

Enhancing the grid:

Victoria's Water Grid Partnership in 2018



Acknowledgments

The Victorian Government proudly acknowledges Victoria's Aboriginal community and their rich culture and pays respect to their Elders past and present. We acknowledge Aboriginal people as Australia's first peoples and as the Traditional Owners and custodians of the land and water on which we rely. We recognise and value the ongoing contribution of Aboriginal people and communities to Victorian life and how this enriches us. We embrace the spirit of reconciliation, working towards the equality of outcomes and ensuring an equal voice.

Cover image: Craig Moodie, DELWP

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Image: Ric Walis, Melbourne Water

Minister's foreword



Our water grid is one of the state's most important assets. Thanks to the expertise of our water planners and managers, it provides a reliable, affordable supply of high-quality water when and where communities, industries, agriculture and the environment need it.

However, continuing to do so is not without its challenges. The Millennium Drought showed us how rapidly supply shortfalls can arise, and the unpredictable impacts of climate change and climate variability will continue to threaten to disrupt the best-laid plans. As well, population growth and changing community expectations raise complex supply and demand issues, and focus planners and managers increasingly on the extra recreational, cultural, Traditional Owner and environmental benefits the community expects the water grid to deliver.

In recent years, the Victorian Government has invested heavily to extend the water grid. Projects such as the South West Loddon Pipeline, the East Grampians Pipeline and the Lance Creek Water Connection are all major projects designed to provide greater water security for their respective areas and will deliver significant economic benefits.

As well as extending the grid, the Victorian Government has worked tirelessly to modernise it. Our regions have been challenged by climate extremes over the past two decades, having experienced an extended period of dry conditions and floods. Through projects such as the Connections project in the Goulburn Murray Irrigation District and the modernisation of the Sunraysia Irrigation District, a great deal of stress will be alleviated on local farming operations.

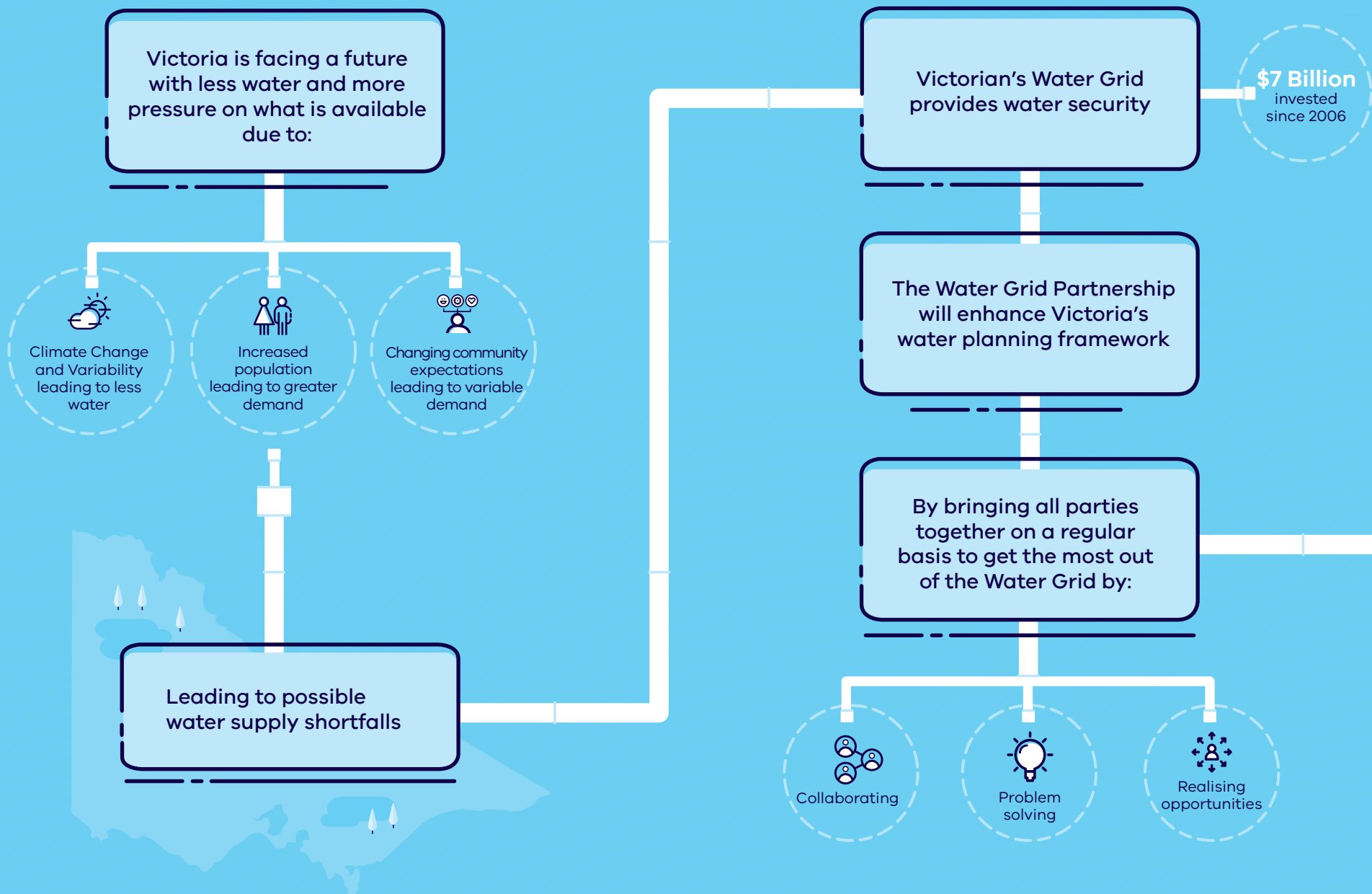
While an enhanced water grid will allow us to deliver more water to where it is valued due to system efficiencies and access to desalination water, it is only one part of the way we are providing a world-class water service for Victorians. Through our integrated water management forums, we are making the most of our alternative, fit-for-purpose, water sources. Finally, Target 155 encourages Victorians to use their water wisely and has led to wide-spread savings of this most precious resource.

Victorians can be proud of their contribution, too: their more intelligent use of water, their greater focus on water conservation and their recognition of the environment's right to water.

Thank you for your interest in Victoria's water grid, and for taking the time to read this statement.

A handwritten signature in blue ink, reading 'Lisa Neville', written over a stylized blue line.

The Hon. Lisa Neville MP
Minister for Water





VISION

Maximise community benefit from a connected grid that contributes to water affordability and underpins water security

Growing the grid where it provides value

Getting the most out of the grid

Gaining an improved understanding of the grid





Introduction

In 2016, through Victoria's water plan, *Water for Victoria*, the government committed to partner with water corporations and key stakeholders to improve Victoria's current and future water grid and how it operates. A strategic grid oversight and facilitation function will bring together the key players to coordinate knowledge and expertise from across the whole industry, to maximise the efficiency and effectiveness of the entire state grid.

This is the first statement, published to coincide with the partnership's establishment. It outlines the challenges to water security and explains the rationale for the partnership and how it will operate. The Water Grid Partnership, will publish every two years, a biennial statement about future water availability and proposals to augment the grid to ensure water security for Victorians.

The water-security forward view

Climate change

Over the last few decades, Victoria's climate has shown a warming and drying trend, which is expected to continue. Compared with historical conditions, Victoria is already experiencing:

- higher temperatures, particularly during the warmer months of the year
- less rainfall in April – October and more rainfall during the warmer months in some locations, as Figure 1 shows
- reduced streamflows.

Less rainfall in autumn and early winter is associated with a southerly shift in rain-bearing weather systems. Climate change is a contributor to this southerly shift, which means the trend is likely to continue.

Streamflows are reducing because there is less rainfall during the filling season (autumn and early winter). Some catchments are now also experiencing reduced streamflows for

a given amount of rain. This occurred during the Millennium Drought, and although some catchments have recovered, others have not.

Figure 1 shows rainfall across Victoria from April to October 1986 to 2015, compared with long-term (1900–2015) averages. It shows that in 1986–95 much of Victoria had average or above-average rainfall, but by 2006–15 almost all the state was either very much below average or experiencing the lowest rainfall on record.

Modelling indicates in the future Victoria could experience:

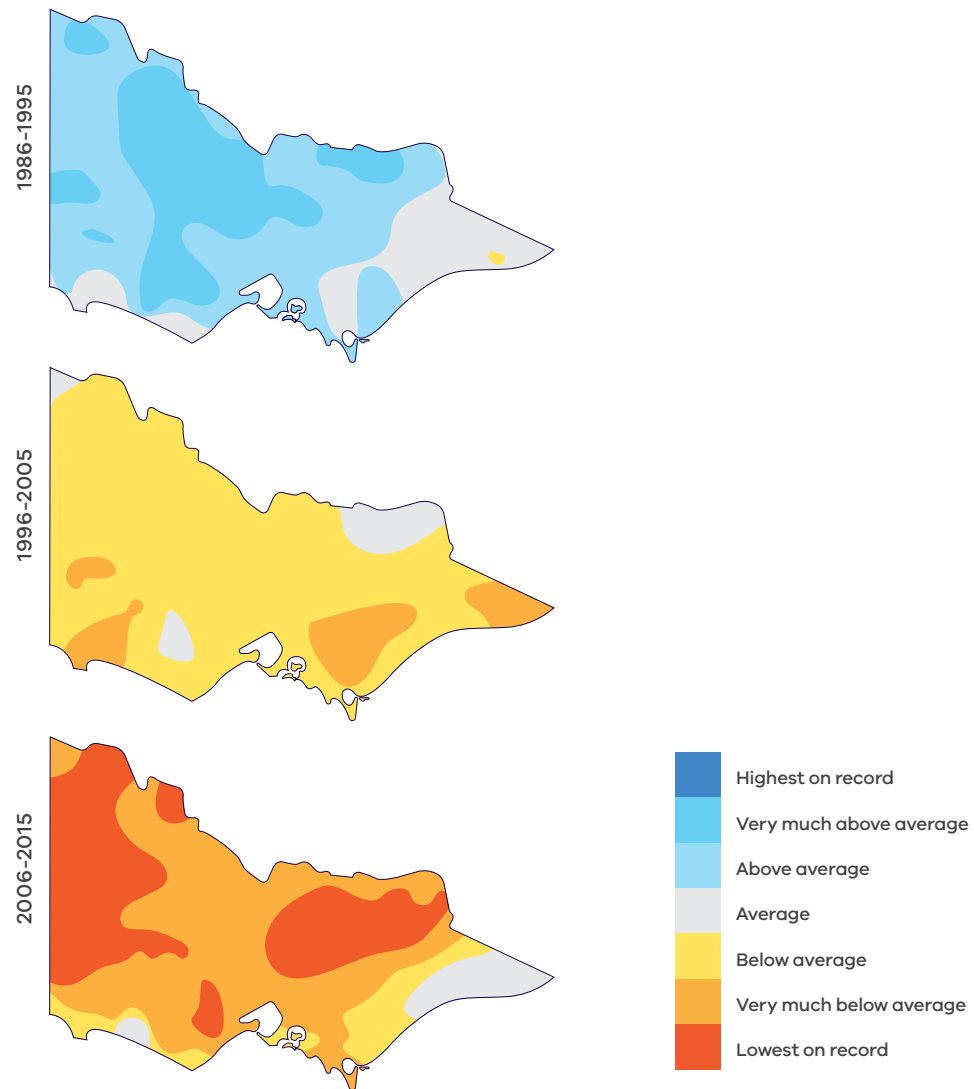
- higher temperatures and rising sea levels
- increases in the intensity of infrequent, extreme rainfall events
- less rainfall in autumn and winter as the new normal
- less spring rainfall but possibly more summer rainfall
- overall reductions in streamflows.

Even if there is more summer rainfall, that is unlikely to offset the reductions in streamflows resulting from less rainfall in other seasons.

While future declines in rainfall and streamflow are expected, there is a wide range of uncertainty about when the reductions will occur, and the magnitude of the reductions. A well connected water grid reduces the vulnerability of the Victorian community, including our agricultural industry, to water shortages by giving users greater connectivity to a larger range of water sources.

All levels of water planning now consider potential climate change impacts as a result of the *Climate Change Act 2017*, Victoria's *Climate Change Adaptation Plan 2017–2020* and other Victorian Government policy initiatives.

Figure 1: April–October rainfall, 1986–2015



Source: Hope, P, Timbal, B, Hendon, H, Ekström, M, Potter, N. 2017. A synthesis of findings from the Victorian Climate Initiative (VicCI). Bureau of Meteorology, Australia.

Victoria's increasing population

Victoria's population has grown rapidly in recent years, with sustained, rapid growth since 2011. In 2016, *Victoria in Future* projected it would increase from about 6.1 million to just over 10 million by 2051. Much of this increase will be in greater Melbourne. Figure 2 shows the current and projected population of greater Melbourne and the rest of Victoria.

Population growth has traditionally increased demand for water and hence water infrastructure. Higher-density living (which reduces the total area of private gardens) and the use of water-efficient appliances help lessen these increases, but greater demand for water is still forecast.

Population growth is not occurring uniformly throughout the state. While some areas (such as

Melbourne's outer-west and outer-north) are growing rapidly, other areas of the state have softer-to-flatlined growth. Such variability in population growth means increases in water demands are similarly variable across Melbourne and the state. The grid will help manage Victoria's growth by ensuring our water is available when and where it is needed to meet the state's future demands.

Figure 2: Current and projected (2051) population, Melbourne and rest of Victoria



Changing community expectations

Though climate change and population growth are the primary factors placing pressure on our water supplies, community expectations are also materially affecting the way the water sector undertakes its long-term planning.

Increasingly, communities expect to engage with water planners and managers with the aim of delivering 'shared benefits'. These are the additional benefits water planners and managers can provide beyond the expectation of them to provide water to the environment and to agricultural, residential and industrial users.

Water for Victoria commits to improving engagement with the broader community and identifies shared benefits as:

- the health and long-term sustainability of the environment
- active and passive recreational opportunities (such as water for canoeing and sites for picnicking, camping and contemplating the beauty and aesthetics of waterways and nature in general)
- heritage, cultural and economic opportunities for Traditional Owner groups and Aboriginal Victorians
- the quality of life – the liveability – of all Victorians.

The Millennium Drought was an important driver of increasing community expectations for shared benefits. The drought highlighted the extent to

which society relies on the water grid not just for water but also for recreational, cultural and environmental benefits. When Victoria dried up, many of these benefits stopped.

Additional focus on the water grid does not prevent, or limit, the extent to which alternative water sources, including stormwater, rainwater and recycled water are used. In fact, the grid and decentralised water solutions work together to ensure the city remains liveable and sustainable.





Water availability and demand

Forward views of water availability, demand, risks and level of water security are provided in water corporations' urban water strategies published in 2017. This data is the result of modelling:


- using the highest of three climate change scenarios from Guidelines for assessing the Impact of Climate Change on Water Supplies in Victoria 2016
- considering different levels of water usage per person
- the number of urban consumers of water.

These strategies include detailed modelling undertaken for planning purposes which in turn help water corporations to understand what may possibly occur to water supplies in urban settings under different climate change scenarios. The modelling helps to ensure that the urban water strategies are adaptive and responsive, accounting for the high level of uncertainty involved in forecasting future demand for, and supply of, water services.

The urban water strategies also reveal situations where external factors are likely to have acute impacts on the water security of various regions should the highest of three climate change scenarios (from Guidelines for assessing the Impact of Climate Change on Water Supplies in Victoria 2016) occur. For example:

- 📍 in Central Victoria, Coliban Water's *Urban Water Strategy 2017* says that under a worst-case climate scenario, flows into storages are projected to decline significantly which will result in reduced water availability. One impact of this will be increased reliance on pumping from Lake Eppalock and the Waranga Western Channel.
- 📍 in south-east Victoria, South Gippsland Water's *Urban Water Strategy 2017* says that high rates of growth will occur along the coastal strip near Inverloch; as a result of this and due to its proximity to Melbourne's urban fringe, water demand is expected to increase. The Strategy also forecasts the likelihood of economic growth for the region's primary industries including milk processing at Leongatha and Korumburra.
- 📍 in greater Melbourne's outer-west, Western Water's *Urban Water Strategy 2017* says that their service area is one of the fastest growing regions in Victoria, with the number of serviced properties increasing annually by an average of 3.2%.

Solutions have been devised for all scenarios. Specifically, the solutions for the 1-3 scenarios are explained further on page 16.



*Image: Tony Proudfoot,
Melbourne Water*



The water grid and imminent augmentations

Figure 4 shows schematically the major components of Victoria's water grid. Victoria's water grid connects sources of water via a network of natural and built infrastructure to meet the demand for water for consumptive, industrial, recreational, cultural and environmental use at locations such as irrigation districts.

More specifically, the water grid includes:

- the capture, production and storage infrastructure (such as dams, reservoirs, weirs, groundwater extraction locations and the Victorian Desalination Project)
- the delivery infrastructure (such as channels, pipes, pumps and the waterways used to deliver water)
- The arrangements by which water can be purchased and sold through the water markets and water entitlement framework.

Victoria's water grid is among the state's most important infrastructure, with a long history. Fully documented in *Heritage Victoria's Victorian Water Supply Heritage Study*, an early achievement was the Wimmera Mallee channel system, one of the world's largest water supply systems. With construction starting in the 1860s to address water shortages as European settlement expanded, the system by the 1930s consisted of 9,600 km of channels serving farms and towns spanning 2.9 million

hectares of the Wimmera Mallee.

The grid expanded rapidly during and after the Millennium Drought. Some \$7 billion was invested in infrastructure projects including:

- the Goldfields Superpipe (connecting Ballarat and Bendigo to the northern water system)
- the Melbourne–Geelong Pipeline
- the Wimmera Mallee Pipeline
- the Hamilton–Grampians Interconnector
- the Victorian Desalination Project
- the North–South Pipeline (otherwise known as the Sugarloaf Pipeline Project).

In recent years, major investments have been made to use water more efficiently (by reducing leaks and evaporation) and reduce run-off (which is wasteful and can harm the environment) by modernising Victoria's major irrigation districts.

The water and entitlement framework, established under the

Water Act 1989, provides the basis for sharing water by establishing water entitlements, processes to allocate water to them annually and water trading arrangements. A connection to the water grid does not automatically grant an entitlement to water, nor does it guarantee the transfer of water to that connection. The system is subject to physical constraints (such as the capacity of a pipeline), and to the operations and rules of Victoria's water markets and water entitlement framework.

Victoria's water industry is responsible for managing the system in a way that maximises community value and minimises the costs of providing water services to the community. Active participation in collaborative Integrated Water Management forums is driving the increased uptake of alternative water sources such as stormwater harvesting and recycling of wastewater and helps water corporations determine the best mix of centralised and decentralised water solutions for their community.

Werribee Irrigation District Modernisation Project

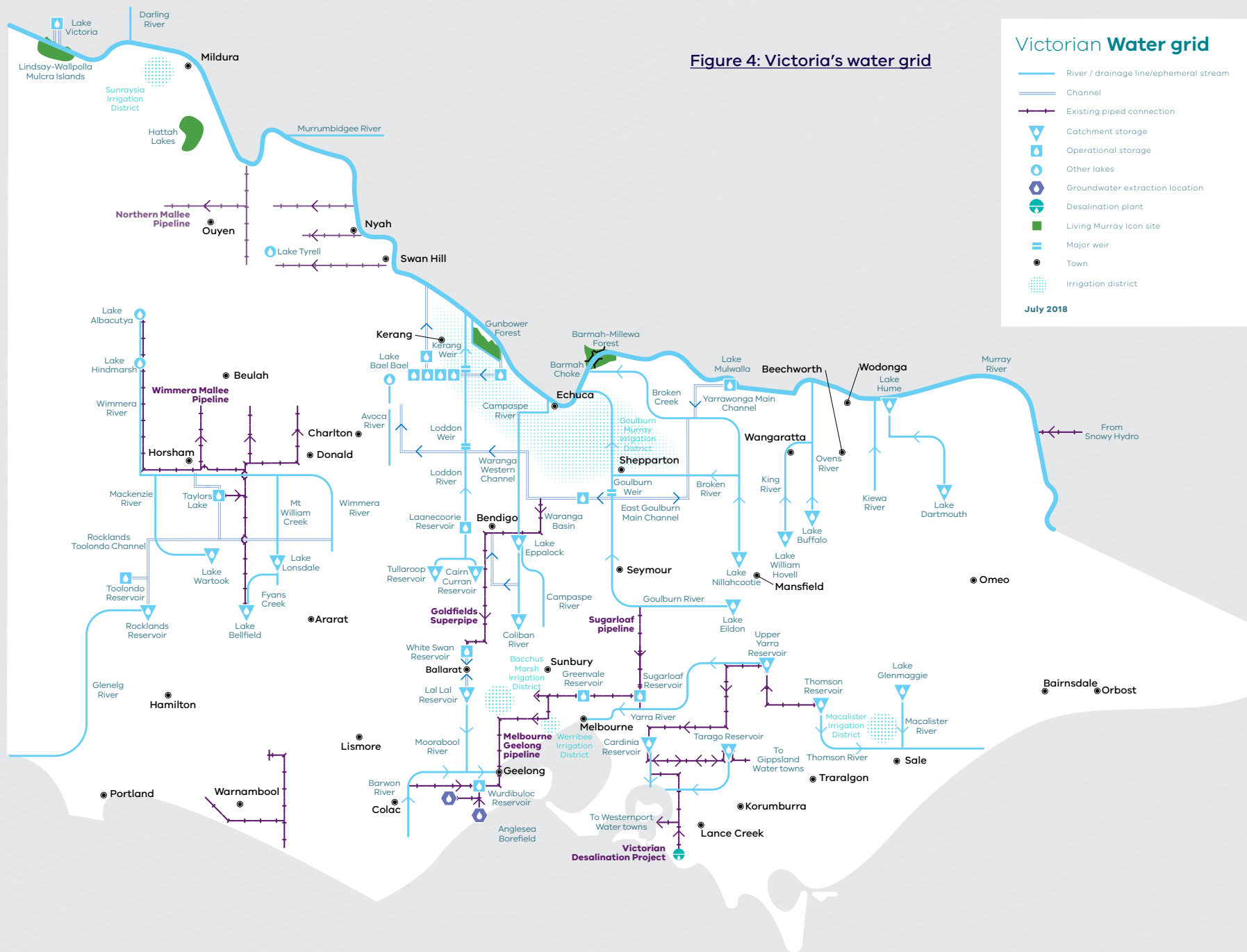
Southern Rural Water is in the process of piping and modernising the Werribee Irrigation District. The Victorian Government is supporting the project which will make water distribution throughout the district more efficient, reliable and resilient to a drier climate. In the absence of the project, the future of Werribee South as a major vegetable producing area would be in jeopardy as up to 50% of water is typically lost through seepage, leakage, measurement error and evaporation.

The Goldfields Superpipe

The Goldfields Superpipe was constructed in 2008. It enables water to be transferred from the Goulburn system to Bendigo and Ballarat. Overseen and managed by a joint venture between Coliban Water and Central Highlands Water, it was essential for ensuring Bendigo did not run dry in 2009. The superpipe continues to allow the long-term plans for water resources in that region to be accelerated.

The Victorian Desalination Project

Victoria's Desalination Project provides a high-quality source of water which does not depend on rainfall. It can produce up to 150 GL of water annually, or around one-third of Melbourne's current water consumption. The government decided to deliver the project in 2007 when Melbourne's storages were at 29% and continuing to fall. At the time, water supply shortfalls in the order of 250 GL a year on average were forecast.





Imminent water grid augmentations and solutions to pressure on water supplies

Under *Water for Victoria* Action 9.2, DELWP will explore options for additional connections to better use the grid, and the biennial statement will report on these and other augmentation options.

Figure 5 below shows:

- A sample of the actions water corporations are taking to address possible water supply challenges as mentioned on page 12
- Other major projects to augment the water grid currently being planned or built which will deliver significant community value for their respective regions.

The actions being taken to increase water security through the grid

1 Enhanced use of the Existing Grid

Coliban Water's Urban Water Strategy 2017 says 'that the region will continue to benefit from previous Drought Response Measures' introduced throughout the early 2000's. Included as part of this is the construction of the Goldfields Superpipe. The capacity to use the Goldfields Superpipe to access a greater volume of water and physically move this resource to Bendigo and Ballarat when needed is a key mechanism to minimise the risk of drought.

2 Lance Creek Water Connection

The Lance Creek Water Connection, which at the time of publication was almost completed, will help meet increasing demand for water in Korumburra, Poowong, Loch and Nyora. South Gippsland Water is managing the project, which will connect towns to the grid that currently rely on water from small, rainfall-dependent, local storages. The project will provide secure water supply to industrial and domestic users, and will support food processing in the area.

3 Western Melbourne Grid Connection

The Western Melbourne Grid Connection will upgrade the link between metropolitan Melbourne and Sunbury, Gisborne, Macedon, Melton, Bacchus Marsh, Lancefield, Woodend and other towns to Melbourne's west. The connection will help increase supply as demand in these towns increases for urban and industrial uses.

Other major projects to augment the water grid

★ South West Loddon Rural Water Supply Project

In 2016, construction started on the South West Loddon Rural Water Supply Project. When complete, the project will provide a secure water supply to more than 600 rural properties that would otherwise rely on rainfall and dams.

The project will increase stock and domestic water access for rural communities around Wedderburn. It will also connect the Wimmera Mallee Pipeline to the Waranga Western Channel.

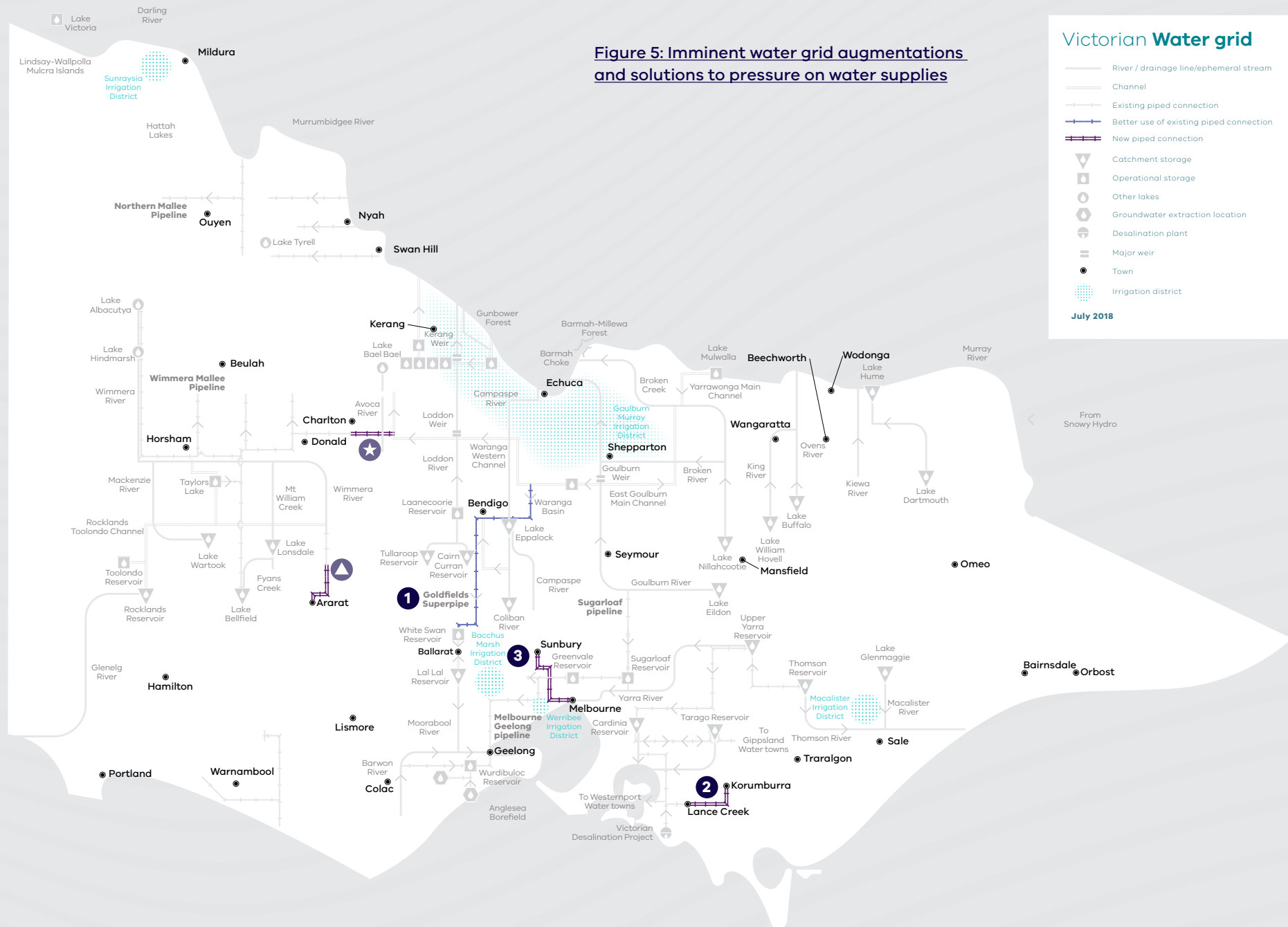
▲ East Grampians Water Supply Project

The Ararat Rural City Council, the Northern Grampians Shire Council, the Pyrenees Shire Council and DELWP have developed a business case to extend the Wimmera Mallee Pipeline to provide water to farms in a 530,000 ha area in the west of the state. Funding is now being sought for the project — the East Grampians Water Supply Project — which will build the 1,600 km pipeline to supply water for stock and domestic use. This will provide farmers around Ararat and in the two shires who rely on private dams and water cartage with a secure water supply.

● Irrigation modernisation projects

Goulburn Murray Water's Connections project is an example of the many irrigation modernisation projects occurring throughout Victoria. The project is the largest such project in Australia, it will minimise evaporation and leakage, as well as upgrade related infrastructure. The Victorian and Commonwealth governments are funding the project, which will ensure the sustainable future of productive agriculture in northern Victoria. The project will better enable irrigators to get water when and where it's needed and increase the amount of water for the environment. When complete, the project will recover an estimated 429 GL.

The Bacchus Marsh, Werribee and Macalister irrigation districts in southern Victoria are also the beneficiaries of modernisation projects which will ensure that they are more efficient, reliable and resilient to a drier climate.





The Water Grid Partnership

Introducing the partnership

Action 9.1 from Water for Victoria committed to develop a grid oversight and facilitation function to inform strategic regional and system-wide (across water corporations' boundaries) water resource planning and investment decisions and to release a statement to report on the grid every two years

To implement the action, DELWP has consulted with water corporations and other stakeholders, and together they determined that a partnership should be formed to implement the action. This publication, coincides with the commencement of the partnership. Accordingly, future statements will report on the operations of the partnership in the two preceding years: this statement describes the partnership and how it will operate.

Rationale

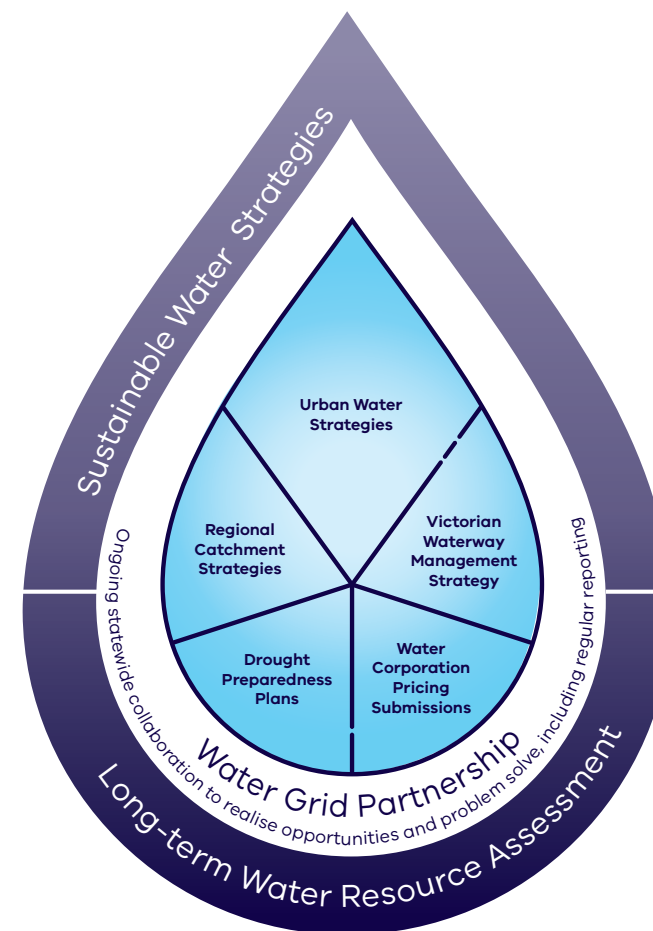
Many water managers —19 water corporations, 10 catchment management authorities and the Victorian Environmental Water Holder — are responsible for the constituent parts of the water grid. There has been no formal mechanism to piece together these parts to form a complete picture of the grid, including the opportunities it offers and the constraints on those opportunities.

The Water Grid Partnership will therefore be a statewide forum to realise opportunities, collaboratively 'bring the picture together' to solve problems. By identifying improvements and recommending changes to the grid and how it operates, it will help make planning and management of the water grid more efficient and effective. The partnership will also consider

statewide issues affecting the grid, and it will propose changes to the way the grid is planned and managed to address those issues. The partnership will not duplicate or diminish existing decision-making processes.

The partnership will address a gap in Victoria's water planning and investment framework. While there are a range of short and long-term plans for water uses and values at both state and regional levels, there are no ongoing opportunities for stakeholders at a state level to come together and consider future water requirements and solutions. The partnership will allow for continuous statewide coordination, and for reporting every two years.

Figure 6: The Water Grid Partnership fills a gap in the existing water planning framework



Vision

The partnership's vision is to maximise community benefit from a connected grid that contributes to water affordability and underpins water security.

The partnership will achieve this vision by supporting the industry to:

Get the most out of the grid

By having arrangements and rules that all parties involved in water security understand, which encourage whole-of-system optimisation of the grid at the lowest economic costs

Gain an improved understanding of the grid

By having an integrated suite of data and information about statewide trends, to provide assurance we are prepared for a future with less water

Grow the grid where it provides value

By having an agreed process for making sound decisions about augmenting the grid, including to develop the portfolio of potential augmentation options.

Membership and operation

Initially, the partnership will comprise:

- a steering committee featuring representatives of water corporations, catchment management authorities and the Victorian Environmental Water Holder. A DELWP senior executive will chair it.
- working groups consisting of representatives of other relevant organisations (such as Traditional Owners and recreational users), as well as subject matter experts from DELWP, relevant water corporations and catchment management authorities
- a team within DELWP responsible for the Water Grid Partnership's ongoing operation.

Steering committee

Steering committee members will advise DELWP and the broader industry regarding how the whole grid can operate to provide the greatest community benefit. They will be well equipped to do so: their organisations collectively have a deep understanding of the importance of water and the grid to our society, economy and environment.

The steering committee will meet up to four times a year. It will advise and make recommendations to DELWP and the broader industry about policies, rules and other arrangements for the most efficient and effective use of the grid, and it will ensure all parties involved in water security understand them.

Membership of the steering committee will be reviewed regularly — at least every two years — to ensure it has the membership most appropriate to addressing current issues and projects. The steering committee will mostly comprise representatives of organisations that operate key grid infrastructure and organisations that rely heavily on the grid for their water supply, but membership will be flexible enough to accommodate the types of organisations most affected by the projects of the working groups.

Terms of reference

To achieve these things, the partnership will develop terms of reference. These will include the details of the steering committee's operations (such as quorum and voting requirements, conflict of interest policy and procedures, conduct of meetings and reporting arrangements).

Working groups

The steering committee will, as required, establish and direct working groups. These groups will be:

- project-based
- disbanded when their project is completed
- comprised of representatives of cultural, recreational, environmental and agricultural water and other interests, as required.

Initially, the intention is that three working groups identify improvements and make recommendations in accordance with the following three projects:

- review arrangements for water corporations accessing the south-central system (which includes the desalination plant and the Melbourne pool) and to identify issues with current arrangements for sharing water-security benefits)
- review the current process for making cross-boundary augmentation decisions including trigger levels and which organisations are responsible for which decisions
- share information and build a common understanding of the grid including grid-related modelling, assumptions and cross-boundary investment planning considerations, and stress-testing the grid.

DELWP Water Grid Partnership team

DELWP staff will coordinate projects and policy advice. They will also:

- manage internal and external communications
- access specialists and experts to test ideas developed by working groups and gather further evidence if required
- seek and synthesis stakeholder feedback for all documents and matters for consideration
- provide a secretariat service for the steering committee
- coordinate working groups.

Stakeholder consultation

The partnership will establish a stakeholder engagement framework so organisations not represented on the steering committee can ensure their matters are considered.

Victoria has other forums addressing water planning and management issues (such as integrated water management forums and resource managers forums). The framework will identify relevant forums and work with them to develop procedures to ensure the partnership is exchanging evidence and analysis with them (and through them to their stakeholders) to most effectively implement its vision.



For information please see below links:

To find out about water storages, irrigation and local catchment authorities

<https://www.water.vic.gov.au/water-reporting/water-in-your-region>

For more information about environmental water:

<http://www.vewh.vic.gov.au/>

Understand the short term water outlooks, supply and demands:

<https://www.water.vic.gov.au/water-reporting/outlook>

delwp.vic.gov.au