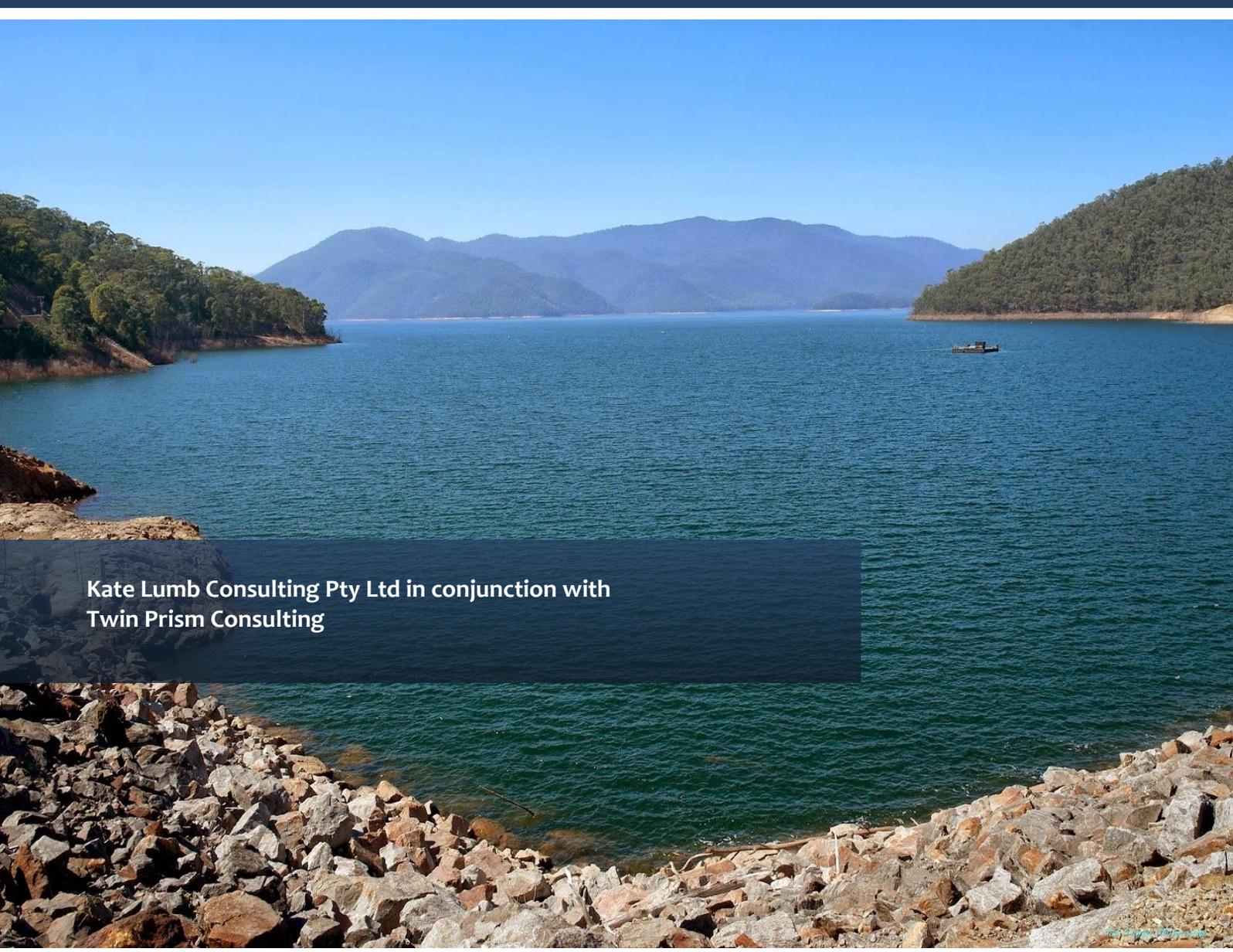


Goulburn-Murray Water

Lake Dartmouth Land and On-Water Management Plan

Draft - May 2019



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Twin Prism Consulting

Table of Contents

1. Introduction.....	5
1.1 Objectives of the plan	5
1.2 Context.....	5
1.2.1 Vision	5
1.2.2 Lake Dartmouth.....	5
1.2.3 Lake Banimboola Regulating Pondage	6
1.2.4 Scope	6
1.2.5 Land Status	6
1.2.6 Legal Status	6
2. A Plan for the Management of Lake Dartmouth	7
2.1 Plan Implementation	7
2.1.1 Lake Dartmouth Implementation	7
2.2 Community Awareness and Involvement	7
2.2.1 Aboriginal Cultural Heritage.....	8
2.2.2 Education and Awareness Programs	8
2.3 Recreation and Tourism	9
2.3.1 Boating.....	9
2.3.2 Fishing.....	10
2.3.3 Hunting.....	11
2.3.4 Camping and Touring	12
2.4 Water Quality.....	13
2.4.1 Water Quality Monitoring	13
2.5 Healthy Ecosystems	14
2.5.1 Flora and Fauna	14
2.5.2 Pest Plants and Animals.....	15
References	17
Appendices	18
Appendix A - Agency Roles and Responsibilities	18
Appendix B - Summary of Community Consultation	20
Appendix C - Lake Dartmouth	21
Appendix D - Lake Banimboola Regulating Pondage.....	22

Executive Summary

Lake Dartmouth is located within the Mitta Mitta catchment downstream of the confluence of the Mitta Mitta and Dart Rivers, approximately 24 km east of Mitta Mitta in north-east Victoria. The main river rises on the slopes of Mount Bogong as the Big River which joins the Cobungra River at Anglers Rest to form the Mitta Mitta River. The Big River and Mitta Mitta River, from the Big River Bridge on the Omeo Highway to the tail waters of Dartmouth Dam, has been declared a Heritage River, recognised for a number of values including scenic landscapes, canoeing, and significant flora and fauna.

Lake Dartmouth is the largest capacity dam in Victoria. Its primary purpose is for the storage of water for irrigation, domestic and stock use in Victoria and New South Wales. The dam was constructed by the Victorian Rural Water Commission on behalf of the then River Murray Commission. Construction began in 1973 and was completed in 1979. Goulburn Murray Water (GMW) manages the lake bed and the immediate foreshore land (50 vertical metres above the high-water mark) under direction of the Murray Darling Basin Authority (MDBA). The Dartmouth power station commenced operation in January 1981 and consists of a single 180 MW hydro-generator. The power station is remotely operated by AGL Hydro and is strictly controlled to give precedence to downstream water requirements. Whenever possible, releases for irrigation are made through the power station. The power station is located at the base of the dam wall and its maximum permissible flow is 12,000 ML/day.

A small regulating lake, known as Lake Banimboola Regulating Pondage, was constructed about six kilometres downstream of Dartmouth Dam. It is used to regulate releases from the dam into the river downstream. The pondage wall is concrete and incorporates 3 sets of regulating gates, 3 penstocks and a spillway. It has a hydroelectric power station, which has a maximum capacity of 12.5 MW. Both the regulating pondage and the power station are operated remotely or locally by AGL. Since construction, access to the pondage foreshore has been prohibited. In 2018 GMW, Victorian Fisheries Authority (VFA) and AGL negotiated restricted access to this area as a fishery.

Community interaction is a prominent element associated with the management of GMW water storages, and the management of public recreational use of irrigation storages is a challenge for GMW. 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. This is currently being addressed through the development of Land and On-Water Management Plans for all GMW storages. Each plan is being developed through an extensive process of engagement with communities to ensure they have strong community support for implementation.

The Lake Dartmouth Land and On-Water Management Plan aims to identify and protect important values associated with the waterways by outlining priority land and on-water management issues and identifying key actions to be implemented over the next five years. Most importantly, this plan aims to increase communication, consistency, coordination and cooperation between agencies, stakeholder groups and the community to protect the values and attributes of the lake.

The development of this plan has been supported and informed by a community and stakeholder consultation process, which included community forums, focus groups and interviews. Ongoing stakeholder engagement for the implementation of the plan will be facilitated through GMW in collaboration with Parks Victoria and Towong Shire. It is a dynamic document and will continue to evolve as the various actions and strategies identified are developed and implemented. It is proposed that the plan will be reviewed every five years by GMW.

1. Introduction

1.1 Objectives of the plan

Land and On-Water Management Plans are viewed as an integral component of GMW's water storage management planning portfolio. The plans are intended to be a key reference document, not only for GMW but also for the communities and the many stakeholders that interact with these storages.

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

- recognise the diverse range of values and uses associated with the storage,
- provide a strategic framework for management of the storage,
- identify important social, economic and environmental issues, and develop a series of actions to address these issues to be implemented over the next 1–5 years,
- protect the natural and cultural values by obtaining broad-scale agreement between agencies on principles relating to sustainable use and development of the lake and surrounding foreshore, and
- protect the long-term quality of the water resource for local and downstream users.

Land and On-water Management Plans take into account the needs and interests of all users of the lake, including adjoining landholders and licensees, recreational users, local government, and government agencies. To this end, a comprehensive community and stakeholder consultation program was an important component of the development of the plan.

1.2 Context

1.2.1 Vision

The following vision statement describes clear long-term outcomes from the prioritisation and implementation of key actions outlined in the plan. Stakeholders involved in the development of the plan, particularly GMW, Towong Shire Council and Parks Victoria, will play an important role in achieving this vision.

“Lake Dartmouth is the largest capacity dam in Victoria and provides a well-maintained place for visitors to enjoy the environment and pursue recreational activities without compromising its primary role as a water storage”.

1.2.2 Lake Dartmouth

Lake Dartmouth is the largest capacity storage in the River Murray system and has the highest embankment of any dam in Australia. It is located downstream of the confluence of the Mitta Mitta and Dart Rivers, approximately 24 km east of Mitta Mitta (95 km from Wodonga, 75km from Tallangatta) in north-east Victoria. The catchment is located entirely within Victoria and has an area of approximately 3,600 km², less than 25% of the catchment of Hume Reservoir and only about 0.3% of the Basin. Despite the catchment's size, almost 10% of the inflow to the River Murray system comes from upstream of Dartmouth Dam. Its primary purpose is for the storage of water for irrigation, domestic and stock use, and environmental flows. In dry seasons, the storage supplements releases from Lake Hume and increases supplies to the River Murray system.

Lake Dartmouth offers a variety of passive water sports and recreation facilities. It is a favourite spot for fishing, especially for trout and Macquarie perch. Camping (with limited facilities) is permitted in designated areas around the lake. Boat launching facilities are available for motor boats, however water skiing and house boating are not permitted. Boats are required to keep at least 700 metres away from the dam wall (GMW, 2018).

The Dartmouth power station, operated by AGL, is located at the base of the dam wall and can operate unrestricted when water level is between 434 and 483.5 m above sea level. Guidelines apply when it operates outside this range (GMW, 2018).

GMW is the waterway manager for the lake and manages it on behalf of the MDBA.

Lake Dartmouth is a major tourism asset for Towong Shire and the vast majority of land above the foreshore is part of the Alpine National Park.

1.2.3 Lake Banimboola Regulating Pondage

A small regulating lake known as Lake Banimboola Regulating Pondage was constructed six kilometres downstream of Dartmouth Dam. The prime purpose of the pondage is to regulate releases from the dam into the river downstream. Since construction of Lake Dartmouth, access to the pondage foreshore for fishing has been prohibited due to perceived risks concerning the rise and fall of water levels from hydro power generation, exposure to cold water, and risk to infrastructure as a result of increased visitation. In May 2018, a 700m section of the pondage foreshore was opened to fishing and the pondage stocked with 20,000 trout to accelerate the fishery's development (VFA, 2018). This was due to continued campaigning resulting in the establishment of a multi-agency Advisory Committee to investigate risks and identify mitigation actions related to recreational fishing on the pondage. The regulating pondage has a hydroelectric power station, which has a maximum capacity of 12.5 MW. Water levels are managed to meet water discharge responsibilities and the needs of hydro electricity generation. Water levels therefore vary and are independent of the water levels in Dartmouth Dam.

1.2.4 Scope

The geographic scope of this plan is limited to the lake and the land immediately surrounding the Full Supply Level (FSL). While the plan focuses on the lake and foreshore areas, it also aims to positively influence activities throughout the broader catchment. Land and On-Water management Plans do not address water levels in the storage.

1.2.5 Land Status

GMW manages the lake bed and the immediate foreshore land, 50 vertical metres above the high-water mark (see Appendix C). Beyond the immediate foreshore, the bulk of the land surrounding Lake Dartmouth is within the Alpine National Park, managed by Parks Victoria, which is used for conservation, recreational and nature-based tourism. There is a small area of land surrounding the lake which is state forest managed by DELWP. This runs north of the dam wall approximately 700m from the dam wall on the north shore and south of the dam wall approximately 1 km south of the boat ramp. There is an area of land beyond the foreshore on the north-western arm of the lake immediately surrounding the dam wall which is GMW freehold.

There are pockets of land surrounding Lake Banimboola Regulating Pondage which is GMW freehold and there are two private landholders located within close proximity to the pondage (see Appendix D).

1.2.6 Legal Status

The *Water Act 1989* outlines the appointment of water storage managers and their functions. As an appointed Authority under the Act, GMW must have regard to protecting the ecological values of the water system relating to the land specified in the instrument of appointment, protect the reliability and quality of the water supply, and minimise the impact on the environment when performing its functions under the Act.

The Lake Dartmouth Land and On-water Management Plan has no legal status. It will not impose any new legal or statutory requirements but may influence policy, potentially leading to legislation changes to help meet the objectives of the plan. It does not override any local government planning schemes, legislation or operational agreements.

2. A Plan for the Management of Lake Dartmouth

2.1 Plan Implementation

An Implementation Reference Group has been established by GMW for all the Land and On-Water Management Plans to date. An Implementation Reference Group is a vehicle to enhance communication between group members, increase understanding about issues relating to the lake, and most importantly, guide the implementation of the plan. Principles of collaboration, integrated management and a partnership approach to funding applications are paramount to the Implementation Reference Group.

2.1.1 Lake Dartmouth Implementation

Stakeholders, including GMW, Parks Victoria, Towong Shire, MDBA and community representatives, will play an important role in enabling the Lake Dartmouth community and various user groups to have ongoing input into the implementation of the actions identified in this plan. Stakeholders will meet on an as-needs basis to:

- engage representatives from community groups, recreational users and landholders to provide input into the implementation of actions,
- assist with the implementation and monitoring of actions in the plan, including the development of joint funding applications,
- identify and manage any new issues that arise,
- provide opportunities for agency representatives and the community to exchange ideas about the management of the lake and to discuss policy and regulatory changes relevant to its management, and
- review the plan after five years.

Issues

- The need for coordinated action between agencies and community to ensure implementation of the plan

Objective

- To meet on an as-needs basis to implement the plan and vision for Lake Dartmouth and Lake Banimboola Regulating Pondage

Actions

1. GMW to develop an Implementation Reference Group with Terms of Reference to meet on an as-needs basis, collaborate and form partnerships to implement high priority actions, and develop funding applications
2. Conduct a review of the plan and its implementation in five years or as required

2.2 Community Awareness and Involvement

Lake users and visitors, local residents, and surrounding landowners play an important role in sustainable management of the lake. Improved education and awareness programs are important to help protect water quality and the surrounding environment and raise awareness of different activities that take place at the lake and their impact on the lake and immediate surrounds. Education and awareness programs are also required to help the community understand how the lake operates, disseminate information on forecast water levels and demands, and the destination (use) of water discharged from the storage. Various mechanisms can be used to increase education and awareness including interpretive signage, websites and fact sheets.

2.2.1 Aboriginal Cultural Heritage

In Victoria the *Aboriginal Heritage Act 2006* and *Aboriginal Heritage Regulations 2018* protect Aboriginal cultural heritage, formalise Aboriginal community involvement in decision-making, and provide a consistent approach to managing Aboriginal cultural heritage issues relevant to land use and development proposals. Commonwealth legislation also applies, with the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* designed to provide protection where it is not adequately provided at the state or territory level. The *Aboriginal Heritage Act 2006* (the Act) recognises Aboriginal people as the primary guardians, keepers and knowledge holders of Aboriginal cultural heritage.

The Mitta Mitta River catchment and surrounding mountains, hills and valleys are the traditional land of the Dhudhuroa and Yaitmathang Nations. These groups were hunters and gatherers with strategic migrations across the landscape in response to seasonal resource abundance. They utilised a diverse range of resources (for food, tools, shelter, clothing, medicine, and cultural items for ceremonial purposes) from the environment (NHC, 2007). Historical reports document that the Dhudhuroa speakers first encountered British settlers when the Hume and Hovell expedition passed through their territory in 1824, however there is little specific information about Dhudhuroa society and customs.

A number of violent conflicts between settlers and Aborigines occurred in Dhudhuroa and Yaitmathang territory. In 1852 gold was discovered at Beechworth and Omeo. The following year it was discovered in the Ovens Valley and later at other places including Rutherford and on the Mitta Mitta. The discovery of gold brought thousands of newcomers to the area, which caused dislocation to Aboriginal society in the region (NHC, 2007).

There is no Registered Aboriginal Party (RAP) appointed for the management of Aboriginal cultural heritage in and around the lake. A small number of registered sites are located within close proximity to the lake, however detailed on-ground investigations and/or surveys have not been undertaken.

Issues

Awareness and understanding of Aboriginal cultural heritage within the Mitta Mitta River catchment

Objectives

To protect, conserve and raise community awareness about the importance of Aboriginal cultural heritage within the Mitta Mitta River catchment

Actions

3. Support initiatives to raise community awareness and enhance protection of Aboriginal cultural heritage

2.2.2 Education and Awareness Programs

The forest and alpine landscape in the Upper Mitta Mitta system, together with Lake Dartmouth, generate a significant amount of tourism through activities such as fishing, hunting, bushwalking, rafting and four-wheel driving. Whilst Lake Dartmouth and its immediate surrounds are in very good condition, all those who interact with the lake have a duty of care to continue to maintain the health of the lake, its surrounds and the broader catchment.

Consultations indicated that users of the lake would benefit from education and communication about care of the environment for future generations and key threats to the environment within the immediate vicinity of the lake and the broader catchment. Users would also benefit from signage illustrating the multiple uses of the lake and codes of conduct to enhance health and safety and minimise potential conflict between different user groups (particularly conflict between hunters and campers).

Key issues also raised during the consultation included limited education and communication with recreational users in relation to the role of the lake in the River Murray system. To assist with better understanding of Lake Dartmouth, information relating to the role of the lake in the River Murray system, how the lake operates, and forecasting of water levels should be made available. Consultations indicated that people would clearly benefit from further information about how the seasonal allocations for irrigation water work. With a better appreciation of the operating constraints, the impacts of activities, and the role of the storage, communities will be better informed and prepared for changing water levels in the lake.

Issues

- Lack of community awareness about the impacts of activities and key threats to the lake, its surrounds and broader catchment
- Potential for conflict between different user groups of the lake
- Lack of community understanding about the role of the lake in the River Murray system and how the lake operates

Objective

- To increase awareness and understanding of impacts of activities on the lake and key threats to the lake and the broader catchment
- To develop a Code of Conduct/signage to minimise potential conflict between different user groups and improve health and safety
- To increase awareness and understanding of how the lake operates

Actions

4. Improve understanding and awareness of the impacts of activities on the lake and key threats to the lake and broader catchment
5. Ensure that signage for the lake includes information about user responsibilities, rules and regulations, safety and etiquette
6. Improve understanding and awareness of the role of the lake in the River Murray system and how the lake operates, including forecasting of water levels in the lake
7. Promote the Lake Dartmouth Interpretive Centre as a useful resource to disseminate knowledge about the lake

2.3 Recreation and Tourism

Lake Dartmouth and the Mitta Mitta River are the main recreational and scenic focus within the Mitta Mitta catchment. The lake is a popular recreational trout and Macquarie perch fishery and offers a variety of passive water sports as well as recreation facilities. Camping is permitted in designated areas around the lake, some of which can only be reached by boat. Beyond the foreshore, the bulk of the land in the Mitta Mitta system is within the Alpine National Park (managed by Parks Victoria) which is used for conservation, recreational and nature-based tourism.

2.3.1 Boating

Boating is a popular recreational activity at Lake Dartmouth. Water skiing and house boating is not permitted, and boats are required to keep at least 700 metres away from the dam wall. There is no speed restriction in place for boating. Water skiing is prohibited due to the banks of the lake being extremely steep and susceptible to slumping. The significant waves this may cause are deemed a risk to health and safety. GMW conducts regular checks for slumping and occasionally uses a helicopter to survey the entire storage. A boat launching ramp is available in the Six Mile Creek area, 10km from the township. Boats can also be launched at Eustace Creek campsite.

GMW is the designated waterway manager under the Marine Safety Act 2010. This role includes the policing and compliance activities associated with use of the waterway and the power to make recommendations to the Director of Transport Safety Victoria to provide for the efficient and safe operation of vessels.

Boating infrastructure at the lake, including the boat ramp, toilets and car park, are maintained by GMW. No issues in relation to current boating activity at Lake Dartmouth were raised during the consultation, however some community and agency representatives discussed the possibility of exploring the feasibility of houseboats at the lake. Anyone interested in houseboats at the lake would need to conduct their own feasibility study, including investigation of:

- operating areas, mooring and refuelling
- wastewater, sewerage and rubbish
- environmental impacts
- access and roads
- market demand and costs
- changing water levels

There is no reliable mobile phone coverage at the lake.

Issues

- Maintaining infrastructure and facilities
- Lack of mobile phone coverage

Objectives

- To maintain infrastructure and facilities to a high standard

Actions

8. GMW to continue to maintain infrastructure and facilities at the lake to a high standard, including the boat ramp, car park, toilet facilities, rubbish collection and signage
9. Investigate opportunities for mobile phone coverage at the lake

2.3.2 Fishing

Lake Dartmouth is a popular fishing location in Victoria. The lake contains Brown trout, Rainbow trout, European carp, Blackfish, Macquarie perch, Trout cod, Eastern gambusia, and Goldfish. Some anglers visit the lake at specific times for fishing competitions, which are held three or four times a year.

Brown trout are the most common species caught by anglers (80%), followed by rainbow trout (19%). Most trout are caught by trawling. During the warmer months (after late December), trout move into deeper, cooler water (4-10m) and are caught using baits and lures.

The populations of Brown trout and Rainbow trout are self-sustaining, however in recent years there has been a shift in the size and composition of the trout fishery. Whereas in the 1980s the fishery produced a mix of medium-sized trout and a few large trophy-sized fish, the current trout fishery produces large numbers of medium-sized fish. This shift is thought to reflect changes in fish growth, which in turn is a result of a decrease in the productivity of Lake Dartmouth as it ages. A new minimum of 25cm has been introduced at Lake Dartmouth for all species of trout to sustain and promote the lake as a high-quality trout fishing destination. The Mitta Mitta River is also popular for trout fishing, particularly Brown trout and the occasional Rainbow trout. In the past three years it has also been stocked with 100,000 Murray cod. Trout fishing on rivers and streams closes on the Queen's Birthday weekend in June and re-opens in September. Trout fishing on the lake is open all year round.

Macquarie perch are endemic to areas north of the Great Diving Range in the Murray River Basin. Lake Dartmouth and its tributaries is one of only three fisheries in Victoria where anglers are permitted to take Macquarie perch. Macquarie perch is limited in geographic distribution and has been greatly impacted by habitat alteration and degradation. These threats are recognised by the listing of the species as threatened under the *FFG Act* and endangered under the *EPBC Act*. Currently, there is limited data on the levels of recreational take of this species or its total population abundance. Anecdotal reports suggest that the sustainability of the Macquarie perch fishery in the north east region should be investigated. The bag limit is one fish with a minimum legal length of 35 cm. The closed season is from 1 October to 31 December.

A designated area at the Lake Banimboola Regulating Pondage is a popular location for trout fishing (see Appendix D). There is an agreement in place between VFA, AGL and GMW that outlines access to the pondage and public liability management, and clearly defines the responsibilities of each of the partner organisations. The access point is 700m long and clearly marked by bollards that extend out into the water. This area is considered the safest part of the lake for fishing access due to its flat, open terrain at varying lake levels and is the only area where fishing is allowed (see Section 1.2.3).

Access to the fishing area is via a marked walking track, roughly 700m in length. The track begins at the car parking area and ends at the bollards at the fishing area. At high water levels, the track may be flooded. Toilets and car parking facilities are located at the main access point, which is off Dartmouth Rd at the pondage wall and power station. The VFA is currently responsible for maintaining infrastructure at the access point.

The Freshwater Fisheries Management Plan 2018 provides the overarching, strategic direction for managing freshwater recreational fisheries in Victoria.

Issues

- Sustainability of the Macquarie perch fishery
- Maintaining infrastructure and facilities at the regulating pondage
- Supporting the Freshwater Fisheries Management Plan 2018

Objectives

- To support research and investigation into the sustainability of the Macquarie Perch fishery
- To continue to maintain infrastructure and facilities at the regulating pondage
- To support the strategic directions within the Freshwater Fisheries Management Plan 2018

Actions

10. Support research relating to the Macquarie perch fishery to better understand recreational take and population abundance
11. VFA to continue to maintain infrastructure and facilities at the regulating pondage
12. Support implementation of the Freshwater Fisheries Management Plan 2018

2.3.3 Hunting

Deer hunting at Lake Dartmouth is permitted on a seasonal basis within the Alpine National Park immediately surrounding the lake (February 15 – December 15). No dogs are allowed. There is an area of public land on the north-western arm of the lake surrounding the dam wall, which is not part of the Alpine National Park, where deer hunting is not permitted. Currently, the high number of Sambar deer is a particular concern within the catchment.

Duck hunting is not permitted at Lake Dartmouth.

During the consultation, issues arose in relation to current and potential conflict between deer hunters and campers at the lake. Conflicts include concerns around deer carcasses placed in and around campsites and hunters

shooting deer from boats in and around camping areas near the foreshore. Community members and agencies suggested signage outlining user responsibilities, rules and regulations, and hunting etiquette would be beneficial.

Issues

- Potential for conflict between different user groups of the lake

Objectives

- To minimise potential conflict between different user groups and improve health and safety

Actions

13. Ensure that signage for the lake includes information about user responsibilities, rules and regulations, safety and etiquette (see Action 5)

2.3.4 Camping and Touring

The main attractions of Dartmouth Dam, the Mitta Mitta River, Mount Wills and Mount Benambra are accessible in a conventional 2WD car. There are many early gold and tin mining sites to explore in the Mount Wills, Mount Murphy and Cassilis Historic Areas, however 4WD vehicles may be required at times to negotiate rough and difficult terrain.

Camping (with limited facilities) is permitted in three designated areas around the lake. The track from Sassafras Gap to the Eustace Creek camping area on the southern shoreline can be accessed by car, although a 4WD is recommended in wet conditions. The two other camping grounds (Eight Mile Creek on the southern shoreline and Dart River on the eastern shoreline) can only be reached by boat.

Each of the camping sites contain picnic and toilet facilities in good condition and well-maintained by GMW. GMW provides a weekly rubbish removal service from each of the sites and has a maintenance regime in place to manage fallen and/or dangerous trees around each site.

During the consultations, concerns were raised about unattended campfires and bushfire risk. Concerns were also raised about dogs being permitted at the Eustace Creek camping area, which is an entry point to the national park, and their potential impacts on native wildlife.

Issues

- Maintaining infrastructure and facilities
- Ensuring that campfires are not left unattended
- Impacts of dogs on native wildlife.

Objectives

- To maintain infrastructure and facilities to a high standard
- To minimise risk of bushfire
- To minimise impacts of dogs on native wildlife

Actions

14. GMW to continue to maintain infrastructure and facilities at the lake to a high standard, including the boat ramp, car park, toilet facilities, rubbish collection and signage (see Action 8)
15. Ensure signage for the lake includes information about unattended campfires and bushfire risk

16. Investigate the possibility of restricting dogs at the Eustace Creek camping area to align with National Parks policy and legislation in Victoria

2.4 Water Quality

Good water quality is critical in supporting a range of values that are derived either directly or indirectly from Lake Dartmouth, including water for irrigation, stock and recreation. GMW provides North East Water with raw water from the Mitta Mitta River downstream of Lake Dartmouth for treatment and distribution to the Dartmouth township. Water authorities have a responsibility under the *Safe Drinking Water Act 2003* to identify, and where possible, mitigate risks to water quality. This Act is aimed at protecting water quality intended for human consumption. GMW manages its responsibilities under this legislation independent of their Land and On Water Management Plans.

Key factors that have the potential to impact on water quality at Lake Dartmouth include human waste entering the water system (the key source being the public toilet facilities located at the boat ramp in close proximity to the Full Supply Level), and bushfires and flooding (including trees washing into the catchment after fire events and post-fire storm events washing nutrients, ash and sediment into the storage). Lake Dartmouth is largely protected from erosion due to the presence of heavily forested public lands surrounding the storage, however erosion can be exacerbated after fire events.

Recreational users of the lake have the potential to impact on water quality, and are in turn impacted by the effects of poor water quality.

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.

2.4.1 Water Quality Monitoring

Accurate water quality monitoring is important to improve our understanding of the trends in biophysical and chemical parameters in inland rivers, water storages and streams. Understanding these trends allows land and water resource managers to develop strategies, actions and frameworks to address water quality decline and any threatening processes impacting on the water resource.

Since the filling of Dartmouth Dam in late 1977, the water quality of the stored water and upstream and downstream sites has been monitored for basic physico-chemical and biological parameters either as part of routine monitoring programs or through specific studies. Results from routine monitoring are summarised and analysed yearly. In situ continuous temperature monitoring has also been undertaken for the purposes of determining the extent to which the dam causes thermal pollution in the Mitta Mitta River downstream of the dam.

Water quality in Lake Dartmouth is excellent. This is likely to be attributable to the presence of large forested areas surrounding the perimeter of the lake and low levels of boating and passive recreational activities at the lake. No Blue-green algae recreational warning has ever been issued at Dartmouth Dam.

Issues

- Impacts of natural events and human activities on water quality and aquatic ecosystem health

Objectives

- To maintain current water quality at Lake Dartmouth

Actions

17. Continue to effectively manage recreation use on and around the storage to reduce impacts and risks to water quality
18. Provide support to partner agencies in the protection and enhancement of water quality within the catchment, including risk mitigation measures relating to fuel reduction burns

2.5 Healthy Ecosystems

The bulk of the land surrounding Lake Dartmouth is within the Alpine National Park. Native vegetation around the lake provides important habitat for native species and protects water quality by filtering nutrients, reducing the inflow of sediment to the lake, and stabilising the foreshore and stream banks of connecting tributaries. The body of water provides habitat for a range of aquatic species, including fish, macroinvertebrates, and a range of plants. It is also an important food source for many birds and other native fauna.

This plan should be read in conjunction with other relevant regional strategies, including but not limited to the North East Regional Catchment Strategy (2012), North East Waterway Strategy (2014) and the North East Native Vegetation Plan (2005).

2.5.1 Flora and Fauna

At Lake Dartmouth, wet sclerophyll forest dominates with candle bark gum and snow gum the major over storey species. Below the dam, dry sclerophyll forest dominates, with major over storey species of narrow leaf peppermint, candle bark gum and broad leaf peppermint (IDA&A Pty Ltd 2001).

On exposed banks along the north-west area of the dam, vegetation cover consists of weeds, hop gardenia and some eucalypt regeneration. Alpine ash is present and clear-felling has occurred on the eastern slopes in the middle section of the dam. Reeds are present in some of the gullies. The southern section of the dam is well vegetated. There is an abundance of fallen wood and dead trees providing habitat adjacent to and within the dam. Macrophytes such as rush, knotweed and dock provide important instream habitat (IDA&A Pty Ltd 2001).

The threatened migratory fish species, the Macquarie perch, is found in and upstream of Lake Dartmouth, in Wombat Creek, Livingstone Creek and the Gibbo River. It is only found in discrete populations, with the largest population occurring in Lake Dartmouth. Currently, there is limited data on the levels of recreational take of this species and its total population abundance (see Section 3.3.2). The high-priority threatened Trout cod has been recorded in the Mitta Mitta River immediately upstream of the reservoir (NECMA 2014).

The system contains numerous other records of significant species, including the vulnerable White-bellied sea eagle which has been recorded around and upstream of the reservoir, and the endangered Spotted tree frog in the Big River and the Bundara River. Middle Creek contains the only record of the endangered Alpine water skink (NECMA 2014). Powerful owls have been sighted around the dam wall and Spotted-tail quolls have been seen in and around the lake. Peregrine falcons nest annually in the upper spillway cut at the dam site.

Issues

- Sustainability of rare, vulnerable and threatened species, including the Macquarie perch fishery

Objective

- To continue to manage the health of aquatic fauna in Lake Dartmouth by addressing threats to water quality, and to preserve and maintain healthy habitat for aquatic and terrestrial flora and fauna
- To support research and investigation into the sustainability of the Macquarie perch fishery

Actions

19. Identify and implement strategies to monitor, protect and enhance habitat for native terrestrial and aquatic flora and fauna
20. Support research relating to the Macquarie perch fishery to better understand recreational take and population abundance (see Action 10)

2.5.2 Pest Plants and Animals

Control of invasive plants and animals is a high priority for communities across the north east region due to the environmental, economic and social impacts on both private and public land. Pest animals that are a high priority in the Mitta Mitta catchment include rabbits, foxes, feral goats, wild dogs and deer.

Currently, Sambar deer are of particular concern within the catchment. Deer trample a wide range of vegetation, snap off shrubs and young saplings, ring-bark trees by 'antler rubbing', and make large wallows in wet areas. Towong Shire is currently advocating to the State Government for deer to be declared a pest species and for the development of a policy appropriate to support their eradication (Towong Shire 2018). There are also a number of state-wide and regional investigations and initiatives focusing on the management of deer in Victoria, including the *Inquiry into the Control of Invasive Animals on Crown Land 2017*, *Victorian Deer Management Strategy 2018*, and the *Sustainable Hunting Action Plan 2016*.

To control wild dogs, DELWP is currently implementing a strategic 1080 baiting program on 139kms of wild dog corridors and tracks on public land across the Mitta Mitta and Sandy Creek Wild Dog Management Zone. DELWP is also implementing proactive trapping across the wild dog management zone within the capacity of wild dog controllers (Agriculture Victoria 2018).

Pest plants that are a high priority in the Upper Mitta system include Blackberry, English broom and Willow. Pest plants can severely decrease the productive capacity of land, alter water flow, lead to erosion problems, and provide harbour for pest animals. They can also out-compete and displace native plant species and lead to a loss of biodiversity.

The Victorian Blackberry Taskforce was established in 2001 to work with Victorian communities and government agencies to provide a collaborative effort to control blackberry. Together, the Taskforce's community partnership program covers over 280,000 hectares of public and private land infested by blackberry. The Victorian Blackberry Taskforce works with a number of local Landcare and Blackberry action groups and government agencies, including the Mitta to Murray Blackberry Action Group, to provide a collaborative effort to control blackberry.

Integrated control measures are in place for English broom, managed by GMW, Parks Victoria & Bio Control Victoria, incorporating spray programs and bio control methods on the upper reaches of the Mitta Arm of Lake Dartmouth.

Issues

- Increasing number of deer in the catchment affecting native vegetation
- Impacts of Blackberry, English broom and Willow, including altering water flow, and out-competing and displacing native plant species leading to loss of biodiversity

Objectives

- To effectively manage invasive plants and animals around Lake Dartmouth

Actions

21. Support an inter-agency approach to the management of deer within the Mitta Mitta catchment
22. Support state-wide and regional initiatives focusing on management zones and cost-effective management strategies to control numbers of deer within the Mitta Mitta catchment

23. Support an integrated cross-tenure approach to the use of bio controls to manage Blackberry and English broom

References

Agriculture Victoria 2018 www.agriculture.vic.gov.au

GMW 2018a Draft Notes

GMW 2018b Dartmouth Dam Water Quality Report

NECMA 2014 North East Waterway Strategy

NHC 2007 Lake Hume Aboriginal Heritage Study Vol 1

Towong Shire 2018 www.towong.vic.gov.au

VFA 2018 www.vfa.vic.gov.au

Appendices

Appendix A - Agency Roles and Responsibilities

Action Number	Action	Lead Agency
1.	GMW to develop an Implementation Reference Group with Terms of Reference to meet on an as-needs basis, collaborate and form partnerships to implement high priority actions and develop funding applications	GMW supported by Parks Victoria and Towong Shire
2.	Conduct a review of the plan and its implementation in five years or as required	GMW supported by Parks Victoria and Towong Shire
3.	Support initiatives to increase awareness and enhance protection of Aboriginal cultural heritage	GMW, Parks Victoria, Towong Shire
4.	Improve understanding and awareness of the impacts of activities on the lake and key threats to the lake and broader catchment	GMW
5.	Ensure that signage for the lake includes information about user responsibilities, rules and regulations, safety and etiquette	GMW
6.	Improve understanding and awareness of the role of the lake in the River Murray system and how the lake operates, including forecasting of water levels in the lake	GMW
7.	Promote the Lake Dartmouth Interpretive Centre as a useful resource to disseminate knowledge about the lake	GMW
8.	GMW to continue to maintain infrastructure and facilities at the lake to a high standard, including the boat ramp, car park, toilet facilities, rubbish collection and signage	GMW
9.	Investigate opportunities for mobile phone coverage at the lake	GMW supported by Towong Shire
10.	Support research relating to the Macquarie perch fishery to better understand recreational take and population abundance	VFA
11.	VFA to continue to maintain infrastructure and facilities at the regulating pondage	VFA
12.	Support implementation of the Freshwater Fisheries Management Plan 2018	VFA
13.	Ensure that signage for the lake includes information about user responsibilities, rules and regulations, safety and etiquette (see Action 5)	GMW
14.	GMW to continue to maintain infrastructure and facilities at the lake to a high standard, including the boat ramp, car park, toilet facilities, rubbish collection and signage (see Action 8)	GMW
15.	Ensure signage for the lake includes information about unattended campfires and bushfire risk	GMW
16.	Investigate the possibility of restricting dogs at the Eustace Creek camping area to align with National Parks policy and legislation in Victoria	GMW supported by Parks Victoria
17.	Continue to effectively manage recreation use on and around storage to reduce impacts on and risks to water quality	GMW
18.	Provide support to partner agencies in the protection and enhancement of water quality within the catchment, including risk mitigation measures relating to fuel reduction burns	GMW supported by Parks Victoria and DELWP
19.	Identify and implement strategies to monitor, protect and enhance habitat for native terrestrial and aquatic flora and fauna	GMW supported by Parks Victoria and DELWP

Action Number	Action	Lead Agency
20.	Support research relating to the Macquarie perch fishery to better understand recreational take and population abundance (see Action 10)	VFA
21.	Support an inter-agency approach to the management of deer within the Mitta Mitta catchment	GMW supported by Parks Victoria and Towong Shire
22.	Support state-wide and regional initiatives focusing on management zones and cost-effective management strategies to control numbers of deer within the Mitta Mitta catchment	GMW supported by Parks Victoria and Towong Shire
23.	Support an integrated cross tenure approach to the use of bio controls to manage Blackberry and English broom	GMW supported by Parks Vic, DELWP and Mitta to Murray Blackberry Action Group

Appendix B - Summary of Community Consultation

Preparation of Draft Plan

Approximately 40 people were involved in the consultations to develop the Lake Dartmouth Land and On-Water Management Plan - draft for public consultation.

A Project Reference Group (PRG) consisting of agency representatives from GMW, Towong Shire Council and Parks Victoria provided guidance to development of the plan.

Consultations to develop the draft for public consultation included:

Interviews with staff from:

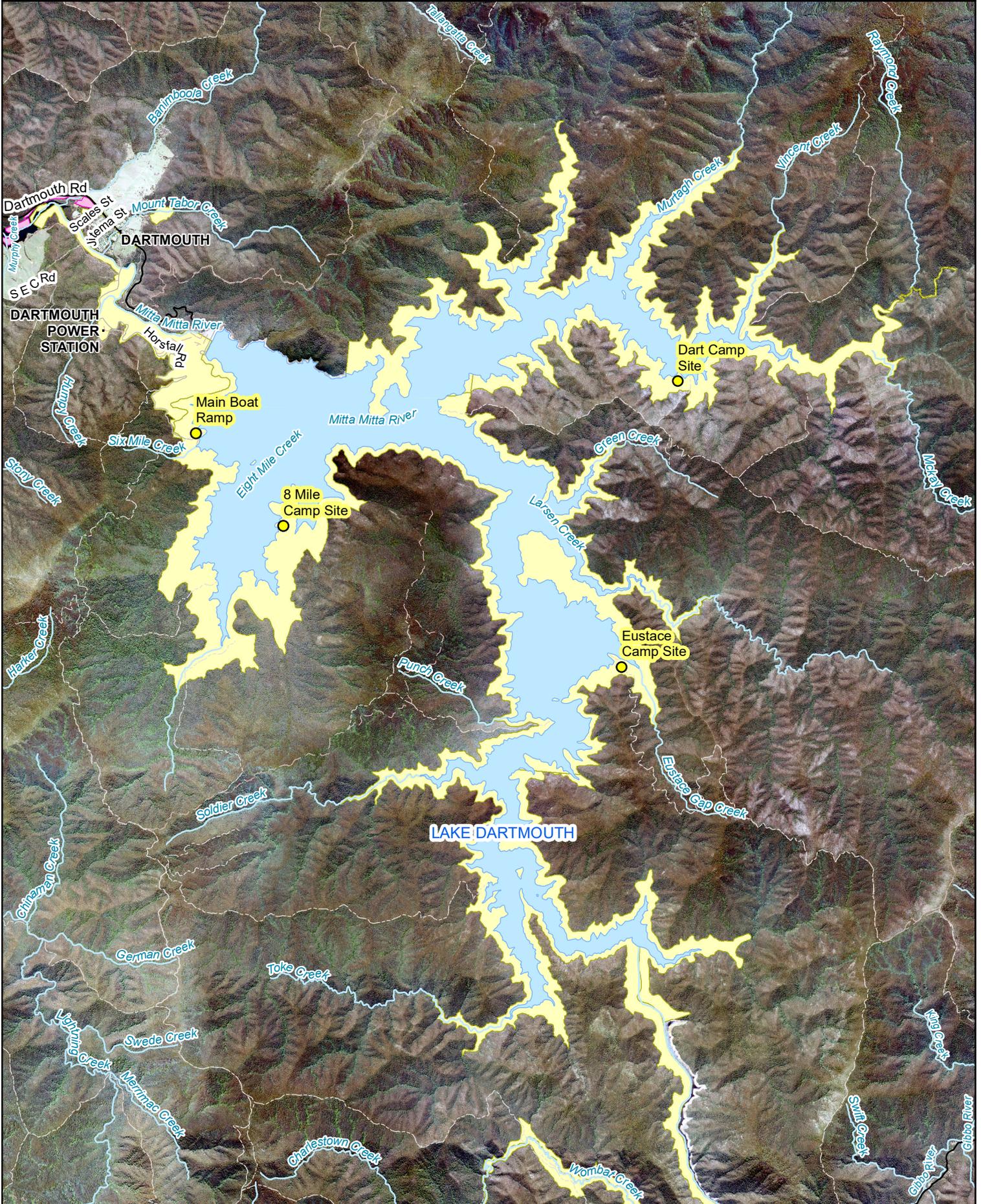
- GMW
- Towong Shire Council
- Parks Victoria
- Department of Land, Environment, Water and Planning
- North East CMA
- Victorian Fisheries Authority
- Game Management Authority
- Dhudhuroa Waveroo National Aboriginal Corporation
- VRFish

Community conversations:

- Have-a-Say conversations at the boat ramp and dam wall 14 January 2019 - 7 people
- Dartmouth Progress Association, Dartmouth Alpine Anglers Club community meeting 16 February 2019 – 17 people

Lake Dartmouth

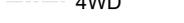
GOULBURN-MURRAY WATER




19515
 10 May 2019
 GOULBURN-MURRAY WATER
 40 CASEY STREET (PO BOX 165)
 TATURA VIC 3616
 Ph (03) 5833 5500 Fax (03) 5824 5827
 gsupport@g-mwater.com.au



Legend

 Major Road	 Lake
 Minor Road	 River
 2WD	 Crown Land Vested in GMW
 4WD	 GMW Freehold

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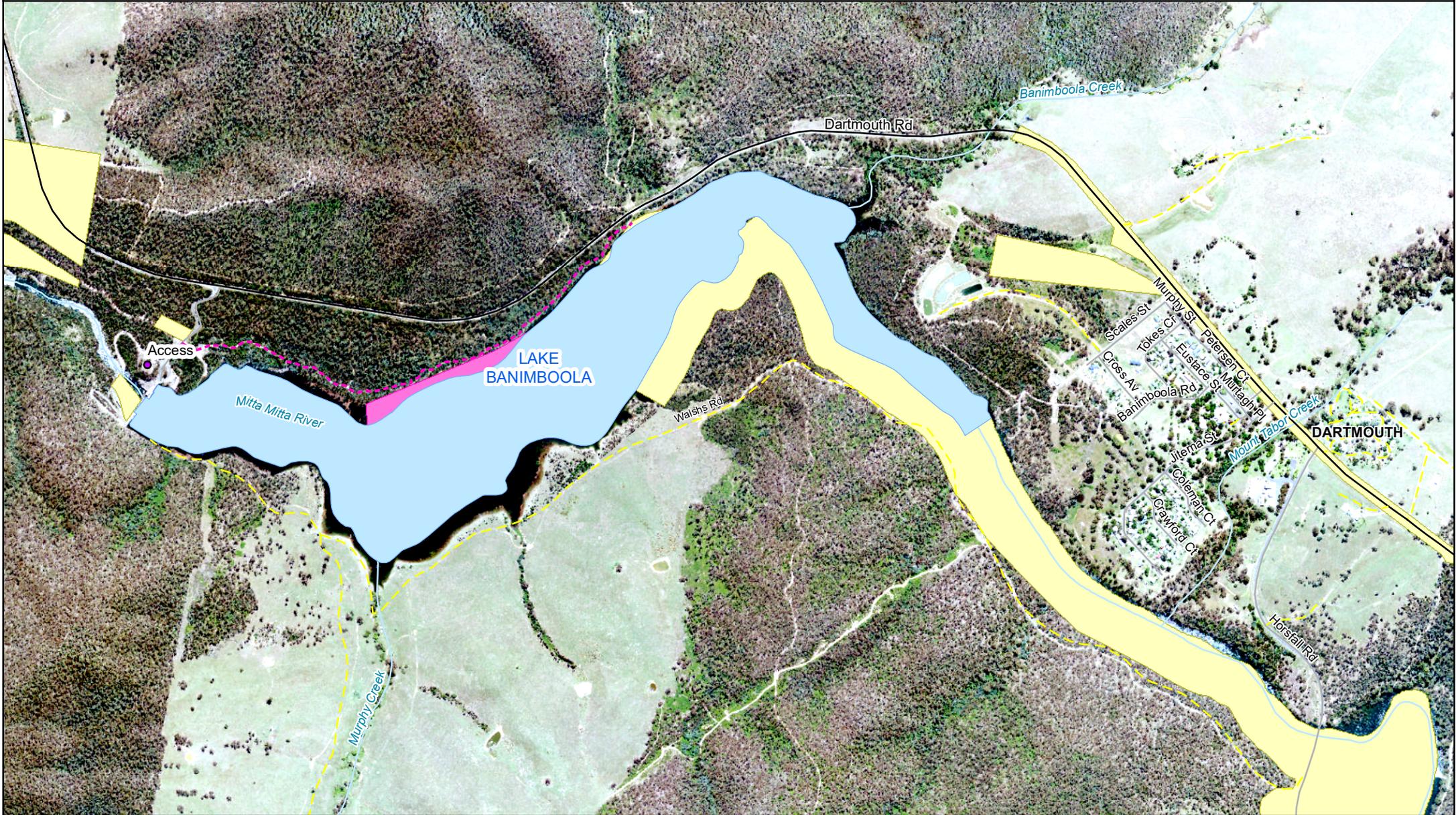


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Lake Banimboola Regulating Pondage

GOULBURN-MURRAY WATER



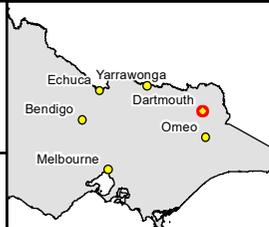


GOULBURN-MURRAY WATER



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 09 May 2019



Legend

 Access track	 Minor Road	 Lake	 Crown Land Vested in GMW
 Major Road	 2WD	 River	 GMW Freehold

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