



ACT
Government
Environment and Planning

ACT Water Strategy 2014–44

Striking the Balance



AUGUST 2014





Minister's foreword

The ACT Water Strategy 2014–44: Striking the Balance (ACT Water Strategy) will guide management of the Territory's water supply, management and catchment practices over the next 30 years.

The ACT Water Strategy builds on the achievements of the original ACT Water Strategy, *Think water, act water* that successfully navigated the ACT through the serious drought that ended in 2009 and the 2003 bushfire recovery to greater water supply security. Long term water security and efficient use of water is central to a sustainable future for the Territory.

Implementation of the ACT Water Strategy will deliver continued water security, improved water quality and catchment health and a water smart community that embraces its waterways and makes decisions with water in mind.

The ACT Water Strategy will guide:

- improved integrated catchment management in the ACT and region
- long term security of water supplies to meet the needs of a growing population and the environment
- strategic investment in catchment management and water security
- integrated water cycle management in the planning and design of urban environments
- provision of safe and clean water for the ACT
- strong community involvement in water resource management.

The active engagement of the community in assisting with components of the strategy in key areas such as catchment management and water use efficiency will be a critical factor to its long-term success.

The ACT Water Strategy will provide a basis for ensuring the ACT Government can continue to support current and future growth, achieve desired environmental outcomes, and be responsive to climate change.

Simon Corbell MLA

Minister for the Environment

August 2014



ISBN 978-1-921117-33-6

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Abbreviations

ACT	Australian Capital Territory
ACTEW	ACTEW Corporation Limited
COAG	Council of Australian Governments
DGWG	Directors-General Water Group
GL	gigalitre (1 billion litres)
GL/y	gigalitres per year
ICRC	Independent Competition and Regulatory Commission
kL	kilolitres (1 thousand litres)
MDB	Murray-Darling Basin
MDBA	Murray-Darling Basin Authority
ML	megalitres (1 million litres)
NRM	Natural Resource Management
NSW	New South Wales
NWI	National Water Initiative
SDL	Sustainable Diversion Limit
TAWW	Think Water, Act Water (previous Water Strategy)
WSUD	Water sensitive urban design





Executive summary

The ACT Water Strategy 2014–44: Striking the Balance (ACT Water Strategy) has the following vision for water management in the ACT over the next 30 years.

A community working together, managing water wisely to support a vibrant, sustainable and thriving region.

The ACT Water Strategy is focussed on achieving three outcomes:

Outcome 1: Healthy catchments and waterbodies

Outcome 2: A sustainable water supply used efficiently

Outcome 3: A community that values and enjoys clean, healthy catchments

For each of these outcomes, the ACT Water Strategy identifies strategies and actions to guide water management in the ACT over the next 30 years. The ACT Water Strategy will be implemented through five year implementation plans with effectiveness of implementation monitored through targets and indicators identified for each outcome.

The ACT is wholly situated within the Murrumbidgee River Catchment, which feeds into the Murray–Darling River system—Australia’s biggest river system and also one of the world’s driest. The ACT will continue to be an active and responsible participant in managing the precious and finite water resources of the Murray–Darling Basin (MDB). The ACT Water Strategy adheres to the Murray–Darling Basin Plan (Basin Plan) (MDBA, 2012), which placed additional requirements on the ACT and other jurisdictions in relation to water use (a limit on water diverted) and water quality.

The ACT is committed to meeting MDB-wide environmental objectives for water dependent ecosystems and water quality. The ACT seeks to manage water quality to ensure that water leaving the ACT is of the same quality or better than that entering the ACT. These environmental commitments place a strong onus on the ACT to manage water quality and ecosystem health within the Territory’s borders.

Outcome 1: Healthy catchments and waterbodies – *Well-managed, functioning aquatic ecosystems that protect ecological values and contribute to the liveability of the ACT community.*

Target 1: The ACT will maintain or improve the quality of water across all sub-catchments within the ACT.

Strategy 1: Achieve integrated catchment management across the ACT and region

Strategy 2: Protect and restore aquatic ecosystems in urban and non-urban areas

Strategy 3: Manage stormwater and flooding.

Recent water quality issues in Canberra’s lakes have reinforced the need for the ACT to adopt a more coordinated and systematic approach to managing catchments in the ACT and region.

The establishment of new catchment management arrangements for the ACT and region will provide a stronger framework for consultation, coordination and collaboration. The aim is to bring together key stakeholders in the region, including ACT Government, NSW state and local governments and land management agencies, technical experts and the community to work together to achieve improved water quality and catchment health in the ACT and region. Planning and investment decisions will be supported by water monitoring and decision support tools.

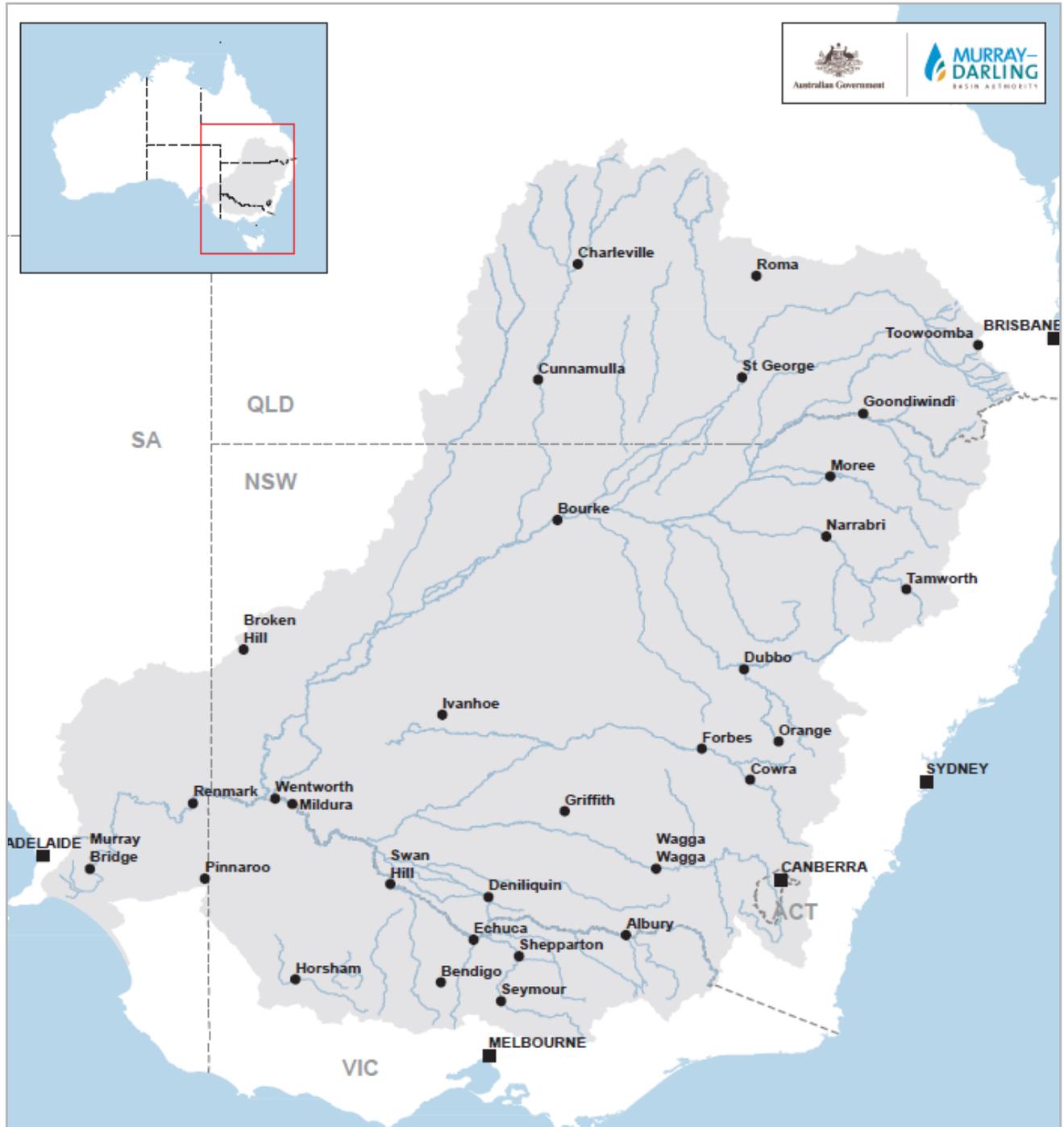
A key focus will be to integrate water cycle management and ‘green’ infrastructure (vegetation and water bodies) into urban planning to slow runoff, ameliorate flooding, and reduce pollutants and sediment entering waterways. Implementation of an improved approach to Water Sensitive Urban Design (WSUD) will be a central part of this. WSUD is about working with communities to ensure the planning, design, construction and retrofitting of urbanised landscapes are more sensitive to the natural water cycle.



The ACT Water Strategy gives priority to protecting and restoring aquatic ecosystems in both urban and non-urban areas. Restoration activities and research and pathways for improving water quality is emphasised, while recognising the important roles of environmental flows and compliance and enforcement in managing water resources.

Direction is also provided on how the ACT can better manage to reduce the impacts of stormwater and flooding on people and the environment.

Figure 1: The ACT sits within the Murray–Darling Basin





Outcome 2: A sustainable water supply used efficiently – *An integrated and efficient water supply system that provides for the optimal mix of supply options, encourages efficient use of water, is resilient to climate variability, and supports the social, economic and environmental needs of the ACT community.*

Target 2: Live within the Sustainable Diversion Limit (SDL) set for the ACT.

Strategy 4: Secure long term water supplies

Strategy 5: Manage and promote efficient and sustainable use of water

Since 2004, the ACT has taken significant steps in securing water to meet its needs, particularly through large increases in storage capacity and better use of existing storages, through infrastructure projects such as the enlarged Cotter Dam project and Murrumbidgee to Googong pipeline completed in 2013. The ACT has also taken initial steps in water trading, which will allow the ACT to purchase water from other parts of the MDB to meet future demand.

To limit water use at environmentally sustainable levels, the Basin Plan places strict limits on the amount of water that the ACT and other jurisdictions can divert from the MDB (Cap/SDL). This limit is regardless of the level of water storage. Provisional modelling of water demand as a result of future population growth indicates that additional water resources – over and above the current water allocation – may be required within the 30 year lifetime of the ACT Water Strategy (Figure 8).

A key action will be to take advantage of the evolving water trading market within the MDB. The ACT will finalise interstate water trading arrangements with NSW based on rules under the Basin Plan. This will allow the ACT to purchase water for potable drinking water purposes in very dry periods as well as enable the ACT to compensate for potential future shortfalls arising from the ACT's current MDB allocation, if it decides to.

The ACT will also continue to investigate the costs and benefits of alternative water supply options, such as treated effluent, grey water and stormwater for consumptive and non-consumptive uses.

Maintaining efforts to reduce demand (consumptive use per capita) over the longer term is another central focus. The per capita use of ACT mains water supply has more than halved over the last 15 years, and total water use has also significantly reduced. Permanent water conservation measures are in place. However, with a growing population and the possibility of a drying climate, these levels of low usage are unlikely to be maintained. Innovative ways of using water more efficiently, and demand reduction initiatives that reduce per capita use and overall consumption, will continue to be pursued.

Outcome 3: A community that values and enjoys clean, healthy catchments – *Work with the ACT community to continue to use water efficiently, and to ensure safe, clean water for recreation and the environment.*

Target 3: Increased community understanding and participation in managing and improving waterways in the ACT region.

Strategy 6: Provide clean and safe water for the ACT

Strategy 7: Engage the community on understanding and contributing to a more sustainable city.

Safe, clean water is central to the community's enjoyment of our water resources and the liveability of our city. The value of water to the community, including the Indigenous community, is recognised. Understanding the community's values (social, aesthetic, environmental and cultural) enables the ACT Government to better address competing objectives such as active recreation in the non-urbanised catchments which feed the drinking water supply.

A number of long term approaches to protect water quality in urban lakes and ponds are proposed that will support healthy recreational use of lakes and other waterways.

The benefits of community involvement in management of water resources in the ACT are many. Individuals and businesses play important roles in ensuring efficient use of water and improving water quality, including by reducing pollutants entering our waterways (nutrients, waste from gardens etc.).



Table 1: The ACT Water Strategy Approach

Vision: A community working together, managing water wisely to support a vibrant, sustainable and thriving region

<p>OUTCOME 1: Healthy catchments and waterbodies</p> <p><i>Well-managed, functioning aquatic ecosystems that protect ecological values and contribute to the liveability of the ACT community.</i></p>	
<p>STRATEGY 1: Achieve integrated catchment management across the ACT and region</p>	
Actions	<p>1 Strengthen coordination and collaboration for catchment management across the ACT and region</p> <p>2 Enhance knowledge and spatial planning for water and catchment management</p> <p>3 Integrate water cycle management and green infrastructure into the planning and design of urban environments</p> <p>4 Improve water monitoring and analysis across the ACT and region</p>
<p>STRATEGY 2: Protect and restore aquatic ecosystems in urban and non-urban areas</p>	
Actions	<p>5 Improve water quality and ecosystem health in the ACT and region's rivers, lakes, aquifers, ponds and wetlands</p> <p>6 Ensure appropriate management (volume, timing, and quality) of environmental flows</p> <p>7 Strengthen compliance and enforcement for water resource management</p>
<p>STRATEGY 3: Manage stormwater and flooding</p>	
Actions	<p>8 Manage stormwater infrastructure sustainably</p> <p>9 Improve planning, monitoring and compliance for stormwater management</p> <p>10 Improve planning, information and regulation for flood management</p>
<p>OUTCOME 2: A sustainable water supply used efficiently</p> <p><i>An integrated and efficient water supply system that provides for the optimal mix of supply options, encourages efficient use of water, and is resilient to climate variability, and supports the social, economic and environmental needs of the ACT community.</i></p>	
<p>STRATEGY 4: Secure long term water supplies</p>	
Actions	<p>11 Plan for long term water security</p> <p>12 Strengthen water trading arrangements</p> <p>13 Investigate the benefits and costs of more diverse water supply options</p>
<p>STRATEGY 5: Manage and promote and sustainable use of water</p>	
Actions	<p>14 Improve and monitor provision of water services</p> <p>15 Encourage water users to conserve and use water wisely</p>
<p>OUTCOME 3: A community that values and enjoys clean, healthy catchments and waterways</p> <p><i>Work with the ACT community to continue to use water efficiently, and to ensure safe, clean water for recreation and the environment.</i></p>	
<p>STRATEGY 6: Provide clean and safe water for the ACT</p>	
Actions	<p>16 Improve management of rivers, lakes and public space to promote recreational use and reduce risks to public health</p>
<p>STRATEGY 7: Engage the community on understanding and contributing to a more sustainable city.</p>	
Actions	<p>17 Promote community involvement in management of ACT water resources</p> <p>18 Ensure that indigenous and other cultural values are recognised in managing water planning and use</p>





1. Background

Purpose of the ACT Water Strategy

The ACT Water Strategy provides long term (30 year) strategic guidance to manage the Territory's water resources. The outcomes, strategies and actions incorporate the full breadth of water management activities in the ACT, including but not limited to: catchment management, stormwater and flood management, water supply and services, water for the environment, recreational water use, and public health.

The ACT Water Strategy is intended to guide the development, integration and implementation of activities undertaken by government agencies (and with ACTEW, Commonwealth, State and Territory agencies), developers, the ACT community, natural resource management groups and other stakeholders involved in planning and water management and water use.

Building upon a long term vision for water

The ACT's previous water strategy, *Think Water, Act Water – a strategy for sustainable water resources management* (TWAW) (ACT Government, 2004) was prepared and implemented at a time of significant pressure on water availability. This was due to the serious drought conditions and the impact on major water supply reservoirs due to contamination caused by the January 2003 bushfires. The ACT was highly successful in responding to these circumstances. Guided by TWAW, the government, community and private sector achieved significant outcomes in the short term through increased security of supply (through major increases in storage capacity and access to additional water sources, e.g. Murrumbidgee and Tantangara, for severe droughts) and demand reduction (through increased efficiency of water use such as WSUD, restricted use through permanent water conservation measures; and alternative supply such as stormwater and effluent use).

Since this time, the water management paradigm has continued to shift with greater clarity around the water abstraction and water quality commitments in the ACT under the Basin Plan and improved capacity for modelling future water availability and consumption.

The ACT Water Strategy has been developed based on extensive review of TWAW (ESDD, 2012). The continuity of a number of TWAW's key directions for water management, that continue to be relevant for the ACT are maintained. The outcomes of TWAW are built on in the ACT Water Strategy with actions designed to achieve long-term water management outcomes for the ACT. The linkages between the previous and new strategies are detailed in Table 2.



Table 2: Continuity between TAWW (2004) and the ACT Water Strategy (2014–44)

Think Water, Act Water (2004)	The ACT Water Strategy (2014–44)
Provision of long term, reliable source of water achieved through 75 GL increase in storage capacity, and construction of water transfer pipeline from Murrumbidgee to Googong.	Continues to build the resilience of the overall water supply system, and live within the ACT’s SDL.
Expansion of water treatment capacity, and demand reduction measures.	Continues to pursue water use efficiency and long term demand reduction measures.
Promoted integrated regional approach through MDB planning and provisional water trading with NSW.	Formalise interstate water trading arrangements to enable the ACT to secure water entitlements from other parts of the MDB. Implements the requirement of the Basin Plan, including finalising the ACT Water Resource Plan.
Developed foundations for protecting water quality in the ACT through ensuring water leaving the ACT was the same quality as the water entering the ACT.	Continues to improve water quality within the ACT through strengthening integrated catchment management, and investing in priority actions to improve water quality.
Facilitated incorporation of WSUD principles into urban, commercial and industrial development through implementation of WSUD principles and guidelines.	Improves application of WSUD to better plan, design, construct and manage urban landscapes to be more sensitive to the natural water cycle and to be designed to maximise benefits from water quality improvement while ensuring the ongoing maintenance costs are sustainable.
Promoted community involvement in water resource management through engagement in demand reduction programs and WSUD activities.	Continues to engage the community in efficient use of water through permanent demand management programs, and reduce pollution in waterways by encouraging community involvement in catchment management and WSUD.

Box 1: Water Sensitive Urban Design (WSUD)

Managing water in urban areas to maintain a clean, healthy environment provides many challenges in landscapes dominated by impervious surfaces, where natural drainage lines are modified and the safety of people and infrastructure must be assured against flooding. WSUD is an approach that is designed to integrate the management of the total water cycle into urban planning and design in a better way. In simple terms, WSUD is driven by the following three principles.

Protect waterways- Protect waterways so that they can remain valuable community assets that enhance liveability and support the ecosystems that rely on them.

Manage stormwater and flooding in the landscape - Manage stormwater drainage and flooding in urban areas so that the intensity and frequency of flood flows are reduced and so that opportunities to improve the quality of runoff are provided before runoff enters waterways.

Add multiple benefits while minimising development costs - Provide for a range of benefits such as alternate supply, improved amenity and safety and contribute to enhanced liveability by enhancing natural features such as rivers and lakes. Under WSUD there is also the potential to replace other large scale reticulated water systems with local solutions.

Adapted from (Melbourne Water, 2014)



2. Policy drivers that inform the ACT Water Strategy

In this section a brief overview is provided of the legal and policy drivers, at the national and ACT level, which have a bearing on the ACT Water Strategy.

2.1 National water reform

The National Water Initiative

The ACT Government is a partner to the 2004 Council of Australian Governments (COAG) *National Water Initiative* (NWI). The NWI is responding to the over allocation of Australia's water resources, and the need for increased efficiency of water use. The NWI is a shared commitment by governments across Australia towards achieving a more cohesive national approach to managing, measuring, planning for, pricing and trading water.

In the ACT, many of the actions under the NWI have already been met under the water planning processes of the *ACT Water Resources Act 2007* (WR Act). A major achievement was the incorporation of a statutory water plan within this Act, which provides guidance on how the ACT can balance environmental needs and human consumption. This Act also allows for the development of a framework for an ACT water market (Strategy 4).

These achievements are acknowledged and it is recognised that further work may be required on a number of the remaining NWI reforms, such as the recognition of Indigenous values in water planning, pricing principles and policies, improving knowledge and building research capacity.

COAG urban water reform

In 2008 COAG renewed the water reform agenda by announcing a work program to address key challenges in urban water management and planning. In 2009, COAG released the National Urban Water Planning Principles. These have been adopted by the ACT (Box 2).

Box 2: COAG National Urban Water Planning Principles

- Deliver urban water supplies in accordance with agreed levels of service.
- Base urban water planning on the best information available at the time and invest in acquiring information on an ongoing basis to continually improve the knowledge base.
- Adopt a partnership approach so that stakeholders are able to make an informed contribution to urban water planning, including consideration of the appropriate supply/demand balance.
- Manage water in the urban context on a whole-of-water-cycle basis.
- Consider the full portfolio of water supply and demand options.
- Develop and manage urban water supplies within sustainable limits.
- Use pricing and markets, where efficient and feasible, to help achieve planned urban water supply/demand balance.
- Periodically review urban water plans.



The need for reform in urban water planning and management is further supported by the outcomes of both the 2011 National Water Commission (NWC) Report, *Urban water in Australia: future directions* and the 2011 Productivity Commission (PC) report into the Australia’s urban water sector (Table 3).

Table 3: Key national reports examining urban water reform

Report recommendations	Relevance to the ACT
NWC report- Urban water in Australia: future directions 2011 (NWC, 2011)	
The recommendations of the report sought to ensure that urban water was managed using an efficient, adaptive, resilient and customer-driven approach that could respond to the challenges of increasing population, concerns about the delivery and affordability of water services, and the impacts of climate change and rainfall variability.	<p>Emphasised the need:</p> <ul style="list-style-type: none"> • for change to institutional and policy settings in the urban water sector • to improve service delivery and enhance focus on customers • to ensure that regulation of water quality, public health and environmental outcomes does not create barriers to integrated water management (whole of water cycle management) • to clarify the role of the urban water sector in delivering liveability outcomes.
PC report: Australia’s Urban Water Sector 2011 (PC, 2011)	
The report recommendations focused on microeconomic reform in the urban water sector and identified pathways to provide consumers with greater reliability of supply, greater choice of services at lower cost than otherwise and reduce the likelihood of water restrictions.	<ul style="list-style-type: none"> • Clarified that the overarching objective for policy in the urban sector is the efficient provision of water, wastewater and stormwater services so as to maximise net benefits to the community. • Emphasised the need to align procurement, pricing and regulatory frameworks with the overarching objective and assigned to the appropriate organisation. • Establish good industry practice for policy making, regulatory agencies and water utilities. • Establish performance monitoring of utilities and monitor progress on reform.

The urban water reform outcomes have been incorporated into the ACT Water Strategy where appropriate, as a key basis for guiding urban water supply planning into the future. This will ensure alignment and continued relevance of the ACT Water Strategy with national developments and common outcomes across other jurisdictions.

Murray–Darling Basin Plan

The Basin Plan (MDBA, 2012) provides a coordinated approach to water use across the MDB’s four states and the ACT. Under the Basin Plan water use is limited to environmentally sustainable levels.

Under the MDB Agreement, each Basin State accepted a limit on the maximum volume of surface water that can be diverted from each of the river systems of the MDB system annually. This abstraction limit is fixed, regardless of the amount of water available in the river system or the capacity to store water (in dams, lakes etc.). This limit is referred to as the ‘Cap’. In 2008 the ACT was allocated a Cap of 40 GL with an allowance for 75% growth in water use on the base 2006–07 population for the ACT (372,000 people); plus 2 GL as the Territory’s contribution to the Living Murray Initiative.

Under the 2012 Basin Plan, from 2019 all Basin States are required to operate under a SDL, which will replace the Cap. The ACT’s SDL for surface water, which includes potable supply and non-potable supply, will be 52.5 GL per year, made up as follows:

1. Water courses – 40.5 GL
2. Runoff dams (a dam or reservoirs that collects surface water flowing overland) – 1 GL
3. Commercial plantation (areas of land in which perennial woody plants are planted primarily for commercial purposes) net take – 11 GL.



The SDL for groundwater SDL is 3.16 GL per year.

The ACT Government is continuing to negotiate with the Murray-Darling Basin Authority (MDBA) on whether the take from commercial plantations can be combined with the take from water courses.

The Basin Plan is to be reviewed in 2022.

The SDL recognises that water resources (surface and groundwater) are inter-related and water resources are finite. The SDL differs from the Cap in two important ways: firstly, the SDL places a limit on the volume of both surface water and groundwater that can be diverted for use (the Cap only covers surface water diversions); and secondly, the SDL will no longer have any provision for future population growth in the ACT and Queanbeyan.

The SDL is central to the ACT's long term water planning. A mixture of policy responses will be required to meet additional future demands including continued efficiency and demand reduction measures, accessing water markets and water trading.

Box 3: ACT and net water accounting

Unlike other states, the ACT uses 'net' abstractions to account for water use because the ACT returns over half the water it uses to the MDB system. That is, the ACT's SDL includes water abstracted and returned to the river, rather than just abstracted. For example, if the ACT abstracts 50 GL from its water resources but returns 30 GL to the Murrumbidgee River (following treatment at the Lower Molonglo Water Treatment Plant), its 'net' abstraction is 20 GL.

2.2 Regional context

The ACT and NSW enjoy a close relationship as a result of unique cross border circumstances. Canberra's location in the centre of the South East NSW Region renders it the principal service centre for the surrounding local government areas in NSW.

The ACT – NSW Regional Collaboration Memorandum of Understanding (2011) strengthens collaboration to optimise regional outcomes and service delivery to the ACT and surrounding South East NSW region, which includes the ACT and surrounding local government areas of Bega Valley, Bombala, Boorowa, Cooma-Monaro, Eurobodalla, Goulburn Mulwaree, Harden, Palerang, Queanbeyan City, Snowy River, Upper Lachlan, Yass Valley and Young. Regional collaboration by the ACT and NSW facilitates joint planning for sustainable regional growth, optimising future regional economic prospects and meeting regional service needs.

The ACT has the largest water storages in the upper Murrumbidgee River Valley and Southern Highlands. Population growth and urban development in NSW communities adjacent to the ACT region are expected to result in growing NSW demand for reticulated water sourced from the ACT's municipal water infrastructure.

The ACT and NSW will continue to work collaborative, under the auspice of the ACT – NSW Regional Collaboration Memorandum of Understanding (2011) to identify a way forward with respect to water supply to NSW communities.

2.3 Water policy framework in the ACT

Water Resources Act 2007

The *Water Resources Act 2007* (WR Act) is the governing legislation for managing water resources in the ACT. The WR Act defines access rights to surface and groundwater resources, environmental flow provisions, water licensing requirements, resource management and monitoring responsibilities and sets penalties for improper actions.

Protection of environmental flows is the most important principle of the Act. Environmental flows are defined in the Environmental Flow Guidelines, which is a legislative instrument under the WR Act. These guidelines set out the volumes and timings of environmental flows and abstraction limits in streams, rivers, lakes, and



aquifers. In the ACT, water can only be used for other purposes once environmental flow requirements are met. The need for a regular review of environmental flows is recognised, especially in light of the potential impacts of climate change.

Under the WR Act, the establishment of a system of water entitlements and licences for water users in the ACT is also allowed, enabling access specifically to water (separate from land ownership). This, in turn, leads to the potential development of a water market, a key initiative of the NWI and a major driver of the Basin Plan. The ACT currently has a small internal market confined mainly to trades where water rights (e.g. access to water through a bore on the property) are sold when the related property is sold.

In order to remain current and provide guidance in response to a changing water management environment, the WR Act will be regularly reviewed and updated over the lifetime of the ACT Water Strategy. For example, the WR Act was recently updated to align water resource offence provisions in the ACT with those provisions in other states and territories.

Integrated Catchment Management (ICM) in the ACT

Catchment management is becoming an increasingly important issue for the ACT and region. Lake Burley Griffin and other major water bodies such as Lake Tuggeranong have experienced regular periods of poor water quality, which have had highly negative impacts on environmental and recreational values. Excessive concentrations of blue green algae have posed a serious threat to human health and have resulted in periodic closure of Canberra’s major lakes. Better integrated management of the lake between the Commonwealth, NSW and ACT government jurisdictions would assist in addressing this problem (Figure 2 and 3).

The importance of implementing an ICM approach in the ACT and region is recognised in the ACT Water Strategy. This approach is widely practiced at all levels of water management in Australia. Improvements to catchment management can only be made by formalising catchment management arrangements which clarify management objectives and the role of various land managers and government agencies. These arrangements will provide the framework to ensure that priority management activities are appropriately planned, undertaken and evaluated.

Figure 2: Conceptual diagram illustrating the role of ICM in balancing environmental concerns, economic issues and social needs and values (Ashton, 2010)

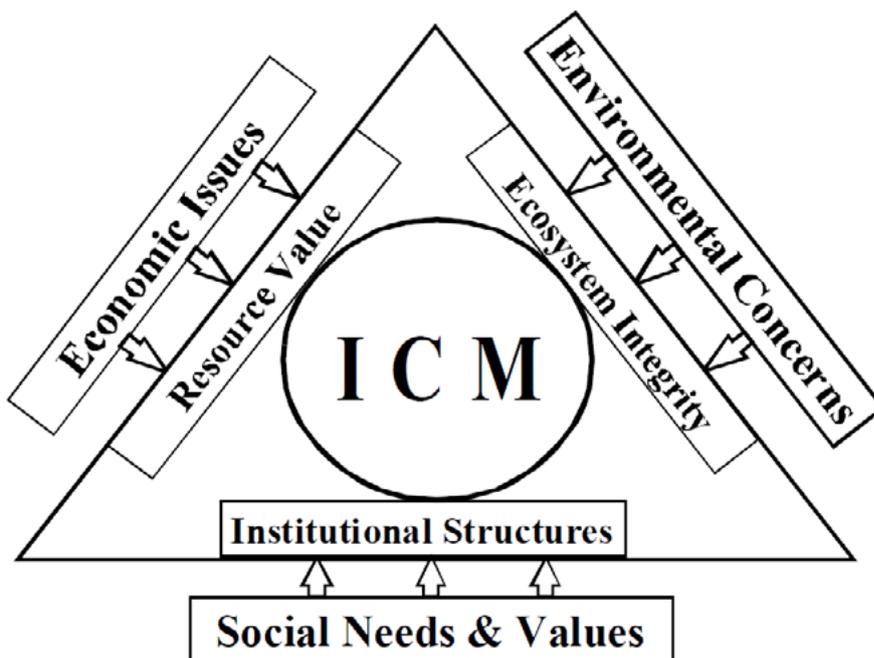
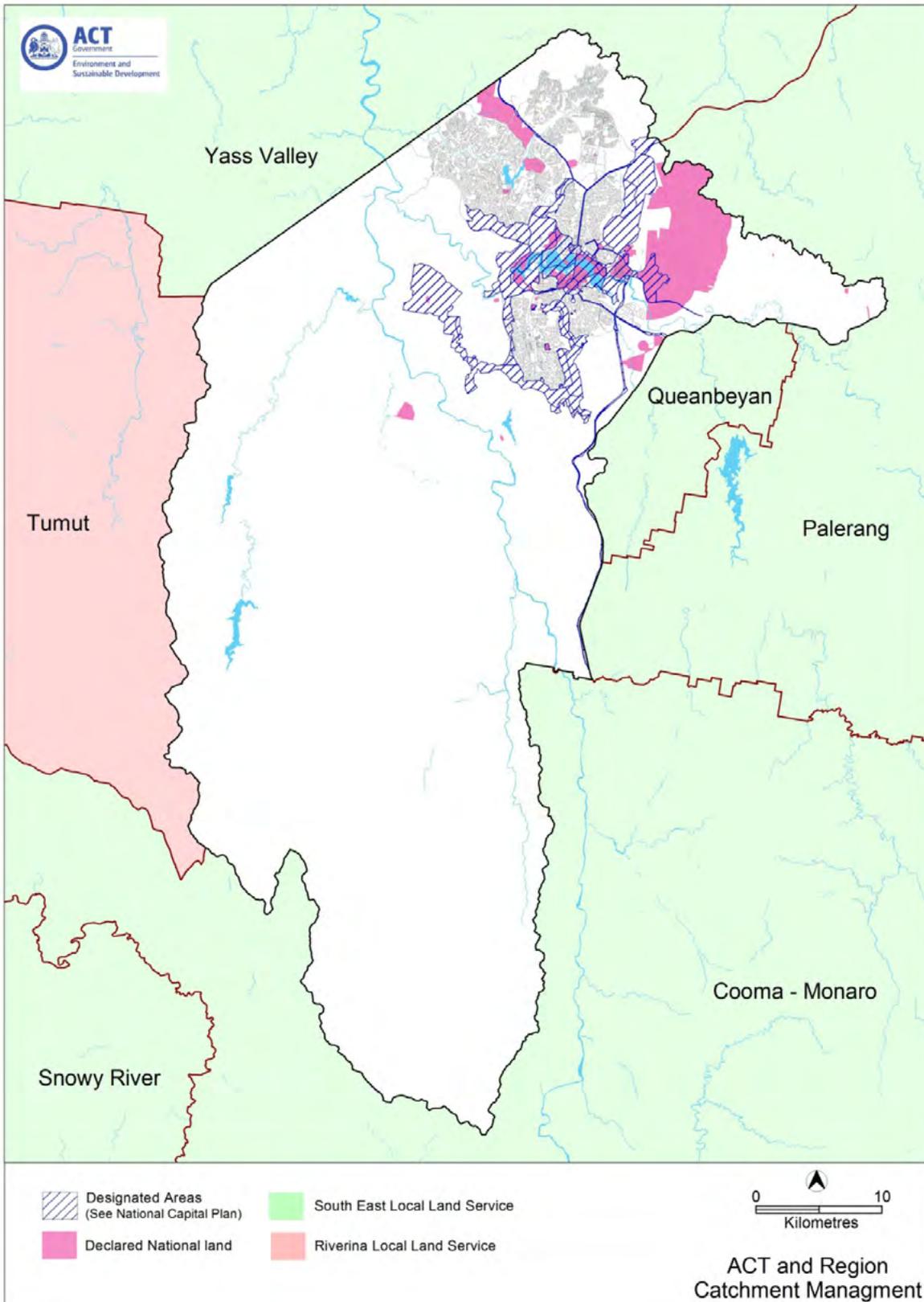




Figure 3: ICM involves managing land and water resources across borders. This will involve collaborating with a range of NSW Government agencies, particularly the South East Local Land Services, and local councils





Environment Protection Act 1997

The *Environment Protection Act 1997* (EP Act) provides the regulatory framework to help reduce and eliminate the discharge of pollutants into air, land and water in the ACT.

Regulations under the EP Act determine which water pollutants cause environmental harm to waterways and set water quality standards for different water uses (e.g. domestic water supply and recreational water use). The EP Act specifies the indicators and the maximum concentrations of substances and materials in water which are acceptable for the maintenance of each environmental use or value. The EP Act is also supported by a number of environment protection policies, including water quality and waste water reuse for irrigation, which provide guidance on achieving compliance with the provisions of the Act and its regulations.

The EP Act carries penalties for non-compliance but the adequacy of these relating to water quality and catchment health requires further review. This may result in enforcements provisions within the EP Act being strengthened to enable consideration of both actual and potential environmental harm.

Other Plans and Strategies

A number of other Plans and Strategies incorporate additional strategic and operational guidance related to water. Those of primary relevance include:

- ACT Planning Strategy (2012) – a critical document that affects land use policy, urban development policy, and the impact of urbanisation on the natural environment. It guides the development of Canberra to help the city achieve its economic, cultural and environmental aspirations. This incorporates consideration of water resource planning and management.
- The Canberra Plan (2008) – guides the long term growth and development of Canberra for this generation and beyond. The directions for population growth and development of industry outlined in this plan will have implications for water planning and service provision in to the future.
- National Capital Plan (amended 2013) and the Territory Plan 2008 (amended 2014) – strategic plans for Canberra that provide direction on environmental values and sustainability. The Territory Plan includes statutory provisions related to water, such as the Waterways WSUD General Code, and the Water Use and Catchment General Code. These codes recognise the competing and often conflicting demands made on the Territory’s water resources. Provisions for protecting the waters and catchments of the ACT by specifying permitted uses and environmental values for each water body are made in these codes.
- ACT-NSW Memorandum of Understanding (MoU) on Regional Collaboration (2011) – strengthens the collaboration between the ACT and NSW governments and serves to optimise regional outcomes and service delivery to the people of the ACT and South East NSW Region. The MoU reflects the desire to pursue a regional approach on a range of areas.
- ACT’s Climate Change Vulnerability Assessment Framework for Infrastructure (2012) – sets out a framework for assessing the vulnerability of the ACT’s infrastructure to climate change.
- Nature Conservation Strategy (2013) – provides guidance on priorities for investment in management and restoration of natural areas and biodiversity, including riparian areas.
- ACT Aquatic Species and Riparian Zone Conservation Strategy (2007)- provides guidance on values and key actions to maintain the health and function of these areas.
- ACT Flood Plan (Dec 2013 – Dec 2016)- outlines the arrangements for a coordinated all agencies approach to flood events in the ACT using the Prevention, Preparedness, Response and Recovery (PPRR) model.
- Permanent Water Conservation Scheme (2014) – details water efficiency measures for residential and non-residential water users.
- Secondary Water use in the ACT (2012) – specifies the technical requirements for the supply, quality, monitoring of, and reporting on drinking water in the ACT.
- Canberra’s Urban Lakes and Ponds Plan of Management (2001) – presents the framework guiding the management of Canberra’s urban lakes and ponds. This plan covers waterbodies defined as Public Land (Lake) and Water Features in the Territory Plan.



- Googong Foreshore: Plan of Management – guides the operation and management of the reserve.
- Namadgi National Park Plan of Management (2010) – includes a primary management objective related to water – the ecological and hydrological condition of water catchments is maintained and, where desirable and feasible, improved, to ensure a continuing high quality and cost-effective water supply for the ACT.
- Lower Cotter Catchment Strategic Management Plan (2007) – defines land use, strategic directions and management objectives for the Lower Cotter Catchment whereby water is recognised as the primary value of the catchment; and provides a sound management framework for the long-term stability of landscapes and security of water quality and supply.
- Jerrabomberra Wetlands Nature Reserve Plan of Management (2010) – focus on the conservation of wetland habitats for a large number of species of land and water birds, including migratory species protected under international agreements.





3. Opportunities and challenges: our current and future water environment

3.1 Water resources in the ACT

When the location of Canberra was chosen as the site of Australia’s new capital city, it was selected based on having an “adequate water supply, climate and landform suitable for the building of a ‘garden city’”. Fed by two rivers (the Murrumbidgee and Molonglo), and with drinking water catchments fed by the foothills of the Australian Alps, the ACT has steadily developed its water resources over the years.

Box 4: How much water flows through the ACT?

The average value for the amount of water that flows from the ACT each year (i.e. from rainfall within the ACT’s boundaries) is 380 GL/yr, with another 100 GL/yr from Googong. Historically the ACT has experienced very high variability in flows year to year (e.g. large flood events make the average higher) so this is an average value rather than a median value.

While ACTEW currently has a licence to extract 65 GL/yr for use in the ACT, water users actually consume about half or less (10 – 40 GL/year) of this water. The other half is returned to the Molonglo River after treatment at the Lower Molonglo Water Quality Control Centre. The Molonglo River flows into the Murrumbidgee River and eventually into Burrinjuck reservoir in NSW, from where the water is available for allocation to downstream users in the MDB (Figure 4). As such (except in extreme dry years such as 2006), the ACT and Queanbeyan, on average, use relatively little of the water available to it –in real terms, only about 6% (adapted from TWAW review, (ESDD, 2012)).

Rivers, reservoirs and wetlands - The key features of water resources in the ACT:

- The Murrumbidgee, Molonglo and Cotter rivers are the main water courses of the ACT. All rivers and creeks in the ACT flow to the Murray–Darling River system.
- The major water supply storage reservoirs in the ACT include the Cotter, Bendora, Corin and Googong dams. Bendora and Corin Reservoirs (30% of total storage) are fed by inflows from Namadgi National Park, a protected catchment. The forested catchment of the Cotter reservoir (downstream of Bendora) was heavily damaged in the 2003 bushfires and is recovering slowly. Part of this catchment is former pine plantation. Googong storage receives inflows from a mixed-use open catchment whose activities are regulated by NSW state and local governments. Additional water (100 ML/day) can be pumped from the Murrumbidgee River to the Googong Reservoir.
- The Tantangara Dam is located upstream from the ACT in the alpine region to the south. ACTEW has a commercial agreement with Snowy Hydro for the release of up to 20 GL water from this dam, down the Murrumbidgee River. The releases can be pumped into the Googong Reservoir for storage or into the reticulation system at the Cotter pump station.
- The ACT has a number of natural fresh water wetlands. These support a range of vegetation types and are located in surrounding mountains and lower-lying areas such as Nursery Swamp in Namadgi National Park, Jerrabomberra Wetlands and Gungahlin’s Horse Park Wetland. They are usually in the vicinity of major rivers and creeks.

The water supply system schematic for the ACT and Queanbeyan is outlined in Figure 4.



Figure 4: Key elements of the ACT and Queanbeyan’s water supply system (ACTEW, 2014)



Urban lakes and ponds – Artificially constructed water quality control ponds aim to replicate natural systems and are designed primarily to improve stormwater quality to protect the Molonglo and Murrumbidgee rivers. Lakes and ponds also attenuate flow during storm events, capture increased runoff from urban catchments, generate microclimates during drought conditions, create habitat for increased biodiversity and enhance landscape amenity. Constructed lakes and ponds have been designed to improve stormwater quality and, for some, to harvest fit-for-purpose stormwater for irrigation of playing fields and parks in place of high quality potable water. Major constructed lakes in the ACT include Lake Burley Griffin, Lake Ginninderra, Lake Tuggeranong, Gungahlin Pond and Yerrabi Pond. There are over eighty smaller ponds on public land in the ACT that assist to improve urban stormwater quality, and many are used for small-scale stormwater harvesting. Six ponds have been constructed in the Sullivans Creek Catchment and have been retrofitted into the established urban catchment. Three of these

retrofitted ponds in the inner north capture stormwater, which is reticulated to end users for irrigation via a larger neighbourhood scale stormwater harvesting system.

Groundwater – Groundwater is the water beneath the earth’s surface which filters through and is held in rock, gravel or sand. An aquifer is a geological formation which can hold groundwater. In the ACT, aquifers fall into two types, aquifers in fractured rock and aquifers in alluvium. Both are relatively shallow and virtually all water that infiltrates to the groundwater system eventually exits into streams. Groundwater discharge is important in maintaining base flows in streams.

Groundwater resources in the ACT are relatively small by comparison with other areas of Australia. The volume is estimated to be too small to ever be practically considered as a significant alternative urban water supply source. Groundwater use is allocated (via licensing) conservatively in the ACT. To maintain the relevant environmental assets and to protect the groundwater productive base the ACT Environmental flow guidelines specify that groundwater abstractions must not exceed 10% of the volume of long-term recharge. No further allocations are made beyond this limit unless specific studies on a particular catchment can provide evidence that such an increase will not result in environmental harm or impact on other users.



3.2 Current and future demand for water

Water for the environment

Unlike other jurisdictions in the MDB, the ACT reserves water for environmental flows before taking water from the system for human consumption (Box 5). As consumptive use of water accounts for about 6% of the Territory's water resources over the longer term, there is only potential conflict between environmental flows and consumptive use during periods of prolonged drought. Adaptive management of environmental flows during the drought period 2001-2009 enabled short term reductions in the volumes used for environmental flows, consistent with natural flow trends in drought, without compromising the long term viability of high value aquatic ecosystems (ESDD, 2012). Under the ACT Water Strategy, the government will continue to periodically review the environmental flow guidelines, in particular to explore opportunities for improved management of flows for in-stream and riparian health, and to improve the condition of urban lakes.

Box 5: Environmental flows in the ACT

Environmental flows are the flows of water in our rivers and streams that are necessary to maintain healthy aquatic ecosystems. They are designed to mimic the natural condition in our rivers, to reduce the impacts of dams and minimise the effect that abstractions, diversions, or additions of flow may have.

Environmental flow guidelines under the WR Act ensure that about 55% of water on average that flows from the ACT and Googong is not available for consumptive use in the ACT, except in droughts, when the environmental flows are modified. The environmental flow guidelines, which set out the volumes and timings of environmental flows and abstraction limits in streams, rivers, lakes and aquifers, will require periodical updates over the course of the ACT Water Strategy in response to changes in climate and water availability.

Water for consumption

The vast majority of water consumed in the ACT is for use in urban areas, mainly residential (Figure 5). Unlike many other areas of the MDB, very little water is used for agriculture (Figure 6).

Figure 5: Water consumption by sector in the ACT (ESDD, 2012)

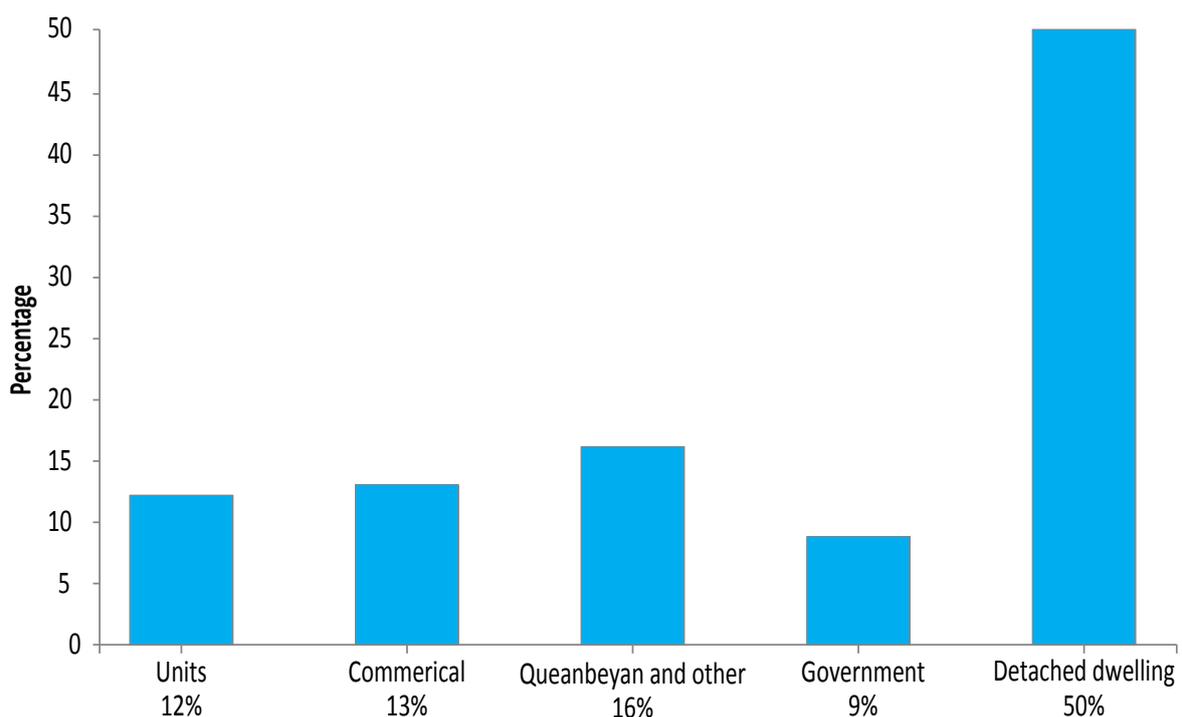
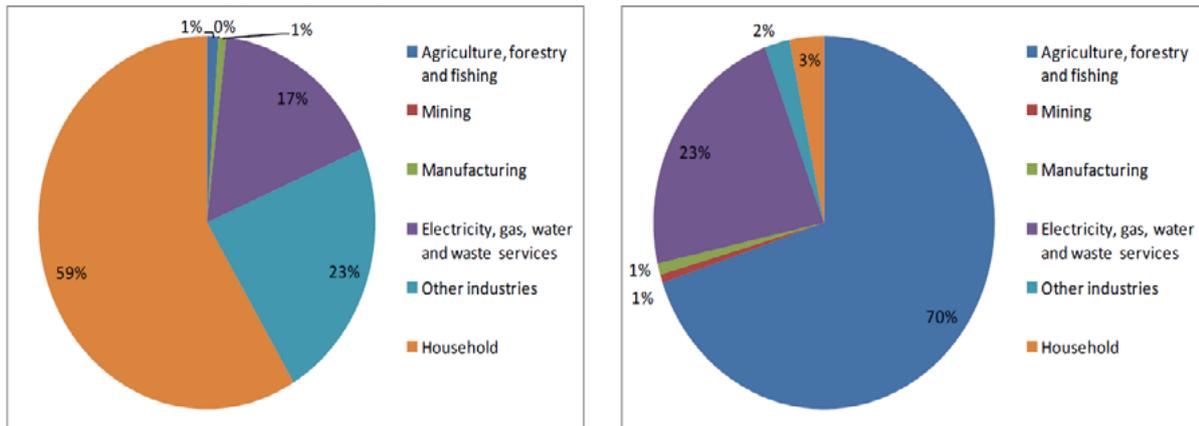




Figure 6: Water consumption in the ACT (predominantly for urban use) on the left above differs markedly from other areas of the MDB (predominantly for agricultural use) on the right. (ABS, 2011)



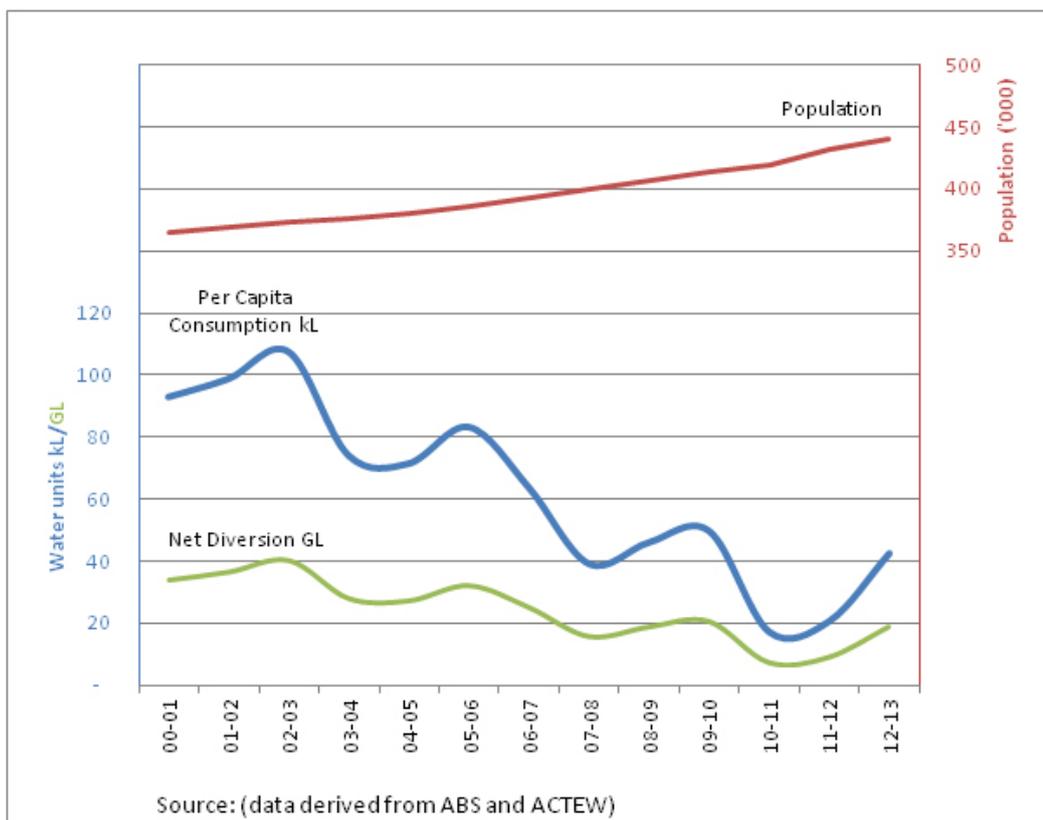
Source ABS Water Account, Australian 2009-10

The current water supply system is considered secure (Box 6) for at least the next 20 years (ICRC, 2012). Construction of the enlarged Cotter Dam and Murrumbidgee to Googong water transfer pipeline has ensured the ACT has secured adequate supply sources for its consumption needs even during drought. These infrastructure investments added an additional 75 GL of storage and increased access to water from the Murrumbidgee River during times of low water inflows into the ACT’s drinking water reservoir catchments.

Box 6: What is ‘Water security’?

Using best available modelling and assumptions, the current water supply system should meet unrestricted demand for the ACT and Queanbeyan 95% of the time until at least 2030.

Figure 7: Net water consumption (ABS and ACTEW) and population growth 2001-2013 (ACT Government, 2013)





The ACT community has made significant progress in becoming more water efficient. Total consumption of residential and non-residential water has been reducing since 2003, mainly due to demand reduction and restriction measures put in place to respond to the Millennium Drought (2001-2009) and 2003 bushfires (Figure 7).

Average consumption has fallen due to a combination of water restrictions, demand reduction (efficiency) measures and water pricing. While water restrictions have been lifted, permanent water conservation measures remain in place.

Predicting future water demand with any degree of accuracy is complex. In the ACT, the main variables used to model future consumption are population growth and likely climate trends, which may affect consumption, particularly in hot and dry years. Other variables include price, the changing nature of housing density, regional growth in high water demand industries, government policies on water use, behaviour change (water users learning to become more efficient), appliance and fitting efficiency and other demand reduction and efficiency programs.

Projections of future population growth are uncertain. Best current estimates are that regional populations that rely on ACT water supply (the ACT and Queanbeyan) could be over 700,000 by 2049 (Table 4). This will significantly increase water demand, and will also require a proportional increase in water and sewerage services.

Table 4: Future ACT region population projections and water needs

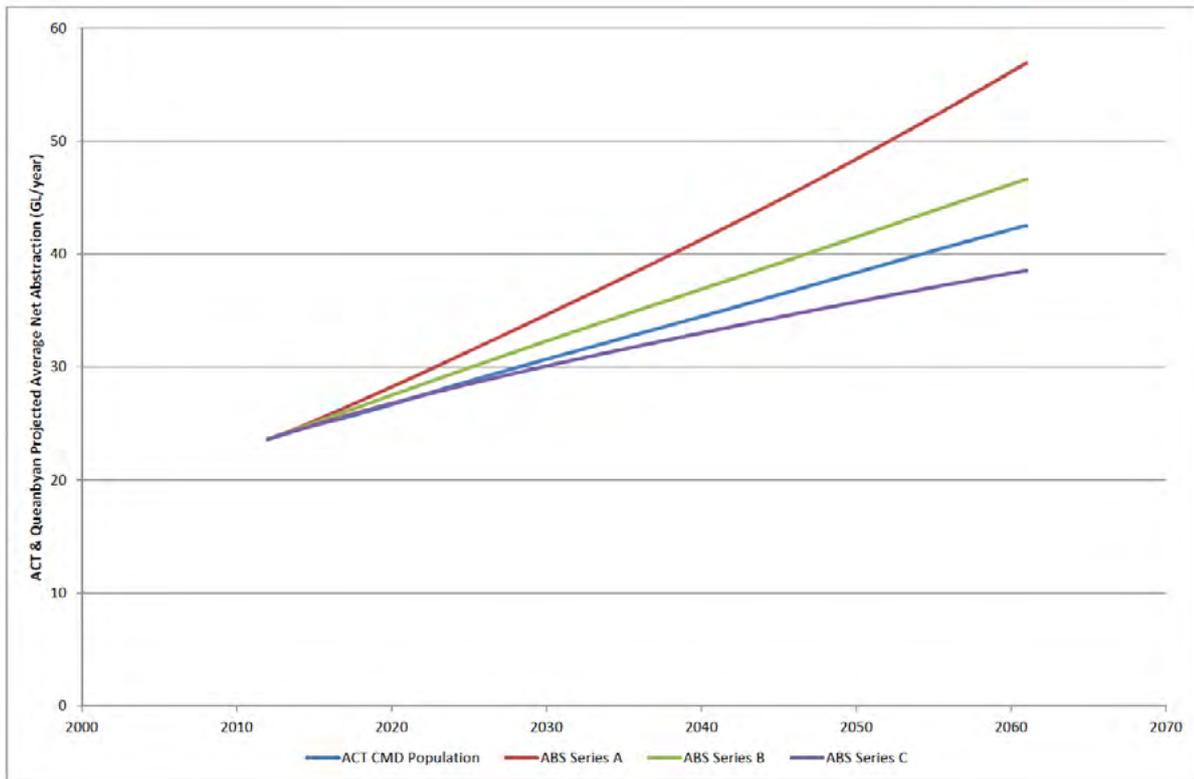
Year	ACT Population	Queanbeyan Population	Total Population
Base 2006-7			375,167
2009	352,189	40,661	392,850
2012	368,100	42,522	410,622
2019	413,800	47,802	461,602
2022	434,500	50,193	484,693
2029	483,700	55,876	539,576
2039	554,200	64,020	618,220
2049	628,100	72,557	700,657

(Source: Compiled from data in ICRC Report into Secondary Water Use in the ACT 2012 (ICRC, 2012))

While the ACT is considered water secure in terms of its water supply system, the wider MDB issue of a SDL will require the ACT to investigate options to stay within the SDL as the population grows. Provisional modelling undertaken for the ACT Water Strategy, as shown in Figure 8, illustrates three possible scenarios for water demand in the ACT and Queanbeyan over the next 30 years. This modelling indicates that because the SDL does not account for population growth, additional action by the ACT may be required within the lifetime of the ACT Water Strategy.



Figure 8: Projected water demand scenarios



In Figure 8 initial modelling illustrates that the SDL of 40.5 GL (42.5 GL – when considering the means by which the ACT met its Living Murray Initiative commitment) should not be exceeded for at least 20 years, subject to climate variability and changes in population projections. When demand exceeds the SDL, the ACT will need to consider buying water entitlements to meet growing demand, or reducing demand through water restrictions or other demand management options. In Figure 8 the basis of current thinking around when the ACT might need to start accessing additional water resources is illustrated. It is based on best available data (ABS, ACT Government, 2013 and ACTEW), and values agreed by the ACT Government and ACTEW have been used to calculate an assumed linear relationship between population growth and water use. The starting point for all three scenarios (23 GL) is based on current (2014) water demand. The starting point represents what could be a low figure due to water restrictions being in place for several years followed by three wet years. It is possible that a return to the hot dry years of 2001–09 will see net consumption increase.

The figure depicts three possible water use futures: (1) A high population growth scenario (ABS Series A) predicts that the ACT and Queanbeyan may exceed the SDL between 2035–40; (2) the medium population growth scenario predicts that water consumption will exceed the SDL between 2045 and 2050; (3) the low population growth scenario predicts that water consumption will exceed the SDL between 2065 and 2070. It is important to recognise that the figure above represents ‘possible future scenarios’, and should not be misinterpreted as a firm estimate of future demand. The modelling will be updated on an ongoing basis as understanding of key variables improves, such as population growth, changing water consumption patterns, the impacts of government policy related to demand reduction, and climate variability.

3.3 Water for recreation

Lakes, rivers and the Molonglo and Murrumbidgee river corridors offer numerous water based recreation opportunities, including swimming, fishing, boating, and water skiing. These activities require water to be of a particular standard, especially those involving primary contact (such as swimming and water skiing). Annual visitation to the Murrumbidgee Corridor and Cotter Precinct is estimated to be 900,000 per year (MARS, 2013).



Residents in the ACT and region use playing fields year round for sport and recreation. Based on sports grounds bookings, usage for all sport grounds is in excess of 82,000 hours per year (ACT Government, 2014). To the extent possible, the ACT Government will continue to irrigate sportsgrounds in an efficient manner.

The Bush Capital maintains a wide variety of urban parks. Town and district parks that are most heavily visited contain recreational infrastructure such as toilet blocks, gas barbeques, ornamental ponds, water quality control ponds, water play areas and children's playgrounds. Numbering in excess of 30 separate parks, these areas attracted more than 13 million visits during 2012–13 (MARS, 2013). Given the high visitor usage, the ACT Government prioritises irrigation for these parks, particularly in times of drought and watering restrictions.

Aboriginal values of water resources

Aboriginal people view rivers holistically as a part of Country, which is linked to traditional beliefs related to wildlife, lore and land management. The rivers form a part of the cultural landscape and are spiritually related to songlines, pathways and ceremony. River corridors provide travel routes and a wide variety of flora and fauna as a readily available food source. It is important that traditional custodians can access rivers to teach younger generations about Country, dreaming, and future land management. In the ACT, the majority of recorded campsites are within 100 metres of a river, and the Murrumbidgee and Molonglo rivers helped connect the Ngunnawal, Ngambri, Wiradjuri, Yuin and Ngarigo peoples.

3.4 Climate change – impacts and adaptation

Possible impacts on water supply

CSIRO climate change projections (CSIRO, 2010) suggest south-eastern Australia will be one of the most impacted areas of the MDB, with increases in surface temperatures, evaporation rates and water demand from existing water users.

Future projections are of a climate with greater variability, but with the following characteristics:

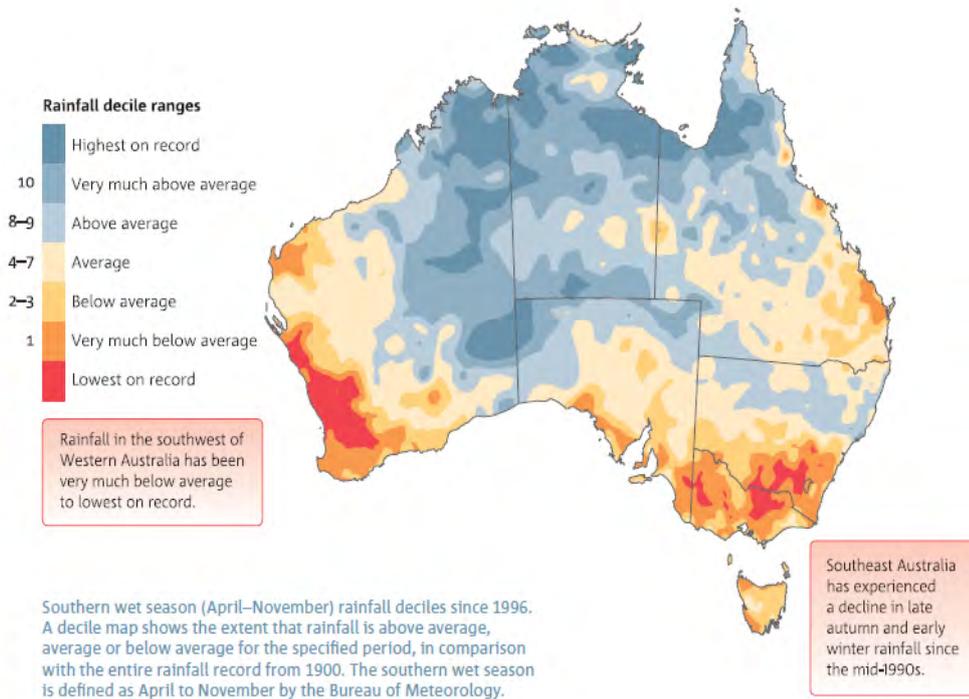
- Change in annual rainfall patterns – a decrease in late autumn and early winter rainfall and an increase in summer rainfall that will reduce surface runoff, soil infiltration and water storage during traditional winter months (Figure 9).
- Reduction in rainfall – total rainfall events are predicted to fall by up to 20%; however, the intensity of falls is likely to increase, meaning less rainfall events, but more intense rainfall.
- Less run off into reservoirs – run-off into dams is projected to potentially fall by as much as 40%.
- Increased risk of bushfires – frequent bushfires in catchments will result in both short-term increased turbidity and medium-term reduced runoff into reservoirs as regrowth demands a higher proportion of water uptake in early years (generally 8 to 15 years after a bushfire).
- Increased risk of drought – future impacts of drought are hard to predict and will depend upon their intensity and duration. Serious drought in the past has resulted in water restrictions (Box 7).

Box 7: Drought in the ACT

Inflows into ACT catchments steadily decreased in response to a serious and prolonged drought from 1994, with drought officially declared from 2001–09. While the ACT did not run out of water at any time during this drought, there were a number of years where consumption was considerably greater than inflows and resulted in the ACT Government implementing water restrictions. For example, during the most severe drought year, 2006, the ACT had approximately 26 GL of inflow (12% of average annual flow) into reservoirs, while 62 GL was consumed. While the ACT has secured its water supply for the next 20 years, the possibility of more extreme drought in the future underscores the need to continue to investigate further supply as well as demand management options.



Figure 9: Autumn and winter rainfall has declined in south east Australia since the mid 1990s (CSIRO and BOM, 2014)



Possible impacts on catchment and ecosystem health

Rivers and wetland ecosystems may face the greatest pressures of any ACT ecosystem from climate change. This is due not just to water availability, but also to changing flood regimes. Lack of flooding or flooding at the wrong time of year could lead to a cascading series of problems including insufficient water for fish spawning, weed invasion (which might be prevented by flushing flows) and loss of riparian systems. Drier conditions may mean that at many times of year rivers may actually be disconnected pools of water. Limiting the ability of fish to disperse and mate, combined with warmer water temperatures (certain fish can only spawn within narrow temperature ranges or habitats) could potentially cause the destruction of entire fish populations. Smaller bodies of water may face localised fish kills from deteriorating water quality.

Possible impacts on the community and water dependent recreation

Reduced rainfall, increased evaporation, increased heat, and more frequent and extreme natural events will have clear implications for community use of rivers, lakes, playing fields and parks. Some possible impacts may include:

- reduced surface quality on playing fields and parks
- more potentially harmful algal blooms, limiting direct contact recreational water pursuits
- reduced opportunity for freshwater-based recreation due to less water at certain times of the year (e.g. very low river levels)
- greater risk of storm or fire damage to facilities and infrastructure
- increased flood risk for facilities located within multiple-use corridors

Impacts such as these will have knock-on effects for government, including increased maintenance and watering costs.

Adapting to climate change

The ACT is already taking considerable steps to adapt our land and water resources to climate change. These steps are contributing to national adaptation efforts through water reform actions under the \$12.9 billion Water for the Future Initiative.



This initiative focuses on four national priorities: taking action on climate change; using water wisely; securing our water supplies; and supporting healthy rivers and wetlands. The program delivers a number of major streams of work to help Australians adapt to a future with less water including:

- development of new, science-based limits on water use for the MDB
- purchasing water to put back into the rivers of the MDB
- improving the efficiency of irrigation systems to minimise water loss
- developing a robust water market, so that as water becomes more scarce there are incentives to deliver it to the areas of highest priority
- improving water markets and trade so that water can move to where it is valued most
- investing in alternative water supplies and water saving initiatives in our cities and towns.

Improving the quality of our water information systems nationally through the Bureau of Meteorology.

Table 5 lists of the range of adaptation actions related to water that the ACT has already taken over the last 10 years.

Table 5: Examples of previous initiatives related to water and climate change adaptation

Actions	Adaptations
Building the resilience of the ACT's water supply	<ul style="list-style-type: none"> • Enlarged Cotter Dam and Murrumbidgee to Googong Transfer Pipeline. • Continue negotiations to establish commercial arrangements with Snowy Hydro Ltd and ACTEW to enable the transfer of water from Tantangara Dam. • Trialling the long term commercial feasibility of supplementing the urban water supply by constructing urban stormwater ponds and using the water to replace potable water used for irrigation.
Building the resilience of catchments and ecosystems	<ul style="list-style-type: none"> • Adoption of integrated catchment management principles (ACT Government, 2000). • Restoration of the Cotter Catchment following bushfires in 2003. • Construction of artificial log and rock structures in the Murrumbidgee River and fish ladders in the Cotter River to enhance habitat for aquatic biodiversity.
Building community resilience	<ul style="list-style-type: none"> • Implementation of water restrictions and the Permanent Water Conservation Scheme. • Information and education campaigns on efficient water use and climate change impacts.

A large number of additional actions are incorporated that will continue to build resilience to climate change including:

- enhancing knowledge and planning capacity for catchment management (e.g. Action 1.2) – new data sets, such as climate models and improved understanding of how water flows through the landscape will assist the ACT in planning where priority investments should be made to increase the resilience of water ways and other natural areas
- promoting green infrastructure, including through WSUD (e.g. Action 1.3) that can cool local environments and reduce the effects of urban heat as well as providing other aesthetic and environmental advantages. Improved WSUD infrastructure, such as wetlands and ponds, will help manage flooding and stormwater while providing additional opportunities for alternative water supply and environmental benefits
- developing a more flexible and resilient water supply system, including through water trading (e.g. Actions 4.2 and 4.3) – alternative water supply options will provide flexibility during periods of climate variability and may help alleviate pressures to implement water restrictions
- encouraging more efficient use of water (e.g. Actions 5.2, 7.1) – demand reduction and water efficiency is about using water more wisely, but also about educating people and influencing behaviour change to align with water availability under a shifting climate.





4. Responding to long term water management challenges – the way forward

OUTCOME 1: Healthy catchments and waterbodies

Well managed, functioning catchments that provide sufficient clean water for the environment and human consumption, support healthy waterbodies, and contribute to liveability of the ACT community

STRATEGY 1: Achieve integrated catchment management across the ACT and region

Actions

1. Strengthen coordination and collaboration for catchment management across the ACT and region.
2. Enhance knowledge and spatial planning for water and catchment management.
3. Integrate water cycle management and green infrastructure into the planning and design of urban environments.
4. Improve water monitoring and analysis across the ACT and region.

ICM underpins sustainable management of land and water resources, and also contributes to biodiversity management. Within ICM landforms, soils, water, vegetation and other natural resources in a catchment are interdependent, and management of any issue consider the whole system.

The aim of ICM in the ACT is to maintain or improve water quality across all water sources, and within all catchments and sub-catchments. ICM will need to address issues such as bushfire management (Box 8); high phosphate loads; turbidity and other sources of pollution; stormwater and flooding; riverine vegetation management; and management for aquatic species to inform priority management actions. Monitoring the performance of ICM will be crucial to inform the effectiveness of management actions to improve water quality.

Box 8 – Fire and water quality

Fires (planned and unplanned) have the potential to degrade water quality and alter the dynamics of stream ecosystems. Severe unplanned fire (i.e. wildfire) can have significant impacts on vegetation, groundcover and soil properties, which lead to changes in water quality and quantity in the catchments, both immediately following the fire and for many years after. Runoff can carry sediments and pollutants that affect aquatic environments, drinking water quality and agricultural industries.

The use of planned fire (i.e. prescribed burning) can play a significant role in protecting catchment and ecosystem functions, although there may be localised impacts on groundwater, vegetation and soil properties as a result of these activities.

The ACT Strategic Bushfire Management Plan identifies strategies for the implementation of planned fire management regimes and access management in ACT water catchments, and carefully considers impacts of high intensity unplanned landscape scale fires and suppression on the water quality and quantity compared to those of planned fire and fire access.

1. Strengthen coordination and collaboration for catchment management across the ACT and region

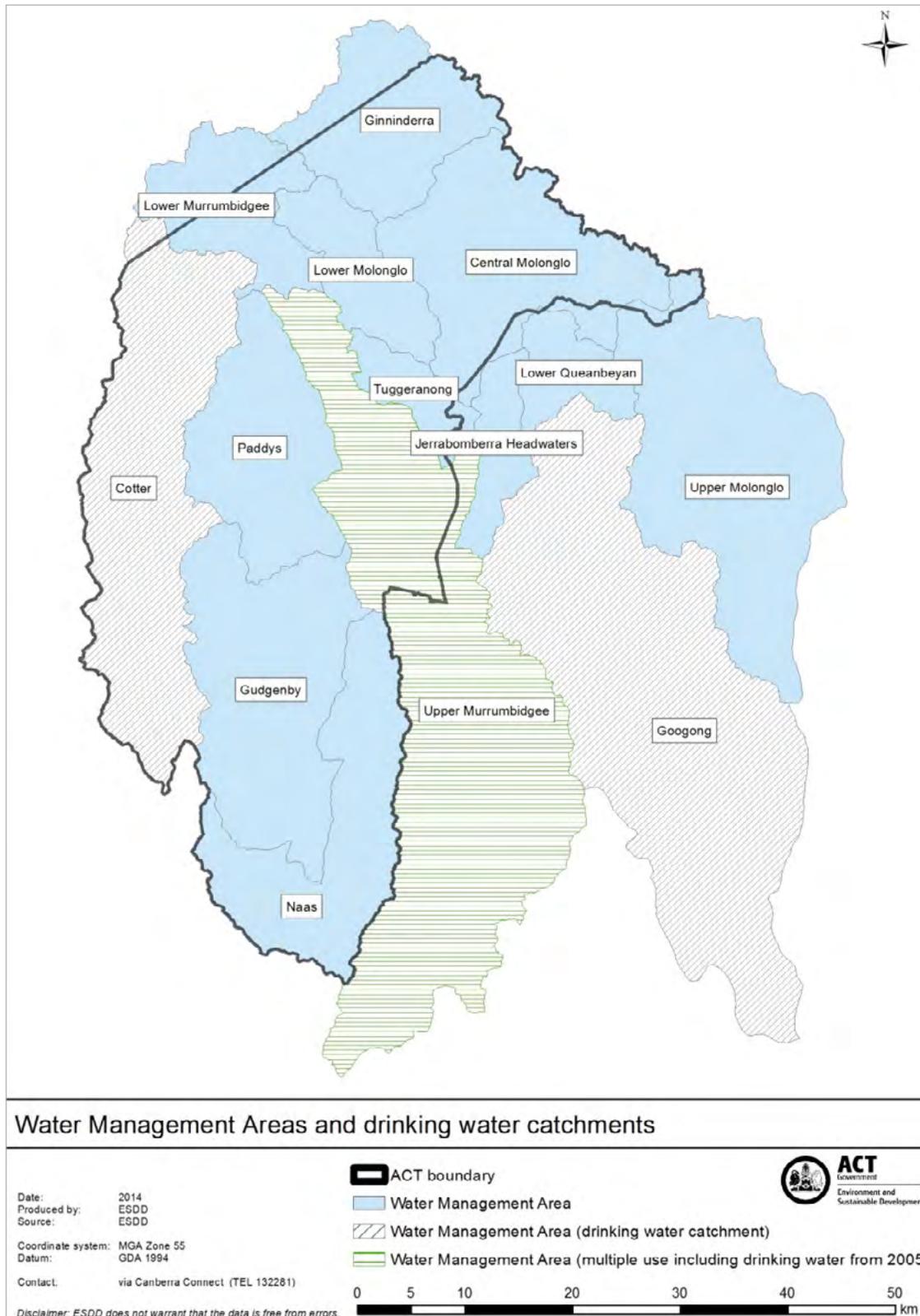
Activities associated with the ACT's catchments are managed by a diverse range of government agencies and other stakeholders, but there is no overall strategic catchment management setting, plan or policy for ACT agencies to operate against. ICM must be seen as a collective responsibility across governments (ACT and NSW) and communities, rather than solely an ACT Government responsibility.



Further, within the ACT it requires collective action across all government directorates. One of the foundational actions is to establish catchment management arrangements to better integrate water and land management for improved water quality and catchment health in the ACT and region. This will provide clarification on the roles and responsibilities within the ACT Government, business and the community in ICM.

This governance framework should have an ACT and region focus supported by a community network and use of experts and advisory panels.

Figure 10: Water management areas and drinking water catchments





In Figure 10 the designated use of each water catchment is indicated. In the past, water quality was managed differently according to the primary designated use of each catchment under the Territory Plan (Water Use and Catchment General Code). For example, 'drinking water catchments' have been managed for water quality, with a lesser emphasis on other values such as biodiversity conservation, while 'conservation catchments' have been managed more for habitat quality, with less attention on managing for secondary uses such as stormwater discharge and water supply. The decision to construct the water diversion pipeline from the Murrumbidgee River to Googong Dam in 2005 meant that the upper Murrumbidgee Catchment was recognised as requiring additional water quality protection for drinking water purposes. Strengthening ICM will continue to improve the management of water quality across all catchments, to support the full range of social, environmental and economic benefits from water.

2. Enhance knowledge and spatial planning for water and catchment management

Further developing an evidence base on which the ACT can make planning and investment decisions will require ongoing efforts to collect data. A significant component of this work may involve the following.

- Completing a catchment process model for the ACT and surrounding inflowing catchments.
- Strengthening catchment knowledge through collection of additional data for:
 - the Hydrogeological Landscape Framework
 - further development of the Waterwatch Catchment Health Indicator Chip (CHIP).
- Climate change data through the NARClIM (NSW/ACT Regional Climate Modelling) project.
- Interpretation of data to inform decision making.

More comprehensive data, in combination with robust monitoring data, will support a range of enhanced water and catchment planning tools and processes, such as the following.

- Developing an integrated catchment management plan for the ACT to guide land and water management for protection of water quality and water supply.
- Enhance the ACT spatial planning framework for natural resource management (NRM) to inform management of land, water and biodiversity).
- Preparing a number of management plans for waterbodies that include clear objectives for water quality and recreational use.
- Ensuring that urban planning is consistent with water quality objectives.

Further guidance on management of riparian and aquatic biodiversity can be found in the ACT Nature Conservation Strategy and the ACT Aquatic Species and Riparian Zone Conservation Strategy.

Box 9 – Green infrastructure

Green infrastructure uses vegetation, soils and evapotranspiration to create healthier urban environments and help manage some of the impacts of climate change, such as the buildup of heat and intensified rainfall events. Green infrastructure can include parks and grassy areas, reserves, community gardens, backyard gardens, waterways, wetlands, roof gardens and other such elements. In the ACT, these elements will continue to be incorporated into planning and urban design to ameliorate the urban heat island effect, better manage stormwater, reduce pollutants and sediments entering waterways, and enhance the liveability of urban environments.



3. Integrate water cycle management and green infrastructure into the planning and design of urban environments

In order to reflect integrated water cycle management as an objective of Canberra's WSUD in a better way, the following activities will be undertaken.

- Finalising the review of the Waterways: WSUD General Code and related documents within the Territory Plan.
- Finalising the review of design standards for WSUD infrastructure.
- Investigating the role of vegetation and waterways in reducing climate change impacts in urban areas.

Box 10: Water Sensitive Urban Design (WSUD) review 2014

In response to the Independent Competition and Regulatory Commission's report on secondary water use (ICRC, 2012), the ACT Government undertook a major review on water related regulation, including WSUD, to expand the options available under WSUD and provide maximum flexibility to developers to lower costs. The review is set against the retention of the existing 40% target (against pre-2003 levels) for reducing mains water usage in new developments, extensions and refurbishments.

The following key issues were identified in the review.

- Need for a strategic context for stormwater management.
- Need to restructure the current WSUD General Code to provide more flexibility and reduce costs.
- Need to address ongoing maintenance costs for WSUD infrastructure through improved whole of life costings.
- Lack of performance monitoring of WSUD infrastructure.
- Need for improved whole-of-government coordination and asset handover.
- Need for improved levels of compliance and more systematic monitoring of erosion and sediment controls during land development and construction.

These key issues will be addressed through actions incorporated under outcomes one and two, particularly Actions 8 and 9.

4. Improve water monitoring and analysis across the ACT and region

Currently, water monitoring in the ACT is undertaken through a range of organisations and methods to serve specific purposes, such as drinking water quality or riparian health at specific locations. This has resulted in missed opportunities for identifying priorities for investment in water quality. Therefore, the development of a more integrated and coordinated water monitoring program is required. Within this action the following sub-actions are highlighted.

- Better integration of Waterwatch and AUSRIVAS activities into a broader monitoring program.
- Identify priority gaps in monitoring and undertake additional monitoring.
- Monitor existing infrastructure for performance and establish monitoring and design guidelines for future infrastructure, e.g. ponds and wetlands.
- Improve access to water monitoring data, including by stakeholders.



STRATEGY 2: Protect and restore aquatic ecosystems in urban and non-urban areas

Actions

- 5 Improve water quality and ecosystem health in the ACT and region's rivers, lakes, aquifers, ponds and wetlands.
- 6 Ensure appropriate management (volume, timing, and quality) of environmental flows.
- 7 Strengthen compliance and enforcement for water resource management.

Aquatic and riparian ecosystems are an important component of our urban and non-urban areas as they provide a source of water and amenity and are home for a wide variety of aquatic and terrestrial species. These ecosystems also improve water quality by providing flood and erosion protection, and filtering pollutants, in place of hard engineering such as concrete channels. Furthermore, they provide a range of other benefits such as shading, local temperature buffering, amenity, open space for walking, and connectivity and refugia for biodiversity. Greater understanding of the processes of aquatic ecosystems and their key threatening processes is required to ensure that they remain protected and functional whilst providing a range of services. A key priority is to reduce the amount of nutrients and other pollutants entering rivers, lakes and aquifers, especially from urban areas.

5. Improve water quality and ecosystem health in the ACT and region's rivers, lakes, aquifers, ponds and wetlands

Improved data, research, analysis and assessment (Action 2 under Strategy 1) will assist in identifying priorities for on-ground investment in catchment management activities that will support improved water quality and the health of riparian and aquatic ecosystems. Investment will be prioritised based on the seriousness of threats to the proper functioning of catchments, and will be sought through a variety of mechanisms including government, private enterprise and in-kind contributions. The following sub-actions are emphasised.

- Undertake restoration activities including infrastructure works to improve water quality (e.g. polishing lagoons, ponds, swales, bio-retention traps, bank stabilisation), restoration of native vegetation, fish stocking, and structures that will improve in-stream habitat (such as artificial log structures).
- Undertake research and trials for improving water quality including macrophyte beds in lakes and carp control projects.

6. Ensure appropriate management (volume, timing, and quality) of environmental flows

The aquatic ecosystem and water quality monitoring data will be used to inform development of further opportunities for management of environmental flows for in-stream and riparian health. This will include periodic review of environmental flow guidelines.

7. Strengthen compliance and enforcement for water resource management

Enhancing regulatory functions in relation to risk assessment, enforcement, stakeholder engagement, legislative review, and monitoring will be an important ongoing action. Compliance and enforcement resources will be strategically deployed according to risk management principles within water catchments. Key sub activities include the following.

- Review the efficacy of zoning and planning overlays to meet water use objectives for rivers, lakes and ponds and make amendments to clarify and strengthen protection where required.
- Development of improved regulatory processes and offence provisions which align with national frameworks and standards.
- Review and develop water related standards.
- Update relevant environmental protection guidelines, such as guidelines for construction.
- Equip officers with appropriate enforcement delegations.



STRATEGY 3: Manage stormwater and flooding

Actions

- 8 Manage stormwater infrastructure sustainably.
- 9 Improve planning, monitoring and compliance for stormwater management.
- 10 Improve planning, information and regulation for flood management.

Rainfall that does not soak into the ground becomes surface runoff, which either flows directly into surface waterways (e.g. channels) or is channelled into the stormwater piped system, which eventually discharges to surface waters (e.g. creeks and rivers). Stormwater is of concern for two main issues: one related to the volume and timing of runoff water (flooding) and the other related to potential contaminants that the water is carrying, i.e. water pollution.

To reduce impacts of stormwater and flooding the government, community and private sector need to work together to better plan, design, construct, maintain and retrofit the urban landscapes to reduce stormwater pollution and create urban environments that are more sensitive to the natural water cycle. Management of stormwater and floods is a core component of improved WSUD.

8. Manage stormwater infrastructure sustainably

While WSUD infrastructure can bring many water management and amenity benefits to urban areas, it may also impose significant costs if not planned, designed or maintained correctly. For example, infrastructure such as gross pollutant traps and stormwater ponds require significant ongoing maintenance (such as cleaning of solid waste and sediment) to ensure they continue to work as intended. Funding models will be developed to guide the design of WSUD infrastructure that ensure whole-of-life performance, and will be guided by the following issues.

- How to adequately incorporate maintenance costs through 'whole-of-life' costings at project planning stages.
- How to monitor WSUD investments to better understand which kinds of infrastructure best achieve WSUD targets.
- Processes and protocols around coordination and handover of assets within government or with other investors such as the private sector.

9. Improve planning, monitoring and compliance for stormwater management

Subject to resourcing, a strategic asset management plan for stormwater infrastructure will be developed and implemented. This should be updated over time in light of new knowledge about climate variability and climate change. The ACT Water Strategy will be a key planning tool in the ACT's revised approach to implementing WSUD. Clear direction will be provided in terms of the following objectives.

- Improved water quality of stormwater discharge, including to areas outside the urban area.
- Reduced risk of damage to infrastructure and natural creeks through high velocity flows, as well as reducing damage to habitat from high frequency flows.
- Identified potential benefits for environmental and urban water supplies, such as offsetting and reducing stormwater infrastructure and management costs.

Sub-actions to monitor, assess and actively manage stormwater impacts and also encourage ongoing review of stormwater asset management and performance will be included.



10. Improve planning, information and regulation for flood management

Existing plans will be reviewed and further work undertaken on flood and risk management to take into consideration the implication of climate variability and climate change when assessing future flood risks and infrastructure opportunities and pressures (Box 11). The following potential sub-actions are also included.

- Build on the ACT's existing flood mapping by undertaking studies and release of information on flood risk for key urban rivers and creeks including: Molonglo River, Sullivan's, Yarralumla, Long Gully, Weston, Woolshed, Tuggeranong and Ginninderra creeks.
- Review and revise codes relating to flood protection, flood planning standards, floodplain protection, retardation and on-site detention.

Box 11: How does the ACT plan for floods?

Canberra planning has always taken into account the need to avoid development in flood prone areas. Since the 1970s, planning for new urban development in the ACT has kept development above the 1% Annual Exceedance Probability (AEP) flood level. The AEP refers to the 1-in-100 year flood – considered the most appropriate flood level to plan for in urban settlement.

The local stormwater system is designed to cope with the 1% AEP storm flows through a combination of piped flows and overland flows. However, no areas are completely immune to flooding. Floods greater than the 1% AEP are possible, and extremely intense local rainfall can cause localised flash flooding.

The ACT Government is updating flood studies over the next three years for creeks and some major stormwater channels within and adjacent to urban areas. Once these studies are completed, maps of the 1% AEP flood extents will be made available to the community. The 1% AEP is an estimate that will change as the climate changes and as more historic rainfall and flooding information is gathered over time, which might change assumptions used in the modeling and estimations.



OUTCOME 2: A sustainable water supply used efficiently

An Integrated and efficient water supply system that provides for the optimal mix of supply options, encourages efficient use of water, is resilient to climate variability, and secures the social, economic and environmental needs of the ACT community

STRATEGY 4: Secure long term water supplies

Actions

- 11 Plan for long term water security.
- 12 Strengthen water trading arrangements.
- 13 Investigate the benefits and costs of more diverse water supply.

Over the life of the ACT Water Strategy, the ACT Government will optimise the mix of water supply options that can respond to water planning variables through a robust and transparent comparison of all demand and supply options (Box 12). The aim is to optimise economic, social, health and environmental outcomes and reduce system reliability risks by spreading risk across the total water supply system and having access to a range of water supply options. This recognises that in most cases there is no one option that will provide a total solution. These water supply options would be drawn upon in different combinations depending on the local and regional climatic conditions, and the mix of sources selected would be those resulting in the most optimal environmental, social and economic outcomes over the long term.

11. Plan for long term water security

The following additional analysis and review will be undertaken to improve long term water resources planning.

- Continuing to build capacity for long term planning using best available data, modeling and analysis, including climate change data, multiple models, and ability to assess tradeoffs e.g. multiple water sources.
- Review the 1 year in 20 year water restriction target planning principle as the basis for ACT water planning for water security.

The ACT is developing a water resources plan, which is a requirement under the Basin Plan. This will incorporate risk management planning, provide direction on engagement with the Indigenous community on water values, and develop a water quality management planning framework and an environmental watering plan.





Box 12: Drivers for planning long term water supply

With current security of water storage achieved through new infrastructure, the ACT Water Strategy focuses on strengthening the resilience of the ACT's water supply system against a number of variables related to the supply and demand of water. These include:

- **Climate variability and climate change** – this variable may have the largest impact on the ACT's water supply, but is one of the hardest variables to predict.
- **Impacts of fires on inflows into ACT reservoirs** – future fires may periodically reduce the quality and quantity of water available in certain drinking water catchments.
- **Future population growth and the possibility of serving additional areas in NSW** – the population for the ACT and Queanbeyan is predicted to exceed 700,000 people by 2049.
- **Targets for reduction in per capita water use** – targets set through policy for per capita water consumption targets will influence the level of storage and supply system required.
- **Environmental flow requirements** – these flow requirements may be adjusted depending upon changing environmental conditions.
- **Acceptable levels of the duration, frequency and severity of water restrictions** – the social, economic and environmental costs and benefits of different water restrictions must be factored into planning. For example, acceptance of more frequent or severe restrictions may require less water supply system capacity.
- **Resilience** – the degree to which a water supply system can cope with variability (e.g. supply and demand), and disturbance (e.g. bushfires, infrastructure failures).

12. Strengthen water trading arrangements

Water trading arrangements, including internal water trading and external trading within the MDB (Box 13) will be strengthened. Key activities will include finalising the following arrangements.

- Interstate water trading arrangements to allow the transfer of water from Tantangara Dam to Googong Dam.
- General interstate water trading arrangements and rules under the Basin Plan.
- Investigating the scope for an internal ACT water trading market in the medium to longer term.

Box 13: Water trading in the ACT

The ACT currently has a very small internal water market confined mainly to trades involving a change of related land tenure. Negotiations between the ACT and NSW on interstate trading arrangements for the implementation of water trading are ongoing. ACTEW has already purchased high security and general security water entitlements from the lower Murrumbidgee River Valley in NSW. These purchases have been made under ACTEW's future water security project. The purchases are also securing water for the ACT Region's future growth. The MDBA will establish protocols for ACT interstate water trading under the MDB Agreement. In the future, as the region develops and the population grows, it is likely that there may be further developments and requirements for interstate trade.

13. Investigate the benefits and costs of more diverse water supply options

The ACT Government will investigate the benefits, in terms of water quality and efficiency of water delivery, from a range of different local water supply systems (Box 14). This analysis will be used to make decisions on future investments in water supply (by government, the private sector and individuals) if and when required. Such analysis will be undertaken within the context of the key variables related to the supply and demand of water. The following options will be investigated.

- Canberra Integrated Urban Waterways Trial will be finalised and the outcomes of this trial assessed.
- Optimising the use of existing infrastructure through efficiency measures – ACTEW and the ACT Government will continue to look into ways to utilise or supplement existing infrastructure to achieve increased efficiencies.



Box 14: Water supply to Canberra

The ACT relies predominantly on a system of water supply that involves collection of water in protected catchments and delivery through a mains supply system.

The use of multiple source type water supplies within a city, however, can offer benefits.

- Capturing stormwater in artificial ponds can provide alternative options for irrigating green space.
- Water abstraction contributing to the performance of lakes and ponds, including for water quality.
- Urban areas can be more efficient at yielding water runoff during droughts compared to forested catchments, the latter of which captures and uses water in the vegetation, and infiltrates to groundwater.
- The removal of demand pressure on the mains supply provided by multiple sources enables environmental flows to be at the optimum level for longer in the catchments that house threatened fish species.
- The application of ‘fit-for-purpose’ principles where the quality and level of treatment required for water is matched to what is appropriate for its intended use.

However, if poorly planned, diverse water supplies can also have unintended negative consequences, such as high operating and capital costs, reducing incentives to use water wisely, disruption of price signals, and pose different health risks than from a centralised mains supply. The cost of providing a system with diverse water supply sources can also be very significant – imposing high water use fees on a system that has already invested heavily in security of supply.

Analysing how multiple water resources can integrate with a traditional supply system needs to be performed in a sophisticated manner to allow proper consideration of the interrelated economic, environment, health, pollution and resource implications.

- Reviewing the performance of alternative water supply options- The ACT Government has already invested significant funding into centralised water infrastructure (dams, pipelines, diversions), which has increased storage capacity and the ability to extract additional water from the Murrumbidgee River. The ACT Government and ACTEW will continue to investigate whether additional water supply options can provide enhanced water security through providing more flexible supply options. A number of options will also be considered for decentralised water supply systems, which will focus on wastewater and greywater systems as well as opportunities for localised irrigation from ponds.



STRATEGY 5: Manage and promote efficient and sustainable use of water

Actions

- 14 Improve and monitor provision of water services.
- 15 Encourage water users to conserve and use water wisely.

Both the 2011 NWC Report, Urban water in Australia: future directions and the 2011 PC report into Australia's urban water sector identified pathways for improving institutional and policy arrangements to achieve resource efficiency. These reports emphasised the importance of the following requirements.

- Best practice arrangements for policy making, regulatory agencies and water utilities.
- Best practice monitoring of utilities and monitoring of progress on reform.
- Protecting public health and the environment by ensuring that the impacts of the water sector's operations and investments are managed cost-effectively in accordance with society's expectations and clearly defined obligations.
- Ensuring that procurement, pricing and regulatory frameworks are aligned with overarching objectives and assigned to appropriate organisations.

Continuous improvement in the delivery of water services by the water sector is a key focus, as is encouraging water users to conserve and use water wisely.

14. Improve and monitor provision of water services

The ACT Government will review agreed levels of service for water utilities in the ACT and monitor their performance, including reviewing ACTEW's licence arrangements. Agreement on levels of service will allow the community to understand how seasonal variability and climate change will impact on supply into the future and how different levels of service relate to costs. Measures undertaken to minimise risk and maximise efficiency in supplying water should be in accordance with agreed levels of service.

15. Encourage water users to conserve and use water wisely

The ACT Government has made significant investments in actions to reduce demand from the ACT's primary water supply system, and has already achieved its water efficiency targets set under TWAW (25% reduction in mains water compared with 2003 levels). The bulk of these reductions occurred through increased efficiencies and reduced demand in residential water use. As a service based economy with very few water intensive industries (manufacturing and commercial irrigation account for less than 2% of water consumption), further cost effective water efficiency measures will require a suite of approaches to be explored as follows.

- Investigate the use of scarcity pricing in promoting water use efficiently.
- Further improve the efficiency of non-residential water use through the Permanent Water Conservation Scheme.
- Improve alignment of the Permanent Water Conservation Scheme with temporary water restrictions to increase the chance of short term efficiencies being maintained over the long-term.
- Continue to implement well designed and targeted public education and awareness campaigns on efficient water use over the long-term.



OUTCOME 3: A community that values and enjoys clean, healthy catchments and waterways

Work with the ACT community to continue to use water efficiently, and to ensure safe, clean water for recreation and the environment.

Safe, clean water means that the community will be able to undertake water based or water dependent recreational activities without concerns for their health as a result of coming into contact with contaminated water. This also means that riparian and aquatic ecosystems are provided with safe, clean water, that allows these ecosystems and associated biodiversity to be healthy and resilient.

STRATEGY 6: Provide clean and safe water for the ACT

Actions

16 Improve management of rivers, lakes and public space to promote recreational use and reduce risks to public health.

Access to clean water is central to the needs of any city. The government will promote uses of water and catchments that enhance the liveability of the ACT and ensure that community, social, aesthetic and cultural values are recognised and maintained when managing water.

16. Improve management of rivers, lakes and public space to promote recreational use and reduce risks to public health

Key priorities under this action are as follows.

- Ensure statutory plans of management for water catchments (e.g. Cotter, Namadgi) include a key objective to manage the catchment for safe drinking water.
- Ensure plans of management adequately designate recreational activities, in particular the Urban Lakes and Ponds Plan of Management.
- Development of sub-catchment plans for the catchments feeding our major urban lakes, which are consistent with the overarching Integrated Catchment Management Planning Framework (ACT Government, 2000).
- Investments in new projects and maintenance programs, including on-ground projects, to allow water quality to be suitable for designated uses. This action aligns with actions under Strategy 2 as per the requirements of the Territory Plan.
- Review the guidelines for ACT Recreational Water Quality, taking into account guidelines on recreational water quality.
- To the extent possible, continue to irrigate sportsgrounds and public open space areas in an efficient manner.
- Refine and develop new communication tools (Web, App etc.) to provide public information and advice on water quality for recreational use to reduce risks to public health.



STRATEGY 7: Engage the community on understanding and contributing to a more sustainable city.

Actions

- 17 Promote community involvement in management of ACT water resources.
- 18 Ensure that indigenous and other cultural values are recognised in managing water planning and use.

The ACT community has a strong and active role in contributing to management of the ACT's catchments. Dozens of community based NRM groups and many more individuals, donate thousands of hours each year to actively manage and advocate for better catchment outcomes.

17. Promote community involvement in management of ACT water resources

The community will continue to play a prominent role in assisting the management and monitoring of water resources in the ACT. The ACT Government will continue to encourage community involvement through the following efforts.

- Supporting community volunteers involved in water resources management, particularly for monitoring and on-ground activities, e.g. through the provision of equipment and training.
- Public education, awareness and behavioural change campaigns on the role that community groups, individuals and businesses can play in improving efficient use of water and water quality, and reducing stormwater contamination.

Box 15: ACTSmart

The ACT Government ACTSmart programs deliver a range of water saving incentive and educational programs to assist households, businesses and schools improve their water efficiency.

- ACTSmart Business programs offer advice and assistance on water efficiency to the business and government sector. Case studies, fact sheets, online tools and awards are available to the non residential sector to support best practice in water management. Based on ESDD estimates of the water saving potential of fixtures installed, these programs saved in excess of 125,000 kL of water in 2013.
- ACTSmart Household programs offer a range of assistance including education, fact sheets, online tools, advice and assistance to low income households to improve the water efficiency of their homes. Based on ESDD estimates of the water saving potential of fixtures installed, these programs saved 1,557,000 kL of water in 2013.
- The ACTSmart Schools Water Program has conducted comprehensive water audits in ACT schools. The program provides schools with best practice guides, curriculum units, workshops for teachers, facilities and business managers and accreditation for the sustainable management of water. Water consumption data sourced from ACTEW indicates that public schools' water consumption was 330,000 kL lower in 2012-13 when compared to 2004-05 levels.

There are high levels of community interest and active involvement in managing the health of water ways. Catchment groups, Landcare and community groups such as the Upper Murrumbidgee Waterwatch (Box 16) and Frogwatch contribute hundreds of hours of volunteer time every year to monitor aspects of the catchment such as water quality and conduct water bug and frog surveys. Monitoring data collected through these groups provides an important basis for ongoing assessments of the condition of the ACT's waterways. Thousands more hours of community effort go towards restoration such as litter removal, weed removal and planting of native species to improve catchment condition.



Box 16: Upper Murrumbidgee Waterwatch

The Upper Murrumbidgee Waterwatch program (Waterwatch) engages with the community to raise awareness, educate, monitor, restore and protect our local waterways. Waterwatch has been running since 1995 and covers the Murrumbidgee catchment upstream of Burrinjuck Dam, an area of more than 13,000km². As at 2014, Waterwatch has 210 active water quality monitoring sites being monitored by over 170 volunteers. The three core objectives of Waterwatch are:

1. Engaging the community in monitoring and caring for our catchments.
2. Educating and raising awareness in schools and the community on catchment health.
3. Using data collected by volunteers to inform policy and on ground catchment management.

There needs to be an increased emphasis on the responsibility of householders and businesses to improve water quality through reducing pollutants entering the water system. Some of the ways in which the community can contribute to this are provided in Box 17.

Box 17: How the community can help protect water quality

The majority of pollution effecting Canberra's lakes and waterways comes from urban stormwater, where rain washes pollutants – nutrients, organic matter and solids – into drains, creeks and water bodies.

Established urban blocks continue to contribute significant amounts of pollutants into waterways. In addition to common sense things such as not pouring oil, paint and solvents down drains, or putting organic material such as garden waste into gutters, there are ten things you can do on your block to ensure that where you live contributes good quality water into our waterways:

1. Rake leaves away from the gutter, compost and use them on garden beds.
2. Apply fertiliser sparingly and only when needed.
3. Use timers on your watering system to avoid overwatering and runoff to gutters.
4. Use organic fertilisers like compost and other slow release forms.
5. Clean your paths, driveways and gutters with a broom rather than water.
6. Catch and use runoff on your block using swales, overland drainage and raingardens.
7. Avoid gravel or other loose material next to kerbs and drains.
8. Plant groundcovers, use mulch and avoid parking on nature strips to prevent erosion and soil compaction.
9. Wash your car on the grass or use a commercial car-wash that recycles wash water.
10. Cut the lawn only when it needs it and only to 5 cm.

Doing some, or all of these things will contribute to good soil condition. Soil which holds water, recycles its own nutrients, and filters what water goes through it, is one of the keys to healthier catchments.

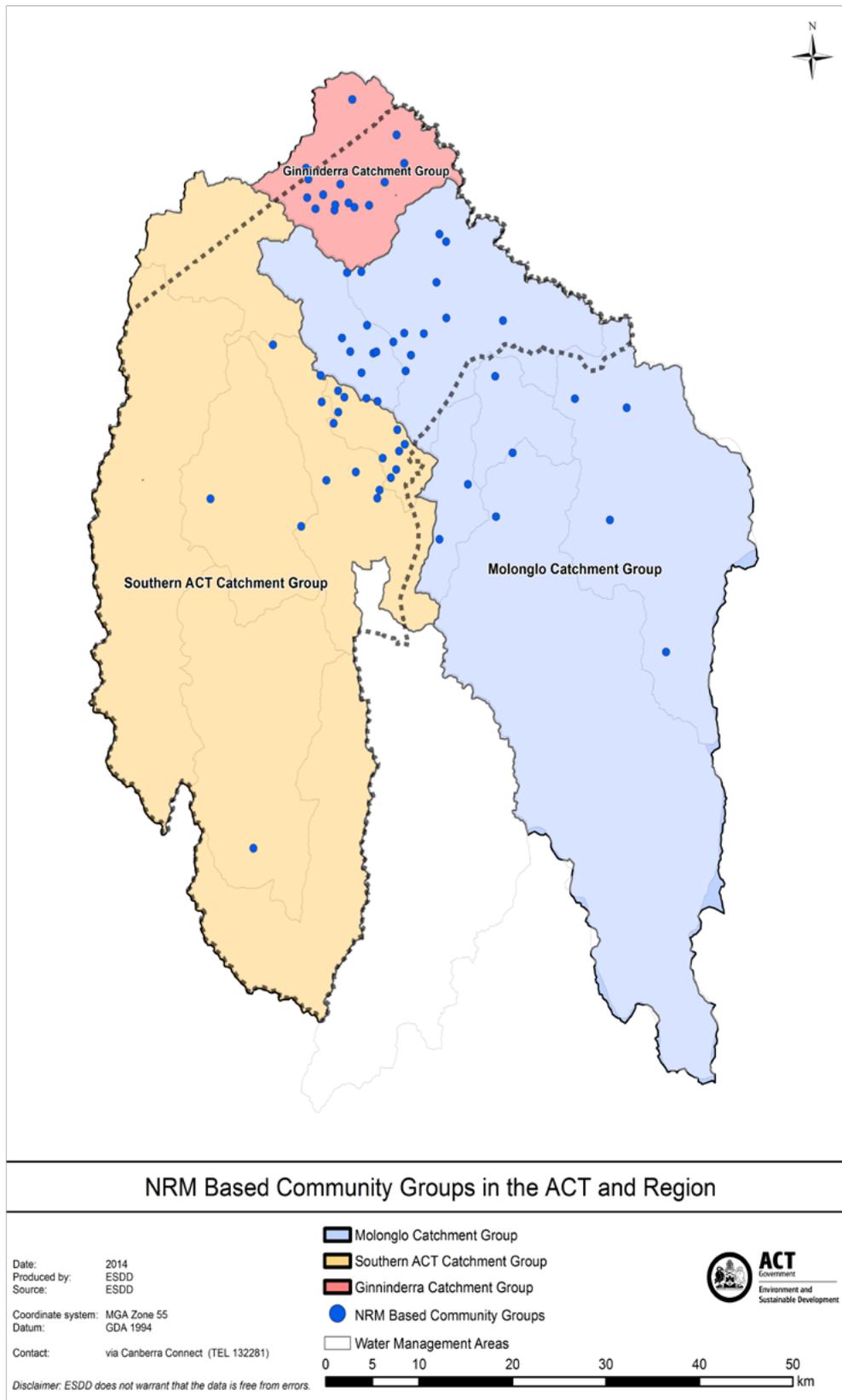
18. Ensure that Indigenous and other cultural values are recognised in managing water planning and use

Increasing our understanding of cultural values of water is fundamental to inform planning and water management. Key priorities under this action are as follows.

- Engaging with the Aboriginal community to recognise cultural values of water.
- Enhancing and sharing knowledge on the cultural values of water in the Upper Murrumbidgee.
- Consulting with the community on values for green infrastructure.



Figure 11: NRM based Community Groups in the ACT and Region



As shown in Figure 11, in addition to water management areas (drainage basins), the ACT also has a number of community based catchment boundaries. These boundaries relate to the communities' understanding of, and active involvement in, the management of land and water. The three Catchment Groups are umbrella community organisations that assist the numerous NRM based community groups such as ParkCare, Waterwatch, Landcare and Frogwatch, all of which actively contribute to catchment management, including monitoring.





5. Monitoring, evaluation and review

5.1 How will the ACT Water Strategy be monitored?

The effectiveness of the ACT Water Strategy will be measured through targets identified under each of the three outcomes. Each outcome has at least one long term (30 year) target to be achieved by the end of the ACT Water Strategy, as well as one interim target to be achieved during the first implementation plan (2014–18). Additional interim targets may be established when subsequent five year implementation plans are developed.

Reporting against actions will also occur through the Environment and Planning Directorate annual reports, the ICRC's reports and be informed by the ACT Annual Water Report required under the Commonwealth's *Water Act 2007*.

The condition of ACT catchments will continue to be reported through the Commissioner for Sustainability and the Environment State of the Environment Report and the ACT Water Quality Report.

5.2 Targets and indicators

Targets related to Outcome 1 – Healthy catchments and waterbodies

1. The ACT will maintain or improve the quality of water across all ACT managed sub-catchments (30 year target).

Indicators

- The AUSRIVAS performance classifications for select reaches of major rivers are maintained or improved. The level of nutrients, organic material and sediment loads entering the ACT reach of the Murrumbidgee River is no greater than from a well-managed rural catchment.
- In the case of urban creeks, reduction in the intensity and volume of urban stormwater flows so that the runoff event that occurs on average once every three months, is no larger than it was prior to development.
- In the case of regulated water supply catchment streams, provision of the base flow, riffle and channel maintenance flows, and special purpose flows in accordance with the ACT Environmental Flow Guidelines.
- In the case of natural ecosystems and modified ecosystems, protection of the base flow, riffle and channel maintenance flows, and special purpose flows in accordance with the ACT Environmental Flow Guidelines.

1a. (Interim target) A measurable improvement in catchment health in areas (sub-catchments) that receive funding for on-ground works from the ACT Basin Priority Project (Commonwealth funded, 2014-2019).

Indicators

- Median Total Phosphorus load from rural catchments less than 12 kg/km²/yr.
- Median Total Phosphorus load from urban catchments less than 20 kg/km²/yr.
- Median Organic material (measured as TOC) load from rural catchments less than 200 kg/km²/yr.
- Median Organic material (measured as TOC) load from urban catchments less than 500 kg/km²/yr.
- Median Suspended Solids load from rural catchments less than 5000 kg/km²/yr.
- Median Suspended Solids load from urban catchments less than 10,000 kg/km²/yr.



Targets related to Outcome 2 – A sustainable water supply used efficiently

2. Live within the SDL set for the ACT (30 year target).

Indicators

- Meeting the TAWW (2004) 25% reduction in mains water usage per capita target by 2023.
- Meeting the 40% target under the WSUD code for reducing mains water usage in new developments, extensions and refurbishments.
- Maintaining the measures set under the Permanent Water Conservation Scheme and investigate any possible extension of the measures.

2a. (Interim target) Measurable reduction in mains consumption for non-residential water use (five year target, 2019).

Indicators

- Measurable reduction in mains consumption for non-residential water use (against 2013 levels) (five year target, 2019).
- Reduction in water use through schools (overall water use, litres per student per annum water use) through the ACTSmart Schools Program.

Targets related to Outcome 3 –A community that values and enjoys clean, healthy catchments

3. Increased community understanding and participation in managing and improving waterways in the ACT (30 year target).

Indicators

- Increased number of community hours devoted to management of aquatic ecosystems (e.g., wetlands, creeks etc.) (compared to 2013).
- Increased initiatives generated by the community for catchment improvements.
- Number of Waterwatch volunteers/sites being monitored monthly and annually (and community monitoring integrated into ACT Water Report).
- Waterwatch monitoring includes data of changes in community behaviour and impacts on water quality e.g., observed litter, damage to river banks, illegal activities etc.
- Number of education campaigns delivered on improving water quality (surveys before and after each campaign).
- Areas of sub catchment where on-ground land and/or water improvements have been undertaken by the community (area, number of plants).

3a. (Five year Interim target) The ACT's community awareness and understanding of waterways, their functions, and why their protection is vital has increased.

Indicators

- Number of education campaigns delivered on improving water quality (surveys before and after each campaign).
- Number of education campaigns delivered on domestic behaviour regarding water demand and quality management (gardening waste, car washing, detergents, fertiliser etc.).
- Number of education campaigns delivered on improving awareness of waterway function and protection (eg species reliant on good water quality such as platypus, native fish, waterbugs and frogs).
- Targeted locations for signage and improved clarity and consistency of messaging.
- Measured improvement in knowledge of a sample representation in selected sub catchments where targeted education campaigns have occurred.



3b (Five year Interim Target) Decreased evidence (assuming standard monitoring regimes) of water pollution in urban sub-catchments of the ACT.

Indicator

- A reduction in gross pollutants collected from GPTs (measured in kg, compared year to year, and based on weather).

5.3 Review

A 30 year planning horizon is adopted under the ACT Water Strategy. Five year implementation plans will be monitored and reviewed to measure progress and to identify future priorities and milestones. The implementation plans are central to ensuring that the ACT Water Strategy remains current and able to respond to the latest challenges and knowledge. A major review of the ACT Water Strategy will be undertaken at ten year intervals to ensure the overarching policy framework for implementing the ACT Government's water responsibilities is responsive to the evolving water management context in the ACT and nationally.





6. Implementation

Implementation of the ACT Water Strategy will be guided by five implementation plans covering five year periods for each plan starting with this plan for 2014–18.

The first plan (Implementation Plan 1) should be read in conjunction with this ACT Water Strategy. Subsequent plans will be developed following a review during the final year of each implementation plan. The review will form the basis of the next implementation plan which will be developed by the ACT Government.

Implementation of actions will be dependent upon the availability of funding. The ACT Government will focus efforts to secure resources for actions that demonstrate cost effectiveness in terms of improving water quality, contributing to improved water security, and better community health and recreation outcomes. Actions which are currently unfunded remain future options for further consideration by government and other interested partners. If funding is not available activities may be required to be re-scoped and undertaken within existing resources.

6.1 Implementation mechanisms

Policy, planning and regulation – Policy review, policy development and regulation is generally the responsibility of the ACT Government in close collaboration with ACTEW. Agencies responsible for these functions are identified in each implementation plan against relevant actions.

Projects and new initiatives – Several actions relating to on-ground investment that will improve water quality, or enhance the security and reliability of water supply are identified in the ACT Water Strategy. On-ground investment is likely to occur through projects and new initiatives at different scales, and often through multiple partners and funding sources. Examples of currently funded projects and new initiatives are outlined in Box 18. New initiatives will arise over the life of the ACT Water Strategy as funding becomes available through ACT and external sources such as the Australian Government.

Government programs – ACT Environment Grants, administered by the ACT Government, are designed to assist the community carry out worthwhile environmental projects. Projects should align with the actions to ensure consolidation of effort. Other relevant government programs from the ACT, NSW and Commonwealth may arise over the life of the ACT Water Strategy.

Box 18: Projects and initiatives

ACT Basin Priority Project (2014-2019) – The ACT and Commonwealth Governments will invest up to \$85 million to identify and invest in actions to improve the quality of water from the ACT that enters the Murrumbidgee River. Activities will include monitoring and investments in infrastructure to improve water quality.

Actions for Clean Water (ACWA) - The ACWA Plan is a collaboration between ACT Government, ACTEW, and South East Local Land Services (formerly Murrumbidgee CMA). It sets out actions needed to improve water quality and reduce turbidity in the upper Murrumbidgee which will benefit the environment and also the water supply of Canberra, Queanbeyan and Cooma. Some components of the ACWA Plan have received funding, while others require further resources for implementation. Some initial seed funding has gone into on-ground actions, and further funding is being sought from implementing partners.



Research and monitoring – Research and monitoring will inform many of the planning, and on-ground actions. For example, trialling in-lake interventions such as macrophyte beds and aerating sediments in the ACT’s urban lakes (an action under Strategy 2) will inform ongoing management of these waterbodies. Monitoring will be used in a variety of ways. For example, monitoring water quality across the ACT will inform priorities for on-ground investments. The performance of infrastructure assets will also be monitored in order to assess their effectiveness for their intended function.

Investigating options and developing business cases - For example, analysis on different water supply options will inform the outcomes of Action 3 (under Strategy 4- Reviewing the performance of alternate water supply options), which will provide information as the basis for future investment decisions.

Delivery of water services – ACTEW plays a key role in the development and implementation of the ACT Water Strategy through the delivery of water and sewerage services to the ACT region on behalf of the ACT Government. ACTEW’s services align with the ACT Water Strategy through: the ongoing analysis and high level advice on future water supply and demand based on a range of scenarios; monitoring and risk assessment of water quality and aquatic ecosystems of the Cotter, Murrumbidgee, Queanbeyan and Lower Molonglo river systems; security and diversity of water supply through infrastructure and trading arrangements; and enhancing environmental flows through discharge regimes from dams and returning flows to the Molonglo River from the Lower Molonglo Water Quality Control Centre.

Ongoing management and maintenance - Responsibilities for managing water infrastructure and water resources are currently divided across a number of organisations and agencies. Catchment management arrangements are described under Strategy 1 of the ACT Water Strategy and involve the cooperation of a large number of regional stakeholders. Generally speaking, the ACT Government is responsible for the management of stormwater including waterways, lakes, ponds and WSUD infrastructure (unless otherwise agreed, where infrastructure is privately owned), and ACTEW is responsible for the potable water supply and sewerage networks.



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