



WQPN 36, FEBRUARY 2009

Protecting public drinking water source areas

Introduction

The Department of Water is responsible for managing and protecting the state's water resources in association with other state government agencies. It is also a lead agency for water conservation and reuse. This note provides:

- our current advice on land and water based activities in proclaimed public drinking water source areas
- guidance on best practice management used to protect the quality of Western Australian water resources
- an overview of the legislation, policies and processes used to protect public drinking water source areas for major population centres and rural towns in Western Australia
- a basis for the development of a multi-agency guideline designed to balance the views of the community, industry and Government, while sustaining reliable safe public water supplies.

Public drinking water source areas (PDWSA) include the catchment area of surface water sources (reservoirs) and the recharge area of a groundwater sources (bore-fields). These areas are presently proclaimed as water reserves, catchment areas or underground water pollution control areas under the *Metropolitan Water Supply, Sewerage and Drainage Act 1909*, or water reserves or catchment areas under the *Country Areas Water Supply Act 1947*. For a current list of PDWSA, see our water quality protection note 75 *Proclaimed public drinking water source areas*.

PDWSA provide the community of Western Australia with the majority of its drinking water supplies. Surface and underground water resources in these areas can be vulnerable to contamination by a range of land uses and water based activities. To address this concern, the Department of Water is responsible for policy development and protection implementation consistent with state water resources management legislation. Drinking water source protection systems should ensure that the state's limited fresh water sources are safe for consumers now and into the future. The main documents that underpin the drinking water source protection program in Western Australia are:

- *Australian drinking water guidelines 2004*
- Department of Water policy - *Land use compatibility in public drinking water source areas 2004*

- Department of Water *Policy and guidelines for recreation within public drinking water source areas on crown land* 2003
- Department of Water *Protecting public drinking water source areas in Western Australia* 2005
- Western Australian Planning Commission (WAPC) - State planning policy 2.7 *Public drinking water source policy*.

We work with other state agencies such as the departments of Health and Environment and Conservation, the Western Australian Planning Commission and licensed water service providers to protect water quality in proclaimed PDWSA. This cooperative approach should ensure the continued availability of safe, good quality drinking water to protect public health at a reasonable cost to consumers.

The departments of Health and Water do not recommend the use of water taken from waterways or private bores for drinking water use, where a scheme water source is available. This is because the catchments of these alternate sources are generally not protected from contamination and waters are not routinely analysed or treated to meet the health-related guidelines for drinking water. However, such sources can be useful for non-potable uses such as for washing clothes, toilet flushing and garden irrigation.

If a scheme water supply is not available, land holders should implement measures to ensure their drinking water source is safe to drink (i.e. arrange water treatment and analyses so the supply routinely meets recommended health criteria in the *Australian drinking water guidelines* 2004). Further information on the management of drinking water sources is provided in our water quality protection note 09 *Community drinking water sources* and note 41 *Private drinking water supplies* ([Reference 4d](#)). The Department of Health also has brochures available covering bores and rainwater tanks ([Reference 3](#))

Why do we protect our drinking water supplies?

Drinking water should be safe to drink and aesthetically pleasing. Ideally, it should be clear, colourless, odour free, pleasant tasting and contain no harmful chemicals or disease-causing microbes. To keep drinking water clean it is important to protect our proclaimed surface and underground drinking water sources.

From the mid 1990s, the Council of Australian Governments (COAG) reform has fostered the sustainable use of water resources by protecting and enhancing their quality, while maintaining economic and social development. This was pursued through the development of the *national water quality management strategy* (NWQMS) comprising more than 20 national guideline documents. Two of these focus on drinking water:

- *Australian drinking water guidelines (paper 6) 2004 (ADWG)*
- *Australian guidelines for water recycling; managing health and environmental risks (phase 2) – augmentation of drinking water supplies, (paper 22) May 2008.*

The 1996 version of *the Australian drinking water guidelines* recognised water source protection through catchment management as an effective approach to preventing contamination of drinking water sources and undertook to investigate this issue further.

In May 2001, the Western Australian government supported the NWQMS (including the drinking water guidelines) through the launch of the *state water quality management strategy* (SWQMS). In late 2002, the 1996 guidelines were updated and released for public comment. The current ADWG were approved in 2004. A consumer guide to the ADWG 2004, called *Water made clear*, was also released to raise awareness of the need to protect drinking water from 'catchment to consumer' ([Reference 1f](#))

Less than half of Perth's scheme water supplies come from surface water sources with the remainder sourced from groundwater or desalination. In 1994, a legislative assembly select committee reported on the issue of Perth's development and groundwater supplies. The select committee considered data presented from around the world and concluded that for catchment management that '*an ounce of prevention is worth a pound of cure*'. In the foreword to the select committee report, the chairman noted: '*experts around the world expressed their envy of our relatively pristine water supply and advised us to protect our groundwater supply at all costs*'.

In 2000, the state legislative council's standing committee on ecologically sustainable development published a report, *Quality of Perth's water supply*, expressing confidence in the system used to manage and operate these water supplies. The standing committee noted, however, that various activities posed a contamination risk to water supplies. It found '*as a first priority that water sources be protected through good land use planning*'. The committee also noted that '*using treatment to deal with contamination is a second-best option*' and '*found support for adopting catchment protection as the major weapon in preventing contamination of water supplies*'.

In November 2001, in support of the government committee finding, the Western Australian Planning Commission (in consultation with the then Water and Rivers Commission) released a statement of planning policy 2.7 - *Public drinking water source policy* for public comment. This policy was proclaimed in June 2003 and guides state and local government land use planning decisions in PDWSA through provisions in the metropolitan region scheme (MRS) and local government planning schemes.

Although the parliamentary committees were reporting on Perth's water supplies, their findings are considered to apply to all public drinking water sources in Western Australia. This is especially true when a community is reliant upon a single drinking water resource (such as the groundwater bore network in Kununurra or the surface water reservoir at Quinninup) rather than an integrated series of sources (such as those that supply the Perth metro region). Contamination of a single drinking water resource caused by inappropriate land use planning or polluting land use activities can have significant health, economic and social impacts.

The State Government released *Securing our water future –A state water strategy for Western Australia* in February 2003. The government's response to section 8.6 catchment protection and land use controls was 'recognition of the primacy of water quality in the management of drinking water catchments, to protect the long term sustainability of the resource, will be used to guide catchment management decisions'. In September 2003, the state government also released the *state sustainability strategy - hope for the future*.

Drinking water catchments are recognised in that strategy as important *natural resources* together with other common natural resources (e.g. agriculture, fisheries, forestry, mining, tourism, aquatic systems, coastal and marine environments and rangelands). The *vision* in the strategy is that *drinking water sources are fully protected for future generations*. The strategy lists the following 'actions'; *stakeholders should*

- *Work to ensure all present and future drinking water sources are protected* (action number 3.48).
- *Ensure the activities in catchments are actively managed and sustainable... through '...investigation of the impact of active catchment management strategies that enhance water quality and quantity outcomes...'* (action number 3.51).

The State government released the *State water plan* in 2007. The plan:

- recognised both the national and state water quality management strategies; and the WAPC SPP2.7 and SPP 2.9 *Water resources policy*
- recognised the need for drinking water source protection plans
- stated an objective *Protect current and future drinking water sources through land use management to prevent contamination and risks to public health*
- made the delivery service policy *current and future public drinking water sources are managed with the primary aim of providing safe drinking water*
- defined the protection planning priorities for PDWSA until 2011.

It noted that *drinking water source protection plans recognise the primacy of water quality in the management of drinking water catchments to provide safe drinking water to consumers. Through source protection planning, inappropriate land uses and polluting activities (which can have significant health, environmental and economic impacts) can be avoided*. The State water plan advises on page 10 *water planning should inform and integrate with land use planning. Increasingly, it is intended that water planning should precede land use planning. This provides an important natural resource management context for land use planning and identifies resource opportunities, constraints and compatible land use activities*.

Who is involved in protecting our drinking water supplies?

The community, land owners, developers, industry, agricultural producers, local government authorities (councils), licensed water service providers such as the Water Corporation and the state government agencies share responsibility for the condition (quality) and availability (quantity) of our drinking water. Each of these stakeholders plays a significant role in the development of drinking water source protection plans for each PDWSA in Western Australia. They may also be involved in the implementation of the recommendations in the protection plans. There are about 150 proclaimed public drinking water sources requiring a plan. Over 90 plans have been completed and are published online at < www.water.wa.gov.au > select *water quality > drinking water*.

Department of Water's role

Our responsibilities include defining, proclaiming and protecting PDWSA. We promote a coordinated approach to water quality protection *from catchment to consumer*, encompassing a variety of related measures including regional and local land use planning, health and environmental legislation.

The Department of Water undertakes the following activities:

- prepares and implements catchment protection legislation
- provides policy and guideline documents (such as water quality protection notes and brochures) to protect sensitive water resources ([Appendix A](#))
- arranges drinking water source protection risk assessments
- prepares drinking water source protection plans (DWSPP) and assists in the preparation of land use and water management strategies (LUWMS)
- advises other decision-making agencies on catchment and source protection measures
- facilitates implementation of source protection measures in DWSPP and LUWMS
- undertakes and facilitates effective by-law enforcement and catchment surveillance
- conducts assessments and recommends approval conditions for land use developments or activities
- negotiates protection measures for the land use planning processes
- advises on the compatibility of land use development and use activities.

The department also provides the Minister for Water Resources with assessment, planning and water resource management advice.

Department of Health (DoH)

The DoH has primary responsibility for protecting community/public health. Its role is to minimise human exposure to environmental health hazards that pose (or have the potential to pose) a health risk and to reduce the incidents and impact of communicable disease. To safeguard against unhealthy drinking water, the Department of Water works closely with DoH and individual water service providers.

The DoH also chairs an inter-agency committee, called the *Advisory committee for the purity of water*, which was established in 1925. This committee is charged with the ongoing responsibility of advising the executive director public health and the Minister for Health on drinking water protection issues from catchment to consumer.

Department for Planning and Infrastructure (DPI)

The DPI has a significant role in the protection of PDWSA. The Western Australian Planning Commission, with the support of DPI, prepares and publishes land use and water management strategies (such as Gngangara, Jandakot, Middle Helena and East Wanneroo LUWMS), planning bulletins and specific state planning policies (SPP 2.2, 2.7 and 2.9) to help protect PDWSA from inappropriate land use developments.

Economic Regulation Authority (ERA)

The ERA has a key role in regulating community drinking water supplies. The ERA is the independent economic regulator for Western Australia. It oversees regulation and licensing in Western Australia for the gas, electricity, water and rail industries and inquires into matters referred to it by the state government. The water division of ERA is responsible for the functions outlined in section 4 of the *Water Services Licensing Act 1995*. These functions include licensing water service providers and monitoring the operational performance of water industry service providers. ERA licences are designed to maintain a high quality of water services to the public.

To obtain a licence, the service provider is required to establish a *memorandum of understanding* with the Department of Health specifying water quality, operating and reporting requirements. A water quality management plan for the water source, including a drinking water source protection plan, is required by the DoH prior to establishing the memorandum. In general, licensees must undergo audits to ensure the effectiveness of their management systems and meet service standards specified in their licence. The Water Corporation is the largest licensee in WA. Other licensed water service providers include the Busselton Water Board and Aqwest (Bunbury Water Board).

Water Corporation (WC)

The Water Corporation was formed in the mid 1990s following the split up of the former Water Authority of Western Australia as part of the COAG water industry reform initiatives. The corporation supplies water to the Perth metropolitan area as well as a further 230 towns across the state. Although it is a corporation, subject to corporations' law and managed by a board of directors (including a managing director or chief executive officer), the state government is the sole shareholder.

Under legislative powers, the Department of Water may delegate certain catchment management functions to the Water Corporation (or other water service providers). Delegation is appropriate as the corporation has a vested interest in assuring high quality drinking water from PDWSA and is prepared to resource catchment management functions. Currently, delegated functions relate to surveillance of PDWSA and the enforcement of by-laws relating to transient activities within these areas. The extent of delegated responsibilities may vary for each PDWSA.

What are the risks requiring protection of drinking water sources?

Land use planning decisions and recreational, business and private land uses and activities in PDWSA can affect the quality and quantity of drinking water sources. Where catchments remain covered with native vegetation with little human activity, the risk of contamination has been found to be low. However, contamination risks increase with the intensity of human activity/development.

Potential contaminants include:

- physical contaminants, such as colour, foaming agents and suspended solids
- chemical contaminants, including salts, pesticides, heavy metals and petroleum residues
- micro-biological contaminants (bacteria, intestinal parasites and viruses).

Although treatment processes can remove many contaminants, treatment also increases the cost of the water supplies. Continuous effective removal of all contaminants is also not technically or economically feasible. The Cooperative Research Centre for Water Quality and Treatment (2006) noted that *treatment barriers are not absolute. It is now recognised that water treatment does not remove contaminants even when working properly. Rather, the treatment barriers reduce contaminant concentrations (Reference 2)*. If contamination of a drinking water source does occur, the opportunity to locate and develop a replacement source is often limited, and the provision of alternatives, such as bottled drinking water, is costly and is considered only a short-term solution.

Preventing contamination before it occurs alleviates the need for costly treatment or development of more costly alternative sources. There is a substantial ongoing financial cost to be borne in sampling and testing for contaminants if they become prevalent in drinking water sources. The benefits (environmental, social and economic) of avoiding contamination through best management decisions and practices are recognised in the *Australian drinking water guidelines 2004* ([Reference 1](#)).

Drinking water quality and safety cannot be taken for granted. Consultation with the community and other stakeholders is needed to establish appropriate state and local government legislative and non-legislative controls. These controls are necessary to manage a range of threats to drinking water areas. Controls are needed for:

- land use planning processes and decisions relating to high risk developments in catchments
- recreational activities where the impact of human wastes and damage to natural protective measures associated with increased intensity land use is addressed
- chemical, animal and domestic waste and pesticides use and/or disposal.

Drinking water that is not effectively treated, or that travels through an inadequately maintained distribution system, also poses a serious public health risk. Several relatively recent events have occurred nationally and internationally that highlight the importance of protecting PDWSA and the need for a multi-barrier protection approach.

The main finding of an inquiry into the well-publicised *Sydney water crisis* (NSW 1998) was that the local catchments were seriously compromised by many potential sources of contamination and that there was insufficient regulatory control to guarantee safe drinking water. The *Sydney water catchment authority* was set up in response to this event, which transferred responsibility for land use decisions within the catchment from the planning authority to the new catchment authority.

At Walkerton (Canada) in 2000 a drinking water tragedy occurred where an *Escherichia coli* disease outbreak resulted in over 2300 cases of illness amongst 4800 residents, 70 people were hospitalised and seven deaths were attributed to the outbreak. A judicial inquiry concluded that the likely initial cause of the outbreak was from manure applied to farmland within the catchment (a common practice around the world) that resulted in bacteria contaminating the shallow underground aquifer used to supply drinking water to the town.

Other contributing factors to the Walkerton outbreak included a high rainfall event immediately prior to the contamination outbreak, an inadequate disinfectant dose rate and poor sampling and monitoring issues related to the distribution system. It is important to appreciate that the drinking water system at Walkerton operated for more than eight years without major incident up until the year 2000. The over-reliance on treatment to provide a safe drinking water supply was highlighted and pathogens were again identified as the most significant risk to drinking water quality. From this tragedy a new approach to drinking water systems management was adopted in Canada. It combined catchment protection and treatment to provide a more reliable and safe supply to consumers. That approach is consistent approaches recommended by the World Health Organisation and Australian drinking water guidelines.

How do we protect public drinking water source areas in Western Australia?

A multiple protection barrier risk-based approach is used to protect drinking water quality in Western Australia from catchment to consumer. This approach conforms with the protection framework recommended in the *Australian drinking water guidelines 2004*.

Catchment management for protection of water quality is considered the primary barrier. Historically, a world-wide reliance was placed on treating water to achieve the desired level of safety, but it is now recognised that treatment alone does not remove all public health hazards. Effective catchment protection combined with treatment is essential.

Other protective barriers that can be employed include:

- selection of an appropriate, safe, high quality source (where alternatives exist)
- controls over land uses and high risk human activities in catchments, underpinned by statutory measures
- protective buffer zones to bores, reservoirs and feeder streams
- catchment protection strategies involving community education, catchment surveillance, enforcement, monitoring and reporting
- pre-treatment of drinking water, such as the use of extended detention and settling in large reservoirs to foster die off of disease-causing organisms
- effective protection of water storage infrastructure (water tanks and reservoirs) from contaminant access
- appropriate water treatment and disinfection of raw water before it enters the distribution system and safeguards ensuring adequate pathogen controls throughout that system
- maintaining the distribution system as a whole including the pipe system, vermin proofing of water tanks and preventing back-flow.

These barriers are promoted and implemented in a range of legislation, policy, plans and guidelines used by this department. Proclamation processes provide a legislative definition of each PDWSA and allow by-laws to be applied. Departmental policy describes the roles and responsibilities of key stakeholders.

Drinking water source protection plans describe the contamination risks within PDWSA and recommend protection strategies (within P1, P2 and P3 protection areas and protection zones) to control those risks. Guidance documents (such as our water quality protection note series) advise on best practice to protect water quality. Our note 06 *Vegetated buffers to sensitive water resources* ([Reference 4d](#)) recommends the use of native vegetation buffers as a protective measure between drinking water resources and land use activities. The retention and, where practical, re-establishment of these buffers is recommended in PDWSA.

More information on plans, assessments, protection classification areas and protection zones is provided later in this note. These legislative and policy measures form the basis of the drinking water protection program employed in Western Australia.

Drinking water source protection assessments and plans

Drinking water source protection plans (DWSPP) are a key component of the *catchment to consumer* protection strategy for Western Australia's drinking water sources. This is reflected in the state government's 2007 *State water plan*. The aim of each DWSPP is to identify existing and potential threats to a drinking water source, and to provide risk management strategies and programs for ongoing management and protection of the source. Plans are prepared in consultation with the community, potentially affected landowners, local government authorities and the state government.

Stakeholders are strongly encouraged to consider the risks and potential consequences of inappropriate land use planning or human activities in PDWSA (such as contamination of the resource and costs to clean-up or establish a new drinking water source). Land use activity restrictions might be applied through land planning processes in order to achieve a safe, good quality drinking water supply.

Providing a basis for establishing compatible land uses within PDWSA, the DWSPP is only one of a suite of measures used by this department to meet its drinking water protection responsibilities.

Land planners and developers should be aware of the location and risks to existing drinking water catchments. To assist with this process, this department arranges for drinking water source protection assessments (DWSPA) and maintains a register of all PDWSA in each local government authority (see our water quality protection note 108 *Public drinking water source areas of Western Australia – A register of drinking water catchments within each local government*). The assessments provide a broad overview of catchment risks, current land uses and a basic understanding of the drinking water catchment and supply system. They are not intended to include extensive data, but characterise the drinking water system by providing useful information for decision-makers.

DWSPA normally provide a desktop assessment of the natural features, water sources and land use data followed by a site visit and discussions with the relevant local government authority. Sometimes the DWSPA may be all that is required to achieve good land planning/ activity controls (through local planning schemes or strategies) for the protection of drinking water source areas. The DWSPA provides a basis for the development of the publicly-consulted DWSPP as described above.

Protection areas

P1 source protection areas are defined to ensure that there is no degradation of the water source. P1 areas are declared over land where the provision of high quality public drinking water is the prime beneficial land use. P1 areas typically include land under public ownership. P1 areas are protected in accordance with the objective of *risk avoidance*.

P2 source protection areas are defined to ensure that there is no increased risk of pollution to the water source. P2 areas are declared over land where low intensity development (such as pasture and dry-land cropping) exists. Protection of public water supply sources is also a high priority relative to other land use values in these areas. P2 areas are protected in accordance with the objective of *risk minimisation*.

P3 source protection areas are defined where it is necessary to manage the risk of pollution to the water source, and where water supply sources need to co-exist with other existing land uses such as residential, commercial and light industrial developments. P3 areas generally include the requirement for use of best available environmental management practice and connection to deep sewerage. P3 areas are protected in accordance with the objective of *risk management*.

Reservoir protection zones (RPZ)

RPZ (termed *prohibited zones* in current legislation), protect surface water sources managed under the *Metropolitan Water Supply, Sewerage and Drainage Act 1909* from contamination by exclusion of access. RPZ consist of a buffer area defined in DWSP within two kilometres of the top water level of reservoirs and include the reservoir itself. These zones do not extend outside the catchment area (i.e. downstream from the dam wall). To avoid the risk of water contamination, catchment protection bylaws are used to prevent people from entering the RPZ except on public roads. By-law changes are currently being developed to allow a RPZ of up to two kilometres from reservoirs to be proclaimed state-wide in DWSP. More information on RPZ is available in our draft water quality protection note 14 *Reservoir protection zones in public drinking water source areas*.

Wellhead protection zones (WHPZ)

WHPZ are defined around groundwater abstraction bores. In the absence of modelled alternative zone shapes, WHPZ in P1 areas are set at a 500 metre radius around bores, and in P2 or P3 areas they are set at a 300 metre radius around bores.

Additional information

In protection areas and protection zones there is a strong reliance on landowners, developers, regulators and other users to be aware of the drinking water resource and contamination risks, and ensure the adoption and implementation of best management practices to help protect the drinking water source.

Existing, lawfully established but non-conforming land uses in PDWSA are allowed to continue, however land users are encouraged to adopt environmentally responsible/best practice land use methods. Expansion of these non-conforming uses will be opposed.

Our water quality protection note 25 *Land use compatibility in public drinking water source areas* presents our policy position on the types of land uses appropriate within P1, P2 and P3 areas. A flow diagram within the note demonstrates how protection classification and protection zones within DWSP are determined. Additional information is available in our draft water quality protection note 94 *Wellhead protection zones in public drinking water source areas*.

More information

Your views on this water quality protection note are welcomed. Feedback provided on this topic is held on our file **18856**.

To comment on this note or for more information, please contact our water source protection branch as shown overleaf, citing the note topic and version.

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This note will be updated periodically as new information is received or industry/activity standards change. Updated versions are placed online at < www.water.wa.gov.au > select *water quality > publications > water quality protection notes*.

References and further reading

- 1 Australian Government - Department of Environment, Water, Heritage and the Arts National water quality management strategy (nwqms) papers available online at < www.environment.gov.au > select *water > water quality > nwqms > nwqms guideline documents*
 - a *Australian and New Zealand guidelines for fresh and marine water quality 4*, 2000
 - b *Australian drinking water guidelines 6*, 2004
 - c *Australian guidelines for water quality monitoring and reporting 7*, 2000
 - d *Policies and principles 2*, 1994
 - e *Implementation guidelines 3*, 1998
 - f *Water made clear – A consumer guide to accompany the Australian drinking water guidelines 2004*, available online at < www.nhmrc.gov.au > select *guidelines > health*.
- 2 Cooperative Research Centre for Water Quality and Treatment papers available online at < www.waterquality.crc.org.au >, select *publications > research reports*
Recreational access to drinking water catchments and storages in Australia, 2006
- 3 Department of Health (WA) publication available online at < www.health.wa.gov.au > search *household chemicals*
Safe use of household chemicals
- 4 Department of Water (WA)
 - a Policies available online at < www.water.wa.gov.au > select *policies*
 - *Land acquisition*
 - *Land use compatibility in public drinking water source areas*
 - *State-wide policy number 2 – Pesticide use in public drinking water source areas*
 - *State-wide policy number 13 – Policy and guidelines for recreation within public drinking water source areas on crown land*

- b *State water plan 2007* available online at <www.water.wa.gov.au>, select *planning for the future* > *State water plan 2007*.
- c Drinking water source protection plans covering water supply schemes across Western Australia are available as PDF files online at < www.water.wa.gov.au > select *water quality* > *publications* > *plans and assessments* or by contacting our nearest office.
- d Water quality protection notes available online at < www.water.wa.gov.au > select *publications* > *water quality protection notes*
 - WQPN 06 *Vegetated buffers to sensitive water resources*
 - WQPN 09 *Community drinking water sources – protection and management*
 - WQPN 25 *Land use compatibility in public drinking water source areas*
 - WQPN 41 *Private drinking water supplies*
 - WQPN 75 *Proclaimed public drinking water source areas*
 - WQPN 36 *Protecting public drinking water source areas*
 - WQPN108 *Public drinking water source areas of Western Australia - a register of drinking water catchments within each local government*

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- a *State water quality management strategy 2001*, available online at < www.water.wa.gov.au >, select *water quality* > *publications* > *other publications*
- b *Securing our water future - a state water strategy for Western Australia 2003*, available online at < www.water.wa.gov.au > select *planning the water future*
- c *The Western Australian state sustainability strategy 2003* available online at < www.dec.wa.gov.au > select *our environment* > *sustainability* > *state sustainability strategy*

6 Government of Western Australia – Legislative Assembly

Select committee on metropolitan development and groundwater supplies, 1994, *Report of the select committee on metropolitan development and groundwater supplies*.

7 Government of Western Australia – Legislative Council

Standing committee on ecologically sustainable development, available online at < www.parliament.wa.gov.au > select *committees* > *reports*.
The quality of Perth's water supply – 9th report, 2000

8 Hrudehy, S.E. & E.J., 2004, *Safe Drinking Water – Lessons from Recent Outbreaks in Affluent Nations*, IWA Publishing, Cornwall, UK. Available for purchase from < www.iwapublishing.com >.

9 Western Australian Planning Commission documents are available online at < www.wapc.wa.gov.au > select *publications*

- a State planning policies
 - SPP 2.2 *Gnangara groundwater protection*
 - SPP 2.3 *Jandakot groundwater protection*

- SPP 2.7 *Public drinking water source policy*
 - SPP 2.9 *Water resources*
 - SPP 3.2 *Planning for aboriginal communities*
- b Land use and water management strategies (LUWMS)
- *Jandakot LUWMS*
 - *Gnangara LUWMS*
 - *Middle Helena catchment area LUWMS*
 - *The future of East Wanneroo: Land use and water management in the context of network city*

Appendices

Appendix A - Sensitive water resources

Clean water resources used for drinking, sustaining aquatic and terrestrial ecology, industry, and aesthetic values, along with breathable air, rank as the most fundamental and important needs for viable communities. Water resources should remain within specific quality limits to retain their values and therefore require stringent and conservative protection measures. Guidance on water quality parameters that are necessary to maintain water values are published in the Australian Government's *National water quality management strategy guidelines*, available online at < www.environment.gov.au > select *water* > *water quality* > *national water quality management strategy*.

The Department of Water strives to improve community awareness of catchment protection measures, for both surface water and groundwater, as part of a multi-barrier protection approach to water resource quality.

Human activity and many land uses pose a risk to water quality if contaminants are washed or leached into sensitive water resources in discernible quantities. These waters include estuaries, waterways, wetlands and unconfined groundwater accessed by water supply wells.

Sensitive water resources support one or more of the environmental values described below:

- 1 Public drinking water sources (i.e. *water reserves, catchment areas or underground water pollution control areas*) proclaimed or assigned under the *Metropolitan Water Supply, Sewerage and Drainage Act 1909*, the *Country Areas Water Supply Act 1947* or the *Health Act 1911*.
- 2 Private sources, used for the following water supplies:
 - a human or stock (animal) drinking water
 - b commercial or industrial water (requiring specific qualities that support activities such as aquaculture, cooling, food or mineral processing or crop irrigation)
 - c urban irrigation (that could affect people's health or wellbeing).
- 3 Recognised ecological functions in groundwater aquifers such as soil or cave fauna.
- 4 Social values in natural waterways including aesthetic appeal, boating, fishing, tourism and swimming.

- 5 Ecological functions of waterways including:
- a those of high conservation significance described in the Environmental Protection Authority's guidance statement 33 *Environmental guidance for planning and development* (section B5.2.2), available online at < www.epa.wa.gov.au > select *EIA > guidance statements*
 - b waterways managed by the Department of Water under the *Waterways Conservation Act 1976*, including the Avon River, Peel-Harvey, Leschenault Inlet, Wilson Inlet and Albany waterways
 - c waterways managed by the Swan River Trust under the *Swan and Canning Rivers Management Act 2006*.

Engineered drains or constructed water features are excluded as functional and operational factors may outweigh their water quality values.

- 6 Conservation values in wetlands (assigned or recognised, excluding those highly disturbed unless actively managed to restore specified environmental values), including:
- a Ramsar wetlands, described online at < www.ramsar.org >.
 - b High conservation significance wetlands as described in the Environmental Protection Authority's guidance statement 33 *Environmental Guidance for Planning and Development* (section B4.2.2), available online at < www.epa.wa.gov.au > select *Environmental impact assessment > guidance statements*.
 - c Wetlands defined by the Australian government in *A directory of important wetlands in Australia*, available online at < www.environment.gov.au > select *water > water for the environment > wetlands > wetlands publications, resources and links > books, reports directories*.
 - d Conservation valued and resource enhancement category wetlands identified in the *Geomorphic wetlands of the Swan coastal plain* dataset; all wetlands identified in the *South coast significant wetlands* dataset, and high value wetlands identified in the *Geomorphic wetlands Augusta to Walpole* dataset. The Augusta to Walpole wetland dataset awaits a detailed evaluation process. The Department of Environment and Conservation (DEC) is the custodian of wetland datasets and is responsible for maintaining and updating the information. The datasets can be viewed online at < www.dec.wa.gov.au > search *maps wetlands* or select *management and protection > wetlands > wetlands data*. Guidance on viewing the wetlands is provided on the same website at *water > wetlands > data* or by phoning DEC's nature conservation division for assistance on 08 9334 0333.

Many aquifers, waterways and wetlands in this state still need a detailed scientific evaluation and their value remains to be classified. Unless proven otherwise, any natural waters that are largely undisturbed by human activity, should be considered to have sensitive values.

Community support for water values, the setting of practical management objectives, providing sustainable protection strategies and effective implementation are vital to protecting or restoring water resources for current needs and those of future generations.

Appendix B - Statutory requirements and approvals relevant to this note include:

What is regulated	Statute	Regulatory agency
Development approval for land use activities Local planning schemes (incorporating SPP)	<i>Planning and Development Act 2005</i>	Local government authority Western Australian Planning Commission < www.wapc.wa.gov.au >
Impact on the values and ecology of the environment including waters	<i>Environmental Protection Act 1986</i> Parts III and IV	Minister for the Environment advised by the Environmental Protection Authority < www.epa.wa.gov.au >
Licensing, works approvals and registration of prescribed premises; pollution abatement	<i>Environmental Protection Act 1986</i> Parts V and VI	Department of Environment and Conservation < www.dec.wa.gov.au >
Management of Western Australia's water resources	<i>Water Resources Legislation Amendment Act 2007</i>	Department of Water < www.water.wa.gov.au >
Licence to use surface water and groundwater from declared areas and all artesian bores	<i>Rights in Water and Irrigation Act 1914</i>	
Development and operations in proclaimed drinking water source areas	<i>Metropolitan Water Supply, Sewerage and Drainage Act 1909</i> <i>Country Areas Water Supply Act 1947</i>	
Safety of community water supplies	<i>Health Act 1911</i>	Department of Health < www.health.wa.gov.au > Local government authority
Licensing and monitoring water service providers	<i>Water Services Licensing Act 1995</i>	Economic Regulation Authority – Water division < www.era.wa.gov.au >

Relevant statutes are available from the *state law publisher* at < www.slp.wa.gov.au >.

Appendix C - Development proposals near sensitive water resources

Where facilities are to be constructed or upgraded near sensitive waters, including proclaimed PDWSA and waterways management areas, proponents should supply a notice of intent to the department, including the following details:

- 1 Site owner or operating tenant's contact name and address details.
- 2 A site plan showing the location of the facility.
- 3 Description of the physical attributes of the site, such as soils, topography, water sources, vegetation cover and meteorology.
- 4 Description of past land use activities at the site and surrounding land use.
- 5 Local government planning scheme zoning of the site.
- 6 Description of the nature and scale of activities that will be carried out.
- 7 Description of materials/chemicals stored or handled on site.
- 8 Description of the types and quantities of waste that will be generated at the facility.
- 9 Proposals for chemical containment, waste management and disposal (with design sketches).
- 10 Details of any contingency measures to minimise the impacts of chemical spills, and disposal of contaminated waters from any fire, flood or other emergency.
- 11 A list of approvals sought or gained from regulatory agencies.