5 Tourism and Commercial Development
Waranga Basin has potential to be an important tourism asset for the region. Stakeholders in consultation were supportive of promoting the Waranga Basin for tourism and recreation purposes, developing new events to attract visitors and providing more accommodation and dining opportunities. Some people supported appropriate levels of commercial development, while some wished to maintain the peace and quiet of their lakeside lifestyle.

Local Government supports tourism and promotion in a number of different ways. Greater Shepparton City Council provide tourist information services and promotional activities as a function of Council and also partners with Tourism Greater Shepparton to promote their tourism assets. Shire of Campaspe do not directly provide tourist information services or promotional activities. They partner with Echuca-Moama Tourism to promote their tourism assets. Clubs located on the foreshore (such as the Pony Club) contribute to the local economy through events or facilities that attract visitors and tourism dollars to the area. The Waranga Basin area is under-serviced in terms of tourist accommodation and dining, according to consultation research. Opportunities exist to improve the current standard, offerings and promotion of current commercial operations, such as the public Caravan Park. Camping sites have been suggested. A few holiday houses and B&Bs are located near or at the Waranga Basin.

Over the years some non-tourism commercial development has been investigated such as fish farming. Other commercial development around the lake is limited to agriculture and grazing.

Key issues:
• Lack of quantity and quality accommodation for tourists.
• Desire for camping sites and RV effluent disposal.
• Desire for a minimum water level in the Waranga Basin to be maintained to encourage tourism and recreational use.
• Opportunities to develop further tourism facilities.
• Poor standard of signage and opportunities for new interpretive signage.

Objectives
Sustainable and appropriate tourism development at Waranga Basin that contributes to the regional economy while not adversely affecting water quality, the environment, public safety or resident amenity.

Actions
30. Review existing tourism and accommodation facilities around Waranga Basin and identify opportunities for appropriate development.
31. Promote Waranga Basin area as a tourism destination.

7.6 Public Access, Infrastructure and Safe Use
The Waranga Basin is highly accessible to the public, being close to Rushworth with the Rushworth-Tatura Road and the Rushworth-Murchison main roads passing within meters of the shore. The area around Waranga Basin is fenced and there are signposted road access points to the swimming areas and boat ramps. See Map 1. Boating Zones (p.10).

Access to Waranga Basin is important to residents and visitors in a number of ways, including condition of roads which provide access into the Waranga Basin, access for fire vehicles, access to fishing and boating sites, access to view or visit historical sites within the Waranga Basin area and access to private property. Of particular concern is the ability of fire vehicles to access water from the storage at low water levels. As a general principal safe public access is supported around Waranga Basin. In some areas fencing has been implemented to provide protection for revegetation works or to protect environmentally sensitive areas. Where there are community concerns regarding loss of access these areas should be reviewed to consider how safe access can be provided.

Access should be reviewed in terms of current suitability, safety, liability and what is available at the access points. Where areas need to be controlled or access denied to the public, reasons for this should be communicated through education, publications, internet or signage.
Much of the recreation facilities and infrastructure at Waranga Basin has been in place for many years. Apart from a recent cosmetic upgrade of the toilet block at Harriman Point, the infrastructure is out-dated and in need of maintenance, upgrading or replacement. Vandalism is an issue.

Risk assessments of facilities and infrastructure have been undertaken, however, more work is required to assess Waranga Basin’s recreation facilities in detail to determine priorities for investment. A Public Infrastructure and Foreshore Master Plan should be developed to help prioritise maintenance funding and future investment in public infrastructure and public recreation area development.

The cost of maintaining and upgrading public infrastructure in the reserves is significant, and any potential for commercial development opportunities to offset costs should be considered. Opportunities should be progressed in consultation with key stakeholders, including local residents and lake users, and must not unacceptably impact on public access, environmental or other values at Waranga Basin.

**Key issues:**
- Operation and maintenance of public facilities.
- Access to public and controlled areas.
- Vandalism contributing to poor standard of facilities.

**Objectives**
Provide adequate and well maintained infrastructure, and safe access to recreation facilities.

**Actions**
32. Develop a Public Infrastructure and Foreshore Master Plan to help prioritise maintenance funding and future investment in public infrastructure (including road networks) and public recreation area development.
33. Seek collaborative agreements between key agencies for improved management of public reserves.
34. Develop a plan for monitoring and policing of regulations relating to public behaviour with relevant agencies to ensure safe use of the area.
35. Undertake regular public safety assessments of public reserves and boat ramps to maintain suitable safe access.
36. Investigate options to reduce vandalism.
37. Educate the community about non-access to unsafe areas.

### 7.6.1 Rubbish Management

Goulburn-Murray Water staff are responsible for enforcement of Goulburn-Murray Water by-laws for boating and general public use and supervising contracted services, including vegetation control, the tidiness of public access areas and toilet facilities and removal of wastes.

Limited garbage bins are located in the main use public access areas of the storage, with visitors encouraged to take away their own rubbish. This strategy means that bins overflow with waste in busy times.

Rubbish was a key concern expressed by stakeholders during consultation.

**Key issues:**
- Litter and waste disposal.
- By-laws supporting environmental safety.
- Dumping of rubbish into the water from boats.

**Objectives**
Adequate, sustainable and well-communicated rubbish management strategy.

**Actions**
38. Develop a litter management strategy to minimise impacts of litter on the surrounding environment.
39. Communicate litter management policy via brochures, signage and other communication tools.
8. Land Management

Good land management is essential to protect water quality in Waranga Basin.

8.1 Planning and Development Framework

Development in the vicinity of Waranga Basin has increased in the past 20 to 25 years, with the establishment of numerous residential developments in the area. About five new houses are approved by the Shire of Campaspe each year, with weekenders and lifestyle properties increasing pressure on farming land. While Rushworth has a reticulated sewer system, properties around the Waranga Basin rely on onsite treatment and disposal of wastewater. Poor design and poor maintenance of onsite wastewater management systems e.g. septic tanks, can result in contamination of waterways and storages by pathogenic microorganisms and nutrients. Contamination can also be caused by stormwater runoff from residential and commercial developments.

Local Government is responsible for ensuring that new developments comply with their planning scheme.

Waranga Basin is not in a declared “water supply catchment”, or a “special water supply catchment”.

Local Government planning zones for the Waranga Basin and immediate surrounds are:

- Farming Zone (FZ).
- Rural Living Zone (RLZ).
- Public Conservation and Resource Zone (PCRZ).

A Land Subject to Inundation Overlay and Wildfire Management Overlay are present in the immediate catchment. There is also a floodway overlay. However it appears that in places this extends beyond the PCRZ boundary, which suggests that the PCRZ may not extend to the high water mark of the Waranga Basin. See 3.3 Land Status.

Key issues:
- Maintenance of an adequate buffer to prevent encroachment of private infrastructure onto public land.
- Clear land management responsibilities at all locations around the Waranga Basin.
- Potential for poor onsite wastewater management and inappropriate development to contaminate surface water and groundwater.
- Potential for poor quality water to impact on downstream land and contribute to issues such as salinity.
- Concern about adequate planning for water quality issues associated with land development.

Objectives

Appropriate land-use management to ensure protection of water quality in Waranga Basin.

Actions

40. Review wastewater management strategies at Waranga Basin.
41. Maintain and improve communication with local government and environmental departments to ensure appropriate development near Waranga Basin.

8.2 Land Use

Existing land use in the Waranga Catchment includes farming, mining and intensive agriculture (piggeries). Goulburn-Murray Water’s Waranga Basin Risks to Water Quality Risk Assessment outlines the various land use activities that have the potential to impact on water quality.

Goulburn-Murray Water owns approximately 800 hectares of land above Full Supply Level as a buffer. Some areas have been used for grazing under licence and some areas have also been leased to clubs, including boat clubs, the Pony Club and a school camp associated with Waranga Caravan Park. See Map 2. Waranga Basin Land Status (p. 31).

Other land surrounding Waranga Basin that is not owned by Goulburn-Murray Water includes land owned by hobby and livestock farmers, the township of Rushworth and state forest. Low density residential subdivisions are located around Harriman Point and Darby Road. Other residential properties are scattered around the foreshore.

Key issues:
- Potential impact of land use on water quality.

Objectives

To ensure land use has minimal impact on water quality.

Actions

42. Develop and disseminate a reference guide to land management responsibilities around the Waranga Basin to ensure people know their obligations and where to go to resolve common issues.
43. Review the impact of existing land-use activities on water quality.
44. Develop a better understanding of the impact of water quality on downstream land.
8.3 Land Tenure

Goulburn-Murray Water owns and manages the majority of the lake bed and immediate foreshore land around Waranga Basin. Some land is leased by clubs and commercial operators, and some grazing licences or permits are issued on other land.

8.3.1 Clubs and Commercial Operators

A number of private operators and clubs lease public land adjacent to Waranga Basin:

- Lake Waranga Caravan Park and Holiday Camp. Department of Sustainability Caravan Park leased to a private operator. The same private operators also lease the adjacent mud brick Holiday Camp building from Goulburn-Murray Water.
- Kyabram Pony Club (co-leased with Tatura Pony Club). Comprising a Clubhouse and facilities for training, dressage and show jumping. Pony Club events throughout the year attract 600-800 riders from all areas of Victoria.
- Waranga Boat Club is a private club on land leased from Goulburn-Murray Water.
- Victorian Water Skiers and Kite Flyers Club is a private club on Crown Land leased from Goulburn-Murray Water.
- Tatura Angling Club is a private club on land leased from Goulburn-Murray Water.

Leases are governed by:

- Individual agency lease agreements.
- Goulburn-Murray Water By-law No. 2 - Water Act 1989 - Recreational Areas.
- Relevant State and Local Government Acts and regulations.

Environmental protection and enhancement is of prime consideration when evaluating the use of water storages and their environs for recreational purposes. Activities of lessees may potentially impact on water quality. Partnerships are vital for the effective implementation of agreements and maintenance of required standards.

Annual audits of all club lease sites are conducted to ensure compliance with lease agreements and conditions. Some club sites have effluent disposal systems that may no longer meet Environmental Protection Authority requirements for waste water management. Goulburn-Murray Water is working with these clubs to identify deficiencies and to implement works required to comply with current standards.

Key issues:

- Potential for lessees to impact on water quality or amenity.
- Recognising and capitalising on the economic, tourism and recreational benefits of appropriate lessees.

Objectives

Cooperative partnerships to provide appropriate, well maintained and safe facilities that protect water quality while enhancing the recreation experience.

Actions

45. Review commercial leases, costs and benefits with a view to ensuring appropriate standard of facilities are maintained and all development is sustainable.
46. Complete upgrades of club wastewater management systems to meet current Environment Protection Authority guidelines.

8.3.2 Grazing Licences

There are currently four grazing licences issued to adjoining landowners on land below the Waranga embankment. Additional short term grazing permits for the lake foreshore are issued on an ‘as required’ basis. Short term permits can be an effective management tool to control vegetation growth where it creates a fire hazard.
Possible threats presented by poorly managed grazing include overgrazing and erosion, and potential threats to water quality. Current grazing at Waranga Basin is not excessive. Based on research conducted at other storages, the potential threat to water quality is not considered significant, provided grazing continues to be carefully managed.

To assist with short term grazing of perimeter lands, additional fencing is planned for Harriman Point and Sapling Point. Goulburn-Murray Water views short term grazing as a vegetation management tool.

For further discussion of grazing impacts see 7.3 Fishing, 8.4 Fire Management, 8.7 Pest Plants and Animals, 10.1 Flora and Fauna.

Key issues:
• Potential impacts from grazing on water quality and biodiversity.

Objectives
A cooperative partnership between licence holders and land owners to provide appropriate, well maintained perimeter land.

Actions
47. Develop guidelines for short term grazing permits.
48. Review adequacy of storage perimeter fencing on grazing licence areas and adjoining private land used for grazing.

8.4 Fire Management

There is potential for vegetation around storages to become a fire risk to neighbouring properties.

Fire protection works at Waranga Basin involve the slashing or grading of fire breaks as well as grazing and controlled burns. These works are documented in the Waranga Basin Fire Protection Plan, which is updated annually. The Rushworth Country Fire Authority conduct controlled burning in an area which has previously been grazed, adjacent to the Sapling Point boat ramp. The Country Fire Authority uses these burns as a training exercise and have involved other local brigades in the past.

As part of lease compliance requirements, club sites around the lake are also required to have emergency management plans in place which include response to fire emergencies.

Key issues:
• Fuel management and fire risk to homes in Harriman and Sapling Point areas.

Objectives
To responsibly manage fire risks.

Actions
49. Manage bushfire risks via existing Fire Management Plan, including communication to the public.
50. Ensure access is available and well signposted for fire vehicles via roads and to water supply points, especially during low water levels.

8.5 Erosion and Sedimentation

Erosion at Waranga Basin occurs to some of the northern foreshore at full lake levels and the exposed lake bed during times of low water levels. The extent of this erosion has not been fully assessed. With little aquatic vegetation, the strong wave action in the Waranga Basin stirs up sediments on the bed of the storage. This may be exacerbated by boating and jet skiing in shallow waters.

To date, no significant water quality impacts have been directly attributed to erosion at Waranga Basin. Management of erosion of the lake bed below the full supply level is impracticable and considered a low priority.

Revegetation of strategic areas may assist in reducing erosion on foreshore.

Key issues:
• Potential for erosion to impact on the Basin.

Objectives
Effective erosion management at the Waranga Basin.

Actions
51. Assess the extent of erosion, and develop an Erosion Action Plan if required.
52. Investigate and identify opportunities for revegetation plantings in high risk areas.
53. Consider landscaping in “barren” high use public recreation areas.
54. Manage grazing on perimeter land to minimise erosion risk.

8.6 Salinity

The area immediately downstream of the Waranga Basin embankment has a number of borrow pits which have accumulated highly saline water. Although saline water in the borrow pits does not impact on water quality in Waranga Basin, concerns have been raised by downstream landowners that the Waranga storage influences salinity downstream of the main embankment. Further investigation is required to better understand the relationship between Waranga Basin and saline discharges below the Waranga embankment.
In 1974 a pump was set up by the Harston Community Landcare Group to pump water from the borrow pits into the Central Goulburn No.7 Channel. Recent high rainfall events have caused runoff from surrounding land to flood the borrow pits and surrounding land. Due to the high salinity of the water, Goulburn-Murray Water is reluctant to allow pumping to occur unless saline water can be diluted by high channel flows.

In the past, saline water has been pumped into the Basin as the channel flows were not high enough to dilute this saline water. When pumping has occurred, daily monitoring of salinity levels is undertaken to ensure there are no significant impacts on water quality.

Currently, a proposal is being developed for the construction of a drain to intercept surface flows and prevent them from entering the highly saline borrow pits.

Key issues:
• Flooded borrow pits containing saline water.

Objectives
Effective salinity management at the Waranga Basin.

Actions
55. Implement construction of interception drain.
56. Investigate salinity impacts from Waranga Basin and borrow pits on downstream land.

8.7 Pest Plants and Animals

Weeds at Waranga Basin include identified (noxious) species such as Chilean Needle Grass, pest weeds such as Stinkwort and Onion Weed, and exotics like Barley Grass and Mint. The indigenous plant Cassinia or Chinese Scrub is also considered a pest in the area.

Rabbits, foxes, feral cats and wild dogs are considered pests in the area, although no formal assessment of pest animal numbers has been conducted at the storage.

Key issues:
• Need for a strategic and adaptable approach to managing pest plant and animal species as they change over time.
• Effects of grazing on weed distribution.
• Potential for weed growth on foreshore and public land areas to increase fire risk.

Objectives
To monitor and manage invasive weeds and pests that impact on water quality or environmental values at the Waranga Basin.

Actions
57. Develop a Pest Plants and Animals Action Plan to manage identified issues and protect environmental values.
58. Support weed awareness and education programs which encourage a cooperative approach to weed and pest management with adjoining landowners.
59. Investigate the impact of weeds around the Waranga Basin area and the impact on access and fire risk.

Further information and relevant strategies:
• National Strategy for the Conservation of Australia’s Biological Diversity, 1996-2010
• Victoria’s Biodiversity Strategy, 1997-2010
• National Weeds Strategy, 1997-2006
• Victorian Weed Strategy, 1999
• Australian Pest Animal Strategy, 2007
9. Water Quality

Good water quality is critical for communities that use the water for irrigation, drinking, industry, agriculture and recreation. There are a number of Goulburn-Murray Water customers that draw stock and domestic water supply directly from the storage. Goulburn-Murray Water also provides raw water from the Basin to a number of urban water authorities to be used for town water supply (including Rushworth, Kyabram, Stanhope, Tongala).

As such Goulburn-Murray Water has an obligation to identify and where possible, mitigate risks to water quality, in accordance with its 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).

Water quality within Waranga Basin can be influenced by a number of activities including land use, storage activities, in-storage processes and the most influential, water quality of inflows. Inflows from the Goulburn Catchment via Stuart Murray and Cattanach Canals can have poor water quality which can affect water quality in the Basin. Water quality may also be affected by point and diffuse sources within the immediate Basin Catchment including runoff from agricultural activities and housing developments. There may be direct water quality issues within the storage including Blue-green Algae blooms, possible fuel pollution from power boats and turbidity issues especially at very low water levels.

As highlighted above, recreational users of the lake have the ability to both affect and be impacted by the effects of poor water quality, if not carefully managed. A full assessment and identification of risks to water quality is being undertaken in Goulburn-Murray Water’s Waranga Basin Risks to Water Quality Risk Assessment.

Good water quality is also important for the preservation and health of aquatic habitat and ecosystems. Public awareness of water quality issues can be enhanced through education programs emphasising the importance of water quality issues.

9.1 Monitoring Strategies

Water quality in Waranga Basin 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. A number of other strategies are being developed that set the direction and scope for monitoring water quality at the Basin including Goulburn-Murray Water’s Waranga Basin Risks to Water Quality Risk Assessment.

Key issues:
• Effective monitoring for water quality.

Objectives
Targeted and effective water quality monitoring.

Actions
60. Review existing water quality monitoring programs to ensure they are targeted and effective.
61. Continue to proactively monitor water quality.
62. Identify and implement programs to manage risks to water quality.

9.2 Blue-green Algae

Blue-green Algae is monitored routinely by Goulburn-Murray Water under the Major Storages Operational Monitoring Program, 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 Waranga Basin for urban supplies, Goulburn-Murray Water has an obligation to notify Goulburn Valley Water in the event of high levels of Blue-green Algae as their treatment system may not be equipped to remove toxins from the raw water taken from the Waranga Basin Major Offtake.

Historical monitoring results suggest that Waranga Basin is not at a high risk of developing high levels of Blue-green Algae and no warnings have ever been issued for Waranga Basin. Turbidity, wave action, mixing and water quality of inflows may be influencing the low Blue-green Algae levels.

Key issues:
• Potential for Blue-green Algae to impact on recreational activities at the Basin.

Objectives
Provide long-term protection of water quality for local and downstream users.

Actions
63. Continue to monitor and manage Blue-green Algae in accordance with Waranga Basin Blue-green Algae Incident Response Plan.
9.3 Stormwater and Other Pollution

Urban stormwater can be a source of water pollution. Other sources of pollution can include runoff from agriculture land, fuel from power boats, rubbish dumping, effluent from adjacent housing, commercial developments and Caravan Parks. The initial stages of Goulburn-Murray Water’s water quality risk assessment process has identified commercial leases, drawdown of storage water, in-storage processes, including overland flows and wave action, drought, bushfires and storage transfers, as high residual risks to water quality at Waranga Basin. The quality of water inflows has been initially identified as a moderate risk, which will be further investigated.

The land surrounding Waranga Basin is not used heavily for horticulture or other high pesticide use industries. Pesticide monitoring at Waranga Basin in the past has not found any significant impacts. Due to the location of Waranga Basin in a largely agricultural catchment, runoff from heavy rain can contain contaminants and pathogens.

According to the Campaspe Planning Scheme; “Another issue of emerging importance is the pressure to develop land adjacent to Waranga Basin for agricultural purposes.” There is a lack of controls in place to ensure appropriate buffer distances of agricultural activity. High use of fertilisers, pesticides and herbicides have the potential to have a detrimental impact on the water quality.

Key issues:
- Impact of identified high risk pollution sources (commercial leases, drawdown of storage water, in-storage processes, drought, bushfires and storage transfers).
- Risk of pollution impacting on recreational amenity.
- Lack of knowledge of current extent and impact from pollution.

Objectives
Minimise impacts on water quality for local and downstream users.

Actions
64. Identify potential pollution sources in the Waranga Basin Catchment and potential impacts on water quality.
65. Encourage environmental and education programs that assist in increasing awareness of water quality issues and ways to protect water quality.

Further information and relevant strategies:
- Victorian Nutrient Management Strategy for Inland Waters, 1995
- State Environment Protection Policy, Waters of Victoria, 2003
- Goulburn Broken Catchment Water Quality Strategy, 1996
10. Healthy ecosystems

Waranga lies within a major irrigation area comprising almost flat plains surrounded by cleared agricultural land. The major geological land systems associated with Waranga Basin are Alluvial Plains and Palaeozoic Sediments.

<table>
<thead>
<tr>
<th>Land System</th>
<th>Land Form</th>
<th>Annual Average Rainfall</th>
<th>Native Vegetation</th>
<th>Land Use</th>
<th>Soil Deterioration</th>
<th>Susceptibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alluvial</td>
<td>Almost Level Plains. Recent alluvium.</td>
<td>375-625mm</td>
<td>Woodland – Eucalyptus microcarpa, E. leucoxylon, E. camaldulensis, E. largiflorens.</td>
<td>Mainly irrigation and grazing; some cereal cropping.</td>
<td>Destruction of topsoils by over-cultivation, flooding on present flood terrace.</td>
<td>Moderate</td>
</tr>
<tr>
<td>Palaeozoic Sediment</td>
<td>Gentle ridges, Palaeozoic sediments; inter-bedded slates, sandstones, quartz reefs.</td>
<td>375-625mm</td>
<td>Open forest - Eucaluptus sideroxylon, E. microcarpa, E. leucoxylon, E. macroryncha, also some whipstick mallee species</td>
<td>Irrigation, grazing, recreation.</td>
<td>Severe sheet erosion on upper slopes; gully erosion and salting on lower slopes; low permeability and marked shrink-swell characteristics limit engineering works.</td>
<td>Moderate to High</td>
</tr>
</tbody>
</table>

The major vegetation types around Waranga Basin can be broadly broken into three segments:

- North – Improved and unimproved farmland (some irrigation) with little native vegetation. This area can be salt affected and subject to flooding close to the wall.
- South – Dominated by Ironbark style vegetation with generally dense vegetation made up of Ironbark, Yellow and Grey Box and Chinese Wattle. Scattered areas of open native grasses.
- East and West – Generally open and grassy country with some scatterings of mature Grey Box, especially in the west. The east side is more native grass dominant with planted Gum Trees. Most of the current grazing licenses are on the eastern side.

### 10.1 Flora and fauna

The hills around Waranga Basin contain remnant goldfields vegetation including Blue, Green and Kamarooka Mallee and Broughton’s Pea. The Orr Road biolink is also home to the endangered Grey-crowned Babbler. Birdlife is perceived by some in the community to be affected by varying water levels. The Waranga Basin is often used by bird-watching groups.

Riparian cover is sparse around the reservoir. Some vegetation exists along the supply channels but generally there is minimal vegetation in exposed areas as a result of grazing pressure. Occasional Grey Box, Chinese Scrub, Wattles and Golden Wattles occur in places. Mudflats located at the southern end of the storage and along the western side adjacent to the Caravan Park are well vegetated.

A revegetation program commenced at Waranga Basin in 2001. A 37 hectare site at Waranga Basin was the first to be revegetated with native vegetation under the policy in the Goulburn Broken Catchment. Further information needs to be gathered regarding the effectiveness and benefits from previous revegetation efforts.

#### Key issues:
- Limited information on flora and fauna within the storage.
- No register of environmental assets.

#### Objectives
Protect and build up native populations of flora and fauna.

#### Actions
66. Identify and implement management strategies to monitor, protect and enhance habitat for native species.
67. Continue fire protection works to reduce bushfire risks.
68. Consider impact of grazing on native vegetation before approving short term grazing permits (see Section 8.3.2 Grazing Licences).

#### Further information and relevant strategies:
- Goulburn Broken Catchment Management Authority Regional Catchment Strategy, 2003-2009
- Goulburn Broken Native Vegetation Management Strategy 2003
The history of Waranga Basin is important to the local community, not only because of several remaining archaeological sites of Indigenous and Non-Indigenous heritage, but its history intrinsically links the social, economic, environmental and cultural fabric of Rushworth, the surrounding agricultural region and the irrigation history of the Goulburn Valley.

A popular topic of discussion during the community consultation was the desire to preserve and promote the cultural heritage of the Waranga Basin area. Historical features of significance to local communities include:

- How Waranga Basin was built (horse and dray) and by whom.
- Archaeological sites.
- Aboriginal sites – canoe trees, middens.
- Burnt Hill, Aboriginal borra boras, old shepherd tracks.
- William Gunn's homestead, Police Camp.
- Old equipment.
- Dam wall - history and importance.
- Inlets into Waranga Basin – Stuart Murray and Cattanach Canals.
- Two tree island – First peach orchard in Goulburn Valley.
See Appendix 6.

11.1 Indigenous Heritage

The Victorian Aboriginal Heritage Act 2006 recognises Aboriginal people “as the primary guardians, keepers and knowledge holders of Aboriginal cultural heritage”. Registered Aboriginal Parties play a leading role in administering the Act and have well defined responsibilities for managing and protecting Aboriginal cultural heritage at a local level. The Taungurung Clans Aboriginal Corporation is the recognised Registered Aboriginal Party for the area of northern Victoria that includes Waranga Basin. The Yorta Yorta Nation Aboriginal Corporation is nearby.

There are some areas of Aboriginal Cultural Sensitivity within the Waranga Basin as defined by Department of Primary Industries.

Key issues:
- Lack of awareness about sites of both Indigenous and Non-Indigenous heritage.

Objectives

Acknowledge, protect and promote the heritage and cultural significance of the Waranga Basin.

Actions

69. Undertake a comprehensive investigation of Non-Indigenous cultural heritage on the Waranga Basin foreshore and lake bed.

70. Undertake a comprehensive investigation of Indigenous cultural heritage on the Waranga Basin foreshore and lake bed.

71. Develop and promote viewing areas with signage to interpret historical sites.

(Photo)
Timber bridge supports over Waranga Creek that once supported the first railway line between Rushworth and Murchison (1890).
Appendix 1 - Overview of Storage Operations

The first stage of water storage commenced in 1905. The embankment was completed in 1908, using picks, shovels and horse drawn scoops, and at the time of construction was described as the largest project of its kind in the world, with an embankment height of 8.8 metres and a length of 7.0 kilometres. Between 1915 and 1921, the embankment was raised by 4.27 metres, and the puddle clay core wall and rock beaching was extended to the new crest level. The storage inundated the original Echuca and Waranga Trust Channel that had been constructed to convey water from the Goulburn River to the Murray at Echuca.

Waranga Basin is an important off-river storage, where water is diverted from the Goulburn River at Goulburn Weir via the Stuart Murray and Cattanach Canals. The Waranga Basin also has a small catchment area of its own, and with a capacity of 432,362 megalitres is one of the largest storages in the Goulburn System. The average water depth is 7 metres and maximum depth of 10 metres.

Goulburn-Murray Water supplies raw water directly from Waranga Basin to customers for domestic and stock use and to Goulburn-Valley Water for urban water supply for Rushworth. Water stored in Waranga Basin supplies the Central Goulburn, Rochester and Pyramid-Boort irrigation areas across northern Victoria. Supplies to the Rochester and Pyramid-Boort areas occur via the 180 kilometre long Waranga Western Channel. The raw water supplied by Waranga Basin via the irrigation channels is used by irrigation customers, domestic and stock customers and a number of urban water suppliers who supply potable water to a number of towns.

Operation and maintenance of the dam and outlet structures is carried out in accordance with schedules and procedures contained in the Waranga Basin Operation and Maintenance Manual.

Waranga Basin is an ‘off-stream’ storage. It has a small catchment area (150 km²) but is filled principally by water diverted from the Goulburn Weir along the Stuart Murray and Cattanach Canals. The total surface area of Waranga Basin is 5,848 ha with a volume of 432,362 ML at full supply level. There is no spillway, and all discharges are regulated through channel outlets.

Waranga Basin is typically filled to capacity at the commencement of the irrigation season (121.36 m AHD) and is drawn down by gravity flow through the two outlets to a minimum level at the end of the irrigation season (115.0 m AHD). The level can be dropped further by pumping. The extent of draw down is influenced by seasonal allocation and climatic conditions.

The Goulburn-Murray Water Reservoir Controller is responsible for the release operations. The major outlet is the Waranga Western Channel (WWC), located on the western side of the Waranga Basin. A portion of the WWC’s flow can be diverted via the Central Goulburn Offtake 9, which is located a short distance from the main WWC outlet. This diversion capacity is 1100 ML/day, reducing the WWC rate to 3520ML/day downstream of the Central Goulburn 9 Offtake. Both Ballarat and Bendigo urban water supplies now include water drawn from the WWC at the Colbinabbin pumping facility. The minor outlet provides up to 1850 ML/ day of water to the Central Goulburn 7 and 8 Channels.

Goulburn-Murray Water continually monitors and reviews the operation of Waranga Basin in response to a range of climatic conditions such as drought and flood, however this must be part of a broader review of the Goulburn system as a whole. Issues associated with the management of water resources are currently being addressed at a national level through the Murray Darling Basin Authority’s Murray Darling Basin Plan.

Urban Water Authorities supplied from Waranga Basin include Goulburn Valley Water, Coliban Water and Grampians Wimmera Mallee Water.

Towns which have raw water supplied by Goulburn-Murray Water and the relevant urban water supplier include:

- Waranga Basin: Rushworth (supplied by Goulburn Valley Water)
- Central Goulburn: Stanhope, Tongala, Girgarre, Kyabram, Merrigum (all supplied by Goulburn Valley Water)
- Waranga Western Channel (and offtakes): Boort, Macorna, Mitiamo, Mysia, Pyramid Hill, Rochester, Dingee and Lockington (all supplied by Coliban Water); Colbinabbin and Cirio (supplied by Goulburn Valley Water); Quambatook and emergency alternative supply to Birchip and Wycheproof (supplied by Goulburn-Murray Water).

Appendix 2 - Summary of Consultation

Meetings with Waranga Community Reference Group.

Community Workshops:

- Workshop 1 - 23 February 2011 at Rushworth Shire Hall – attended by 44 people.

In-depth stakeholder interviews:

- Mary Jo Fortuna (Waranga News/Resident).
- Carolyn Ashton (Rushworth Community House).
- John Williams (Resident and ex-worker on Waranga Basin).
- Cr Marion Riley (Waranga Ward, Campaspe Shire Council).
- Bill Dundas (DSE).
- Rosemary Tate (Waranga Basin Caravan Park).
- Steven Threlfell (President of Shepparton Field and Game).
- Karen Brisbane (former Goulburn Valley Landcare Group Network Coordinator).
- Wally Cubbin (VRFish, Goulburn Valley Association of Angling Clubs).
- Jenny Dyer, David Gittus, Jesse Sherwood (DPCD).
- Mike Wellington (President, Rushworth Historical and Preservation Society).
- Bill Cathcart (Shire of Campaspe – Land Planning).
- Kesha Day (Yorta Yorta) (undertaken by Jeff Harrison).

Surveys:

- Online survey via G-MW website.
- Email survey to stakeholders with email addresses.
- Email update and survey to Waranga Community Reference Group.
- Survey insert into Waranga News.
- 200 Surveys and 10 posters were distributed at local businesses.
- Onsite surveying at Waranga Basin Caravan Park, Harriman Point and Rushworth.
- Surveys distributed to Tatura Caravan Park.
- Mail out of 200 surveys to 22 local clubs and organisations.

Display and survey on Australia Day using Goulburn-Murray Water’s Water Wheels Caravan in Rushworth. Consultation signage around Waranga Basin. Media releases and advertisements.
Appendix 3 - Agency Roles and Responsibilities

Aboriginal Affairs Victoria

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

Campaspe Shire
www.campaspe.vic.gov.au

Campaspe Shire is the local government authority with responsibility for statutory planning matters, urban water supply, wastewater management, stormwater management, waste management services, septic tanks, management of public facilities and reserves, management of animals and local law enforcement.

Environment Protection Authority Victoria
www.epa.vic.gov.au

EPA Victoria 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.

Fisheries Victoria (Department of Primary Industries)

Fisheries Victoria is part of the Department of Primary Industries which promotes the sustainable development of primary industries within Victoria. Fisheries Victoria regulates recreational fishing compliance (licenses, size and bag limits) and managing fish habitat (e.g. timber removal) issues on lakebed areas.

Goulburn-Murray Water
www.g-mwater.com.au

Goulburn-Murray Water maintains and manages the water supply operations, maintenance and safety of the Waranga Basin. Goulburn-Murray Water manages lake bed and public foreshore land, coordinates the Blue-green Algae monitoring and response program, and is responsible for licensing and approving structures on the Waranga foreshore.

Goulburn Broken Catchment Management Authority
www.gbcma.vic.gov.au

The Goulburn Broken Catchment Management Authority 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 CMA has operational responsibility for waterway and floodplain management in priority areas.

Goulburn Valley Water
www.gvwater.vic.gov.au

Goulburn Valley Water is responsible for urban water treatment and supply and wastewater management to townships around Waranga Basin, including Rushworth, Tatura and Shepparton. Goulburn Valley Water also provides advice and assistance to new developers, plumbing services and trade waste.

Parks Victoria
www.parkweb.vic.gov.au

Parks Victoria is the custodian of a diverse estate of significant parks in Victoria totalling approximately 3.96 million hectares, or roughly 17 per cent of Victoria. Through effective environmental and visitor management, Parks Victoria is dedicated to preserving the natural and heritage values of the parks, bays, and waterways, including full protection of sensitive areas. At Waranga Basin, Parks Victoria is primarily responsible for management of areas of Crown Land and other public land areas near to Waranga Basin (see Figure 2 (p.31). This includes management of camping and public access and the protection of environmental values on those areas.

Yorta Yorta
www.yynac.com.au

The Victorian Aboriginal Heritage Act 2006 recognises Aboriginal people “as the 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 for managing and protecting Aboriginal cultural heritage at a local level. Yorta Yorta Aboriginal Corporation is the recognised Registered Aboriginal Party for a large area of northern Victoria which includes the northern foreshore lands at Waranga Basin.

Taungurung Clans Aboriginal Corporation
http://taungurung.info/

Registered Aboriginal Party for Southern area of Waranga Basin.
<table>
<thead>
<tr>
<th>Issue</th>
<th>Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aboriginal cultural heritage</td>
<td>Aboriginal Affairs Victoria</td>
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<tr>
<td>Animal management (e.g. dogs)</td>
<td>Local Government, Goulburn-Murray Water</td>
</tr>
<tr>
<td>Aquatic vegetation and weeds</td>
<td>Goulburn-Murray Water, Department of Sustainability and Environment (DSE)</td>
</tr>
<tr>
<td>Boating management – zones, buoys, signage</td>
<td>Goulburn-Murray Water, Transport Safety Victoria</td>
</tr>
<tr>
<td>Boating management – policing and enforcement</td>
<td>Victoria Police (Water Police), Goulburn-Murray Water, Transport Safety Victoria</td>
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<tr>
<td>Blue-green Algae</td>
<td>Goulburn-Murray Water, DSE</td>
</tr>
<tr>
<td>Camping</td>
<td>Goulburn-Murray Water, Local Government</td>
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<tr>
<td>Commercial operations, developments and events</td>
<td>Local Government, Goulburn-Murray Water</td>
</tr>
<tr>
<td>Dam Operations (lake level and storage releases)</td>
<td>Goulburn-Murray Water</td>
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<td>Environmental incident (pollution, spills, noise, reportable incidents etc.)</td>
<td>Environment Protection Authority (EPA) Victoria</td>
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<td>Erosion (public foreshore land)</td>
<td>Goulburn-Murray Water</td>
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<td>Event licensing - on water</td>
<td>Goulburn-Murray Water, Transport Safety Victoria</td>
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<tr>
<td>Event licensing - on foreshore land</td>
<td>Goulburn-Murray Water</td>
</tr>
<tr>
<td>Event Planning Approval</td>
<td>Local Government</td>
</tr>
<tr>
<td>Fishing information, stocking, licensing and enforcement</td>
<td>DPI Fisheries Victoria</td>
</tr>
<tr>
<td>Fish habitat management</td>
<td>DPI Fisheries Victoria, Goulburn-Murray Water</td>
</tr>
<tr>
<td>Fish deaths</td>
<td>EPA Victoria, Goulburn-Murray Water, DPI Fisheries</td>
</tr>
<tr>
<td>Flood warnings</td>
<td>Bureau of Meteorology</td>
</tr>
<tr>
<td>Flood/weather emergency (non life threatening)</td>
<td>Victoria State Emergency Service</td>
</tr>
<tr>
<td>Grazing (licensed)</td>
<td>Goulburn-Murray Water</td>
</tr>
<tr>
<td>Illegal activity &amp; anti-social behaviour</td>
<td>Victoria Police</td>
</tr>
<tr>
<td>Pest plants &amp; animals (public foreshore &amp; lakebed)</td>
<td>Goulburn-Murray Water, Department of Primary Industries, Local Government</td>
</tr>
<tr>
<td>Planning and development</td>
<td>Local Government</td>
</tr>
<tr>
<td>Public reserves and facilities (e.g. boat ramps, toilets, playground equipment, BBQs, roads, etc.)</td>
<td>Goulburn-Murray Water, Local Government</td>
</tr>
<tr>
<td>Rail Trail</td>
<td>Local Government</td>
</tr>
<tr>
<td>Rubbish &amp; litter</td>
<td>Goulburn-Murray Water, Local Government, EPA Victoria</td>
</tr>
<tr>
<td>Trees and foreshore (riparian) vegetation</td>
<td>DSE, Goulburn-Murray Water, Goulburn Broken Catchment Management Authority</td>
</tr>
<tr>
<td>Timber (lake bed standing &amp; remnant dead timber)</td>
<td>Goulburn-Murray Water, Fisheries Victoria</td>
</tr>
<tr>
<td>Tourist information (general)</td>
<td>Local Government Tourist Information Centres</td>
</tr>
<tr>
<td>Water quality (Blue-green Algae)</td>
<td>Goulburn-Murray Water, DSE</td>
</tr>
<tr>
<td>Water supply &amp; water quality (urban, potable drinking &amp; household use)</td>
<td>Goulburn Valley Water</td>
</tr>
<tr>
<td>Water supply (non-reticulated, non-potable stock and domestic licencing and use)</td>
<td>Goulburn-Murray Water</td>
</tr>
<tr>
<td>Water supply (downstream releases)</td>
<td>Goulburn-Murray Water</td>
</tr>
<tr>
<td>Weed management (public land)</td>
<td>Goulburn-Murray Water, Department of Primary Industries, Local Government</td>
</tr>
</tbody>
</table>
## Appendix 5 - Summary of Action Items

<table>
<thead>
<tr>
<th>Action #</th>
<th>Action</th>
<th>Lead Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Community Awareness and Involvement</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Develop improved public information on recreation, water quality issues, other land and on water issues, management issues, dam operations and water levels.</td>
<td>Goulburn-Murray Water. Support from Waranga Basin Community Reference Group, clubs and other stakeholders.</td>
</tr>
<tr>
<td>3.</td>
<td>Develop an interactive website containing maps, plans, zones, FAQs, management arrangements and by-laws that can be used as a one stop shop for information about Waranga Basin.</td>
<td>Goulburn-Murray Water. Support from Waranga Basin Community Reference Group, clubs and other stakeholders.</td>
</tr>
<tr>
<td>4.</td>
<td>Develop a strategy to promote Waranga Basin.</td>
<td>Local tourism peak body, with support from Local Government and Goulburn-Murray Water.</td>
</tr>
<tr>
<td>5.</td>
<td>Increase the awareness of Waranga Basin by encouraging community-run events both on and off the water.</td>
<td>Echuca Moama Tourism, Greater Shepparton City Council and Local Tourism Groups.</td>
</tr>
<tr>
<td>6.</td>
<td>Establish event policies and guidelines to support community events.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity.</td>
</tr>
<tr>
<td>7.</td>
<td>Consider opportunities to provide tourist photo lookouts with interpretive signage about the area.</td>
<td>Goulburn-Murray Water with support from local tourism peak body.</td>
</tr>
<tr>
<td><strong>Recreation and Tourism</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Undertake a quantitative survey of users of the various infrastructure points at Waranga Basin in order to determine current usage numbers.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity.</td>
</tr>
<tr>
<td>9.</td>
<td>Develop a recreational infrastructure and landscape master plan to assist in prioritising capital investment and maintenance.</td>
<td>Goulburn-Murray Water with the involvement of the Waranga Basin’s commercial operators.</td>
</tr>
<tr>
<td>10.</td>
<td>Consider opportunities for defined walking and/or cycling trails.</td>
<td>Relevant land manager with support from local tourism peak body, Tourism Victoria and Local Government.</td>
</tr>
<tr>
<td>11.</td>
<td><strong>Consider separate designated areas for motorised trail bikes away from passive recreation areas.</strong></td>
<td>Relevant land manager with support from local tourism peak body, Tourism Victoria and Local Government.</td>
</tr>
<tr>
<td>12.</td>
<td>Continue development of a Rail Trail between Rushworth and Murchison.</td>
<td>Local Government with support from community and local tourism peak body.</td>
</tr>
<tr>
<td>13.</td>
<td>Explore potential for bird-watching activities and facilities such as bird hides and viewing platforms.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity.</td>
</tr>
<tr>
<td>15.</td>
<td>Review existing boat ramps in relation to access at all water levels, number, location, safety issues, road access and parking.</td>
<td>Goulburn-Murray Water. Involvement of Transport Safety Victoria, Victorian Water Police and support from the Boating Industry Association of Victoria.</td>
</tr>
<tr>
<td>17.</td>
<td>Provide consistent and up to date boating safety information signage at all boating access points and information via brochures and internet.</td>
<td>Goulburn-Murray Water. Involvement of Transport Safety Victoria, Victorian Water Police and support from the Boating Industry Association of Victoria.</td>
</tr>
<tr>
<td>Action #</td>
<td>Action</td>
<td>Lead Agency</td>
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</tr>
<tr>
<td>18.</td>
<td>Investigate suitability of the Basin for boating events, such as ski-racing and yachting.</td>
<td>Goulburn-Murray Water, Involvement of Transport Safety Victoria, Victorian Water Police and support from the Boating Industry Association of Victoria.</td>
</tr>
<tr>
<td>19.</td>
<td>Assess the current fish habitat and stocking situation.</td>
<td>DPI (Fisheries) is primarily responsible for coordinating this activity, with the involvement of G-MW, DSE, VRFish, and the Goulburn Valley Association of Angling Clubs.</td>
</tr>
<tr>
<td>21.</td>
<td>Promote the fact that the Waranga Basin is stocked with fish.</td>
<td>DPI (Fisheries) is primarily responsible for coordinating this activity, with the involvement of G-MW, DSE, VRFish, and the Goulburn Valley Association of Angling Clubs.</td>
</tr>
<tr>
<td>22.</td>
<td>Establish monitoring programs.</td>
<td>DPI (Fisheries) is primarily responsible for coordinating this activity, with the involvement of G-MW, DSE, VRFish, and the Goulburn Valley Association of Angling Clubs.</td>
</tr>
<tr>
<td>23.</td>
<td>Encourage fishing related events.</td>
<td>DPI (Fisheries) and fishing representative organisations.</td>
</tr>
<tr>
<td>24.</td>
<td>Advocate for the protection and enhancement of appropriate fish habitat.</td>
<td>DPI (Fisheries) is primarily responsible for coordinating this activity, with the involvement of G-MW, DSE, VRFish, and the Goulburn Valley Association of Angling Clubs.</td>
</tr>
<tr>
<td>25.</td>
<td>Consider opportunities for accessible fishing places for all levels of ability.</td>
<td>DPI (Fisheries) is primarily responsible for coordinating this activity, with the involvement of G-MW, DSE, VRFish, and the Goulburn Valley Association of Angling Clubs.</td>
</tr>
<tr>
<td>26.</td>
<td>Investigate the need for and feasibility of fishways in channels to promote fish breeding and migration.</td>
<td>DPI (Fisheries) is primarily responsible for coordinating this activity, with the involvement of G-MW, DSE, VRFish, and the Goulburn Valley Association of Angling Clubs.</td>
</tr>
<tr>
<td>27.</td>
<td>Research current levels of Trout breeding in Channels.</td>
<td>DPI (Fisheries) is primarily responsible for coordinating this activity, with the involvement of G-MW, DSE, VRFish, and the Goulburn Valley Association of Angling Clubs.</td>
</tr>
<tr>
<td>28.</td>
<td>Review the demand and adequacy of current facilities for camping, including effluent disposal facilities.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity, with support from local tourism peak body.</td>
</tr>
<tr>
<td>29.</td>
<td>Evaluate the potential for future camp sites and develop a camping strategy based on the principles established in the Lake Hume strategy.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity, with support from regulating agencies.</td>
</tr>
<tr>
<td>30.</td>
<td>Review existing tourism and accommodation facilities around Waranga Basin and identify opportunities for appropriate development.</td>
<td>Local tourism body with support from existing operators, land managers and regulating agencies.</td>
</tr>
<tr>
<td>31.</td>
<td>Promote the Waranga Basin area as a tourism destination.</td>
<td>Local tourism body, with support from Local Government and Echuca Moama Tourism.</td>
</tr>
<tr>
<td>32.</td>
<td>Develop a Public Infrastructure and Foreshore Master Plan to help prioritise maintenance funding and future investment in public infrastructure (including road networks) and public recreation area development.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity, with support from regulating agencies and local tourism peak body.</td>
</tr>
<tr>
<td>33.</td>
<td>Seek collaborative agreements between key agencies for improved management of public reserves.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity.</td>
</tr>
<tr>
<td>34.</td>
<td>Develop a plan for monitoring and policing of regulations relating to public behaviour with relevant agencies to ensure safe use of the area.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity, with support from regulating agencies.</td>
</tr>
<tr>
<td>35.</td>
<td>Undertake regular public safety assessments of public reserves and boat ramps to maintain suitable safe access.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity.</td>
</tr>
<tr>
<td>36.</td>
<td>Investigate options to reduce vandalism.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity, with support from Victoria Police.</td>
</tr>
<tr>
<td>37.</td>
<td>Educate the community about non-access to unsafe areas.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity, with the involvement of VicRoads and Victoria Police.</td>
</tr>
<tr>
<td>38.</td>
<td>Develop a litter management strategy to minimise impacts of litter on the surrounding environment.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity.</td>
</tr>
<tr>
<td>Action #</td>
<td>Action</td>
<td>Lead Agency</td>
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<tr>
<td>39.</td>
<td>Communicate litter management policy via brochures, signage and other communication tools.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity.</td>
</tr>
<tr>
<td></td>
<td><strong>Land Management</strong></td>
<td></td>
</tr>
<tr>
<td>40.</td>
<td>Review wastewater management strategies around Waranga Basin.</td>
<td>Goulburn-Murray Water and Local Government are primarily responsible for coordinating this activity.</td>
</tr>
<tr>
<td>41.</td>
<td>Maintain and improve communication with local government and environmental departments to ensure appropriate development near Waranga Basin.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity.</td>
</tr>
<tr>
<td>42.</td>
<td>Develop and disseminate a reference guide to land management responsibilities around the Waranga Basin to ensure people know their obligations and where to go to resolve common issues.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity.</td>
</tr>
<tr>
<td>43.</td>
<td>Review the impact of existing land-use activities on water quality.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity, with support from key management agencies.</td>
</tr>
<tr>
<td>44.</td>
<td>Develop a better understanding of the impact of water quality on downstream land.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity.</td>
</tr>
<tr>
<td>45.</td>
<td>Review commercial leases, costs and benefits, with a view to ensuring appropriate standard of facilities are maintained and all development is sustainable.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity, with support from Department of Sustainability and Environment for management of the Waranga Caravan Park lease.</td>
</tr>
<tr>
<td>46.</td>
<td>Complete upgrades of club wastewater management systems to meet current Environment Protection Authority guidelines.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity, with support from Department of Sustainability and Environment for management of the Waranga Caravan Park lease.</td>
</tr>
<tr>
<td>47.</td>
<td>Develop guidelines for short term grazing permits.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity.</td>
</tr>
<tr>
<td>48.</td>
<td>Review adequacy of storage perimeter fencing on grazing licence areas and adjoining private land used for grazing.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity.</td>
</tr>
<tr>
<td>49.</td>
<td>Manage bushfire risks via existing Fire Management Plan, including communication to the public.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity.</td>
</tr>
<tr>
<td>50.</td>
<td>Ensure access is available and well signposted for fire vehicles via roads and to water supply points, especially during low water levels.</td>
<td>CFA with support from Goulburn-Murray Water and road managers.</td>
</tr>
<tr>
<td>51.</td>
<td>Assess the extent of erosion, and develop an Erosion Action Plan if required.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity, with the involvement of nearby landholders and local Landcare groups.</td>
</tr>
<tr>
<td>52.</td>
<td>Investigate and identify opportunities for revegetation plantings in high risk areas.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity, with the involvement of nearby landholders and local Landcare groups.</td>
</tr>
<tr>
<td>53.</td>
<td>Consider landscaping in “barren” high use public recreation areas.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity, with the involvement of nearby landholders and local Landcare groups.</td>
</tr>
<tr>
<td>54.</td>
<td>Manage grazing on perimeter land to minimise erosion risk.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity, with the involvement of nearby landholders and local Landcare groups.</td>
</tr>
<tr>
<td>55.</td>
<td>Implement construction of interception drain.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity.</td>
</tr>
<tr>
<td>56.</td>
<td>Investigate salinity impacts from Waranga Basin and borrow pits on downstream land.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity.</td>
</tr>
<tr>
<td>57.</td>
<td>Develop a Pest Plants and Animals Action Plan to manage identified issues and protect environmental values.</td>
<td>Goulburn-Murray Water is primarily responsible for this action, with the assistance and involvement of local Landcare groups and nearby landholders.</td>
</tr>
<tr>
<td>Action #</td>
<td>Action</td>
<td>Lead Agency</td>
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</tr>
<tr>
<td>58.</td>
<td>Support weed awareness and education programs which encourage a cooperative approach to weed and pest management with adjoining landowners.</td>
<td>Goulburn-Murray Water is primarily responsible for this action, with the assistance and involvement of local Landcare groups and nearby landholders.</td>
</tr>
<tr>
<td>59.</td>
<td>Investigate the impact of weeds around the Waranga Basin area and the impact on access and fire risk.</td>
<td>Goulburn-Murray Water is primarily responsible for this action, with the assistance and involvement of local Landcare groups and nearby landholders.</td>
</tr>
<tr>
<td></td>
<td><strong>Water Quality</strong></td>
<td></td>
</tr>
<tr>
<td>60.</td>
<td>Review existing water quality monitoring programs to ensure they are targeted and effective.</td>
<td>Goulburn-Murray Water is primarily responsible for this action.</td>
</tr>
<tr>
<td>61.</td>
<td>Continue to proactively monitor water quality.</td>
<td>Goulburn-Murray Water is primarily responsible for this action.</td>
</tr>
<tr>
<td>62.</td>
<td>Identify and implement programs to manage risks to water quality.</td>
<td>Goulburn-Murray Water is primarily responsible for this action.</td>
</tr>
<tr>
<td>63.</td>
<td>Continue to monitor and manage Blue-green Algae in accordance with Waranga Basin – Blue-green Algae Incident Response Plan.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity.</td>
</tr>
<tr>
<td>64.</td>
<td>Identify potential pollution sources in the Waranga Basin Catchment and potential impacts on water quality.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity, with involvement from urban water suppliers.</td>
</tr>
<tr>
<td>65.</td>
<td>Encourage environmental and education programs that assist in increasing awareness of water quality issues and ways to protect water quality.</td>
<td>Goulburn-Murray Water is primarily responsible for coordinating this activity.</td>
</tr>
<tr>
<td></td>
<td><strong>Healthy ecosystems</strong></td>
<td></td>
</tr>
<tr>
<td>66.</td>
<td>Identify and implement management strategies to monitor, protect and enhance habitat for native species.</td>
<td>Goulburn-Murray Water is primarily responsible for this action, with the assistance and involvement of local Landcare groups, nearby landholders and Department of Sustainability and Environment.</td>
</tr>
<tr>
<td>67.</td>
<td>Continue fire protection works to reduce bushfire risks.</td>
<td>Goulburn-Murray Water is primarily responsible for this action, with the assistance and involvement of local Landcare groups, nearby landholders and Country Fire Authority.</td>
</tr>
<tr>
<td>68.</td>
<td>Consider impact of grazing on native vegetation before approving short term grazing permits (see Section 8.3.2 Grazing Licences).</td>
<td>Goulburn-Murray Water is primarily responsible for this action.</td>
</tr>
<tr>
<td></td>
<td><strong>Cultural Heritage</strong></td>
<td></td>
</tr>
<tr>
<td>69.</td>
<td>Undertake a comprehensive investigation of Non-Indigenous cultural heritage on the Waranga Basin foreshore and lake bed.</td>
<td>Goulburn-Murray Water is primarily responsible for this action, with support from local heritage and community groups.</td>
</tr>
<tr>
<td>70.</td>
<td>Undertake a comprehensive investigation of Indigenous cultural heritage on the Waranga Basin foreshore and lake bed.</td>
<td>Goulburn-Murray Water is primarily responsible for this action, with support from local heritage and community groups.</td>
</tr>
<tr>
<td>71.</td>
<td>Develop and promote viewing areas with signage to interpret historical sites.</td>
<td>Local heritage and community groups with support from Goulburn-Murray Water.</td>
</tr>
</tbody>
</table>
Appendix 6 - Indigenous and Non-Indigenous Heritage

Indigenous Heritage continued

The area around Rushworth and Whroo was originally the home of the Ngooraialum (now known as Ngurai-illam-Wurrung) Aboriginal people.\textsuperscript{iv} William le Souef, Assistant Protector of Aborigines (1840-1842), relocated the first Protectorate from Mitchelstown to a reservation of one square mile at Murchison on the Goulburn’s banks in 1840, where at any time Aborigines numbered up to 200. By the end of his time at the Protectorate he had created a solid settlement with crops planted and grazing land fenced off as well as several wooden houses, a pumping station on the river and a neat plan of streets.\textsuperscript{v} Richard Horne, Gold Commissioner, makes reference to ‘...small groups of aborigines of the Goulburn River, their long wooden spears, waddles and bark shields.’\textsuperscript{vi}

Rushworth Centenary Official Souvenir (1853-1953) makes reference to the common sight of Corroborees being held amongst the scrub in High Street and in the vicinity of Nuggetty Gully.\textsuperscript{vii}

During modernisation of the irrigation system in 2009, Aboriginal Monitors at the Waranga Major Offtake Works identified significant scar trees, meaning that tribal members would have inhabited this region. Also, many scar trees have been identified throughout the Rushworth Goldfields and State Forest area, but have not been assessed by Aboriginal Monitors.

The Waranga goldfields were first opened in the latter part of 1853. The name ‘Waranga’ was obtained from the native title of the squatter’s run on which the first gold discoveries were made.\textsuperscript{viii} ‘Waranga’ is thought to mean ‘sing’ and, with the abundance of wildlife and birdsong, this possibly inspired the naming of Waranga Lagoon or Swamp.

Non-Indigenous Heritage

Gold discovery on William Gunn’s pastoral run in mid-1853 attracted thousands of gold miners to what was originally known as the Goulburn Diggings (Rushworth & Whroo). Facilitated by utilisation of the Ironbark forest resource, gold mining was the impetus for growth and development of the region. In April 1854, Rushworth and Moora were the first Village settlement sites gazetted in the Goulburn Valley.

Historic goldfields mapping demonstrates Waranga Creek rising at the northern base of Balaclava Hill, Whroo and from here, tortuously trends northwards to enter Waranga Lagoon. Waranga Village, the goldfields Commissioners Camp (one of four outposts) and 40-acre and smaller allotments can be identified on the western shores of Waranga Creek and south of Waranga Lagoon which demonstrates some of the earliest pioneer settlement. William Gunn’s original homestead site (slab hut) was replaced in 1870 (brick and timber) and boasted a windmill, brick-lined well and a treed garden. Remnants of the Gold Commissioner Camp stables and other relics remain evident today at times of lowest water levels. Goulburn Valley’s first pear orchard was established at Waranga Village.

Gold Commissioner, Richard Henry Horne (1853) described Waranga lagoon as a ‘huge and melancholy lagoon’\textsuperscript{x} while ‘the Waranga Swamp – or lake as it was at one time and may again be fitly termed after one or two wet seasons – like Lake Tyrell, Lake Coorong, and Lalbert Swamp, is situated in the Murray tertiaries, and, like them, it absorbs the waters poured into it, but fails to show any outlet. Possibly its waters drain off through the sandy soil into the Goulburn River.’\textsuperscript{xi}

A rapidly expanding Victorian population called for land to be opened up for agricultural production. This was facilitated by Land Selection, Closer Settlement and later, Soldier Settlement Acts.

Colonial Government records show the former Waranga Shire (which once extended to the Murray River) among other agricultural produce had the highest grain yield in the Colony of Victoria.

Apart from growth of other towns and places, commerce and industry developed with the need for supporting major infrastructure such as roads, bridges, telegraph and railways – the Murchison to Rushworth Railway opened in 1890, which saw the opening up of a large timber trade in Waranga, where the principal products have been Ironbark poles, fencing timber, mining timber, mill logs, firewood, eucalyptus oil and ironbark and box sleepers.\textsuperscript{xii} As early as 1856, Richard Horne had advocated the use of Waranga Lagoon (Gunn’s Swamp) as a storage for Goulburn River water\textsuperscript{xiii} and a Chinese population attracted to the goldfields had a unique method of recycling water to grow vegetables in their market gardens, but, from the outset of gold discovery there was an overwhelming need for urban and agricultural/rural water supply.

The Water Conservation Act 881, amended by the Act of 1883, saw establishment of the first Trust, the Echuca and Waranga Waterworks Trust which comprised a district of 584,000 acres between the Goulburn and Campaspe Rivers. By 1888 the Trust had 367 miles of open channels filled by means of powerful pumping machinery erected on the Goulburn near Murchison. The main channel was carried on an embankment for 2½ miles at Gunns Swamp (Waranga Lagoon) and across the Wanalta and Corinella Creeks.\textsuperscript{xiv} Remains of the old Trust channels can still be seen today.

In 1890, surveys were made of the Waranga Lagoon;\textsuperscript{xv} in 1893, the government agreed to clear Waranga Swamp of timber\textsuperscript{xvi} and with plans drawn up for construction, and the embankment contract let to T. Flight, works commenced in 1902. The works brought not only labourers but farmers to Waranga, and a village grew up at the north western end of the embankment wall where a school catered for children of the labourers. ‘One cavalcade consisted of a bullock wagon (on which a house was fixed), a wagonette, drays, horses, bullocks, a cow and calf, and the owner, his wife and family, who had all driven from the dusty north-west to seek work at the Waranga Basin.’\textsuperscript{xvii}
Initially, water from the Goulburn River and Weir flowed through the Stuart Murray Canal (completed in the 1890s) into Waranga Basin which inundated Waranga Village, the Murchison to Rushworth railway line and road, necessitating re-routing the railway line and connecting road link further south. Later, enlargement of Eildon Weir made it necessary for a second channel to carry water from the Goulburn Weir to Waranga Basin. Cattanach Canal was completed in 1956 with the primary excavation undertaken by a Bucyrus Erie 200 W walking dragline fitted with a 7½ cubic yard bucket on a boom 110 feet long.\textsuperscript{xxx}

Waranga Basin was the first major dam constructed in Australia with a gross reservoir capacity of more than 100 million cubic metres. The Murchison Advertiser reported on 27 April 1917 that it was ‘the heart of the Goulburn Irrigation Works’ which had ‘resuscitated a barren waste known as Gunn’s Swamp into…a beautiful inland sea of cool, crystal water.’\textsuperscript{xxxi} It was completed in 1909 to a capacity of 201,300 acre feet, enlarged between 1915 and 1921 and by 1926, the embankment was raised in stages and a core wall inserted. It has an embankment wall 7.0 kilometres long and 8.8 metres high and a capacity of 432,362 megalitres. Construction involved earthworks undertaken by men using horse and drays, and remnants of a narrow-gauge ‘tram-line’ remain at the north-west extremity of the embankment wall that was used as a means of transport across the length of the wall.

The reliability of a water source advanced the dairy and fruit growing industries within the Goulburn Valley.

Nearby to the northern and eastern shores of Waranga Basin no less than six Internment Camps were located. The purpose-built camps operated between 1940 and 1947 and housed civilian males, females and children of German and Italian origin who had been resident in Australia but were deemed potential security risks because of their country of birth.

\textsuperscript{xxi} Indigenous and European Heritage notes edited by Marion Riley.

(Above) Remains of well at Gunn’s homestead. The homestead was timber with brick-addition on either side. Prior to the filling of Waranga Basin, the timber section of the house was sold and relocated to Rushworth and is still there today.
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Map 2. Waranga Basin Land Status