Australian Government
National Water Commission

# Review of urban water quality regulation in Australia

PwC Australia

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Waterlines

A SERIES OF WORKS COMMISSIONED BY THE NATIONAL WATER COMMISSION ON KEY WATER ISSUES

## Waterlines

This paper is part of a series of works commissioned by the National Water Commission on key water issues. This work has been undertaken by PwC Australia on behalf of the National Water Commission.

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## Disclaimer

This paper is presented by the National Water Commission for the purpose of informing discussion and does not necessarily reflect the views or opinions of the Commission.

Australian Government
National Water Commission

# Foreword

The National Water Commission is pleased to release the *Review of urban water quality regulation in Australia*. This report is part of a suite of work undertaken by the Commission to support its keystone project, *Urban water in Australia: future directions*.

Australia's urban water sector is changing and must continue to do so to meet the supply challenges posed by climate variability and population growth. As a result of new scientific and technological developments and the use of more diverse water sources, water managers are facing a broader range of water quality risks. These developments demand more adaptive and collaborative water quality management and regulatory approaches.

This review examines institutional and governance arrangements for urban water quality in Australia. It outlines options for improving regulation, focusing on institutional and regulatory settings.

The good news is that in line with National Water Initiative commitments and the COAG reform agenda, state and territory governments are moving towards a best-practice risk-based system of regulation. The widely accepted approach, which is central to the Australian Drinking Water Guidelines and Australian Guidelines for Water Recycling, provides a sound national platform for managing water quality risks. On the industry front and research frontier, the National Recycled Water Regulators' Forum, the National Water Industry Skills Task Force, and the Australian Water Recycling and Desalination Centres of Excellence, among others, are contributing valuable expertise.

While national efforts are under way to support the move towards greater uptake of risk management approaches, many of these initiatives are short-term, one-off ventures, and some are heavily reliant on a volunteer input from experts across jurisdictions. This is not optimal.

The Commission agrees with the report's conclusion that future reform effort for urban water quality should focus on creating new cross-jurisdictional arrangements that facilitate more consistent, coordinated and timely regulation. The Commission supports the second of the options set out in the report, to establish greater cross-jurisdictional coordination, as a starting point for the urban water sector to consider.

This review offers an important contribution to improving Australia's regulatory systems for water quality. We encourage discussion of the options presented and look forward to working with governments and other stakeholders to advance this important aspect of water management in Australia.

Chloe Munro

Chair, National Water Commission

May 2011

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# Abbreviations and acronyms

| | |
|---|---|
| ADWG | Australian Drinking Water Guidelines |
| AGWR | Australian Guidelines for Water Recycling |
| CMA | catchment management authority |
| COAG | Council of Australian Governments |
| DWMS | decentralised water management system |
| EPA | Environment Protection Agency |
| EPHC | Environment Protection and Heritage Council |
| ERAC | Electrical Regulatory Authorities Council |
| FSANZ | Food Standards Australia New Zealand |
| ISO | International Organization for Standardization |
| NHMRC | National Health and Medical Research Council |
| NRMMC | Natural Resources Management Ministerial Council |
| NRWRF | National Recycled Water Regulators Forum |
| NTC | National Transport Commission |
| NWC | National Water Commission |
| NWI | National Water Initiative |
| NWQMS | National Water Quality Management Strategy |
| NWQMU | National Water Quality Management Unit |
| OBPR | Office of Best Practice Regulation |
| OECD | Organisation for Economic Co-operation and Development |
| RIS | regulatory impact statement |

# Executive summary

Approximately 88 per cent of Australia's population lives in urban areas. Ensuring that the water and wastewater used and produced by urban residents is of sufficient quality is vital in achieving human health and environmental health outcomes.

The quality of urban water[1] in Australia is governed by a complex set of regulatory and non-regulatory arrangements. Regulatory requirements can cover processes, people and products. Some regulatory requirements are longstanding (such as the Australian Drinking Water Guidelines, or ADWG). Others, such as those governing recycled water, are more recent. While the states and territories have constitutional responsibility for the management of water resources, requirements for maintaining urban water quality are developed and administered by all three levels of government (Commonwealth, state or territory, and local).

By and large, the existing arrangements for regulating urban water quality have served us well. The safety of drinking water in Australia, for example, remains high and there have been improvements in the management of sewer overflows. Furthermore, as illustrated by a recent Australian Water Association survey, the water industry generally perceives 'water quality/health' regulation to be effective. The existing regulatory arrangements have also been characterised by a close and cooperative relationship between public health officials and water service providers.

This notwithstanding, there are outward signs that the broader regulation of urban water quality in Australia is not equivalent to best practice. Recent reviews, for instance, have highlighted a number of challenges that lie ahead if the urban water sector is to manage current and emerging risks associated with integrating our urban water systems. Core to these challenges are the effective and efficient implementation of the Australian Guidelines for Water Recycling (AGWR) and ADWG and identifying pathways for transitioning towards a regulatory system based on risk management.

The urban water sector is changing. There are more diversified urban water sources and emerging contaminants from new supply options such as sewer mining, water recycling, stormwater harvesting, greywater reuse, and managed aquifer recharge. Moreover, there are increasingly complex treatment systems, combined with new institutional arrangements (such as third-party access) and new market players. These developments are placing stress on existing regulatory arrangements for urban water quality. A particular area of concern is the absence of a clear legal framework in urban water quality regulation—one that consistently articulates the water quality expectations of regulators and provides certainty about ownership of risk.

In light of these concerns and the increasingly dynamic nature of the water sector, the National Water Commission (NWC) engaged PwC Australia (PwC) to undertake a review of the institutional and governance arrangements for urban water quality in Australia. The purpose of the review is to identify how existing regulatory arrangements could be reformed to address identified concerns and manage the growing complexity of urban water quality issues. In doing so, the review will provide greater clarity in the approval pathways for new supply options and greater certainty in the implementation of risk management frameworks.

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[1] *Urban water* refers to water and wastewater used and produced by humans in the urban environment. It encompasses all water supply scales, including water supply from wastewater, urban waterways, stormwater and groundwater. Urban water can affect both human health and environmental health outcomes.

PwC sought to achieve the goals of the review by using a series of evaluation principles (see Box 1) to determine the extent to which existing regulatory arrangements for urban water quality are aligned with best practice and to identify areas in need of improvement. Subsequently, PwC sought to outline a broader philosophy and possible directions for reform that government and industry could adopt to address identified problems.

### Box 1 Evaluation principles

The evaluation principles were drawn from comprehensive analysis of the best practice literature (which is outlined in more detail in Chapter 3), as well as an examination of the regimes underpinning the regulation of food safety, electrical safety and rail safety in Australia. The evaluation principles used in this review are:

- Consideration should be given to policy and regulatory harmonisation, where relevant.
- Governance arrangements should be clear, with broad agreement and recognition about roles and responsibilities.
- The role of risk assessment should be kept separate from policy development.
- Regulators should adhere to best practice principles in choosing regulatory approaches to manage risks.
- Regulators should have adequate resources and competent staff.

This evaluation was informed by a comprehensive stocktake of existing regulatory regimes, consultations with regulators, industry and water quality scientists and researchers, documentary analysis of existing reports and studies, and written comments provided by an expert panel of peer reviewers. Given the weight of feedback from stakeholders as to what the key issues are (and, to a lesser extent, the literature that was analysed), the review tends to focus on:

- requirements relating to public health as opposed to the environment
- issues around risk management processes (particularly those in the guidelines developed under the National Water Quality Management Strategy (NWQMS), which is generally seen as the 'central mechanism for water quality management in Australia') and the associated implementation and enforcement of these processes—and to a lesser extent, people and product standards.

The regulation of wastewater, stormwater and waterway health is captured in this report to the degree in which these aspects transect the regulatory and approval pathways for safe water supply. The reform directions offered in this report, however, are primarily informed by the circumstances surrounding the regulation of urban water quality from the perspective of human health.

While we believe that our directions for reform are applicable to all aspects of urban water quality regulation, further discussion within and across jurisdictions and industry will be required to determine the extent to which our preferred direction for reform is appropriate for the regulation of environmental water quality. As such, this Waterlines report offers an important contribution to the debate.

Table 1 outlines the findings of our evaluation. High-level examples of supporting evidence are provided. More comprehensive analysis and evidence is outlined in Chapter 4.

Table 1: Summary of identified problems

| | *Problem* | *Implications* | *Evidence* |
|---|---|---|---|
| **Governance arrangements** | Governance arrangements and policy drivers for urban water quality are complex and lack clarity. | Uncertainty about roles, responsibilities and policy direction can reduce the overall effectiveness and efficiency of the regulatory regime. | During consultation, a wide sector of water industry professionals noted a lack of clarity across the governance arrangements for urban water quality. |
| **Regulatory requirements** | Inconsistent application of best practice regulatory requirements by states or territories when adopting/legislating in respect of existing NWQMS guidelines. | Some regulatory requirements may be inconsistently applied in different jurisdictions and not commensurate with risks involved. | Duplicate validation requirements have been reported to cost small-scale domestic recycling schemes an increase in compliance costs by 200 per cent.<br>Fragmentation between land-use development regulatory instruments and risk management for domestic recycling schemes has been reported. |
| | The NWQMS guidelines require more frequent and regular review and updating. Concerns have been raised that the NWQMS package are guidelines only. | Fragmentation between science, policy and practice leading to suboptimal uptake of new science in guidelines revision.<br>Leads to duplication of research and development effort by jurisdictions (in terms of developing their own requirements) and suboptimal information sharing across jurisdictions in terms of those requirements.<br>Can increase the research and development burden on industry and consumers of water<br>Limits information sharing and the ability of timing injection of science into regulatory frameworks. | Absence of periodic review highlighted by a range of stakeholders.<br>One expert stakeholder notes the lack of resources dedicated to review of the NWQMS guidelines—'at present, the national guideline development process almost entirely relies upon volunteer inputs from state departmental staff, including those from state-owned utilities'.<br>In one case of a stormwater harvesting system, regulatory inconsistencies between agencies were noted as increasing 'monitoring, verification and validation requirements (more than $500,000 at present) beyond that justified by the scheme's risk assessment'.<br>Nubian maintains that 'it is not possible to manufacture and sell a standard greywater treatment system … which will meet the requirements of all states'. |
| **Administration of requirements** | Numerous bodies responsible for regulation of urban water quality at state and territory and local government level. | Jurisdictional bodies often face a growing workload without necessary resourcing and at times compete for scarce technical expertise.<br>Situation exacerbated in recent times by growing complexity of water quality issues, increase resource pressures on regulators. | Both regulators and industry have highlighted the capacity constraints faced by water quality regulators. |
| | Diversity of guidelines resulting in a lack of certainty in the application of specific values.<br>Applicability of the NWQMS guidelines can be challenging for proponents of on-site and decentralised systems. | Pathways for navigation between water supply guidelines and environmental protection guidelines are often not clear.<br>Adherence to different aspects of risk management frameworks between guidelines has been known to cause uncertainty, leading to delays in approval processes. | 'Guideline shopping' has been reported leading to uncertainty and a lack of understanding between industry and regulators.<br>Stakeholders noted that the NWQMS guidelines were seen as challenging documents from the perspective of decentralised system management and regulation. |
| | There is a lack of coordination in the development of tools to support the AGWR.<br>Similarly, there are no formal arrangements for sharing information and coordinating mutual recognition of process barriers and preventive measures that have been validated in other jurisdictions. | Duplicate research and development effort and limited clarity in centralisation of emerging knowledge and tools to support guidelines, including guideline values.<br>Increased costs on proponents, as they are required to duplicate validation efforts across jurisdictions. | Power (2010) notes that the AGWR provide 'very limited information on how to validate'.<br>One regulator notes that 'current project specific validation requirements impose costs on proponents'. |

The experiences of comparator sectors suggest that urban water quality enjoys a number of strengths in relation to its readiness and suitability for regulatory reform. These include an underlying set of good national guidelines, greater national collaborations (such as the National Recycled Water Regulators Forum, or NRWRF) and (as discussed in Chapter 2) a willingness to consider future reform regulatory frameworks. The comparator sectors also highlight a number of potential obstacles to achieving greater harmonisation of urban water quality regulation. These include:

- the broad range of portfolios and agencies involved in urban water quality regulation (for the most part, the regulation of food safety, electrical safety and rail safety belonged to one portfolio/agency in each jurisdiction, respectively)
- the numerous ministerial councils[2] and standing committees that have a responsibility for aspects of urban water quality policy and regulation—this can diffuse efforts to streamline reform, particularly if harmonisation is seen as a priority by one ministerial body and less so by another
- the absence of significant cross-jurisdictional trade in water and related services; the existence of a national market generally encourages greater regulatory harmonisation—a useful impetus for reform.

The existence of the problems detailed in Table 1 and the learnings derived from the comparator sectors suggest the need for reform of Australia's regulatory framework for urban water quality. Feedback from stakeholders provided two parameters to guide future reform.

First, stakeholders highlighted the need for a broader philosophy to guide the reform and general development and maintenance of urban water quality regulation in Australia. Drawing on the best practice framework and the history of urban water quality regulation in Australia, we suggest that the regulation of urban water quality should be guided by the following principles:

- The goal of urban water quality regulation is to protect human and environmental health.
- Central to the goal of urban water quality regulation is risk management.
- Harmonisation is important, but flexibility is required to accommodate the impact that situational factors can have on risks to water quality (and approaches to manage these risks).
- Governance arrangements should be clear, with broad agreement and recognition of roles and responsibilities across water supply, wastewater and waterway health agencies.
- Decision making around urban water quality should be transparent, timely and accountable, with clear mechanisms to leverage the knowledge and experience of industry and the broader scientific/research community.
- Regulatory frameworks should support regulators in managing the complexity of urban water quality issues, and facilitating a multiplicity of supply sources.
- Regulators should adhere to best practice principles in choosing regulatory approaches to manage risks, ensuring that due consideration is given to the costs and benefits of proposed government actions.

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[2] Drawing on a review by Allan Hawke in 2010 of its ministerial councils, the Council of Australian Governments has recently agreed to a comprehensive reform plan for a new system of ministerial councils. Under the new system, enduring issues of national significance will be addressed through standing councils, while critical and complex issues will be addressed through limited-life select councils. The number of ministerial councils will be nearly halved, from 40 to 23.

- Regulators should have adequate resources and competent staff.

Second, stakeholders proposed two broad directions for reform to address the various problems seen to afflict current regulatory arrangements (as outlined in Table 1, above).

The first of these directions for reform is to bolster current arrangements. This reform direction essentially retains the existing architecture of urban water quality regulation in Australia. The current arrangements would be strengthened by:

- allowing the functions carried out by the National Health and Medical Research Council (NHMRC), Natural Resource Management Ministerial Council (NRMMC) and Environment Protection and Heritage Council (EPHC) to be adequatedly resourced and sufficiently coordinated to develop and maintain the NWMQS guidelines
- developing a framework for achieving mutual recognition arrangements of validation processes and the formation of a body to administer a national database of previously validated treatment processes and exposure barriers
- providing jurisdictions with incentives to implement national guidelines more consistently
- formalising the NRWRF (and establishing an equivalent for environmental water quality regulators) to facilitate cross-jurisdictional cooperation and coordination and oversee the administration of a validation framework (currently being developed by the Australian Water Recycling Centre of Excellence).

The second direction for reform would be to achieve greater cross-jurisdictional coordination. This reform direction focuses on creating new cross-jurisdictional arrangements to facilitate greater consistency and coordination in the regulation of urban water quality across Australia. The key aspects of this reform direction include:

- The establishment of a legally applicable National Water Quality Risk Management Framework, based on the 12 elements of the ADWG and AGWR. The national framework would set out principles, objectives and high-level processes for the management of risks to urban water quality.
- The establishment of a Human Health Regulators' Panel and an Environmental Health Regulators' Panel (building on the NRWRF). These panels would have responsibility for overseeing the development and maintenance of consistency in urban water quality regulation, drawing on other resources outlined below. The regulators' panels would also facilitate other areas of harmonisation, such as establishing a framework for mutual recognition and developing model guidance to help jurisdictions convert guidelines to regulations within existing jurisdictional responsibilities.
- The regulators' panels would be supported by a National Water Quality Management Unit (NWQMU). The purpose of this body is to provide an institutional foundation on which the goals of greater coordination and consistency in urban water quality regulation can be realised. The core responsibilities of the NWQMU would be to develop and maintain the national framework and national water quality guidelines. The NWQMU would also play a role in ensuring that new science is reviewed and incorporated into the revisions of the national guidelines, and identify national priority research to inform guideline revisions.
- Scientific advisory committees would be established under the NWQMU; one to advise on human health and the other on environmental health. They would be tasked with undertaking the technical development and regular review of the values contained in the national water quality guidelines. The scientific advisory committees would comprise technical experts drawn from the NHMRC, state and territory health departments, state and territory environmental protection agencies (EPAs) and industry (such as urban water utilities), as well as academics and research specialists, as required.

- The states and territories would retain their current responsibilities in developing and administering urban water quality regulation, although they would formally agree to implement the national framework and guidelines in a consistent manner (allowing for local variations where relevant). Incentives would be provided to facilitate consistent implementation and information sharing.
- Local councils would play a reduced and clearer role in approving systems through standardised land-use development controls (e.g. Power (2010) notes that councils approve larger, on-site systems). The creation of standardised development control conditions would rest with the states and territories and be established under a national framework.

We have also considered a third direction for reform: establish a national water quality regulator. Under this reform direction, responsibility for all aspects of urban water quality regulation would reside in a single, national body. While the consultation indicated little support for this option, we have analysed it as part of this review for completeness and to illustrate the relative trade-offs associated with such an approach.

A summary of the three directions for reform considered by this review is given in Table 2.

## Table 2: Three directions for reform considered by this review

| | *Bolster current arrangements* | *Greater cross-jurisdictional coordination* | *A national water quality regulator* |
|---|---|---|---|
| **Key bodies** | NWQMS bodies—NHMRC, NRMMC and EPHC<br>A formalised NRWRF<br>Environmental Water Quality Regulators Standing Committee—an environmental water quality equivalent of the NRWRF<br>State and territory regulators<br>Local councils | National Water Quality Management Unit (NWQMU)<br>Human Health Regulators' Panel<br>Environmental Health Regulators' Panel<br>State and territory regulators<br>Local councils<br>Scientific advisory committees, for human health and environmental health guidelines | A national regulator of water quality |
| **Guidelines and regulations** | The NHMRC, NRMMC and EPHC would continue to develop and maintain the NWQMS guidelines, but would be given adequate resourcing to do so.<br>The formalised NRWRF and Environmental Water Quality Regulators Standing Committee would help in the development of national guidelines—particularly in coordinating the views of regulators for guideline revisions and establishing processes for information sharing. | The regulators' panels would have responsibility for overseeing the development and maintenance of water quality regulations. The NWQMU would be responsible for developing the national water quality guidelines. As part of this, the national unit would manage the regular review and updating of performance values.<br>The NWQMU would establish scientific advisory committees to undertake the technical review and development of the performance values in the national water quality guidelines. The NWQMU and scientific committees would collaborate with the regulators' panels to develop and maintain a practical, enforceable, management framework for water quality management. | The NWQMS guidelines would be incorporated into the regulations (and possibly quasi-regulations) administered by the national regulator. |
| **Validation and approvals** | The formalised NRWRF and Environmental Water Quality Regulators Standing Committee would develop a framework for achieving mutual recognition arrangements for validated values and processes.<br>A national database of previously validated treatment processes and exposure barriers—to be managed by an existing state or territory regulator, with input from the Australian Water Recycling Centre of Excellence and the formalised NRWRF. | The regulators' panels (supported by the NWQMU) would develop a framework for achieving mutual recognition arrangements for validation values and processes.<br>A national database of previously validated treatment processes and exposure barriers—to be managed by the NWQMU, with input from the Australian Water Recycling Centre of Excellence and the regulators' panels. | No need for mutual recognition under a single, national system.<br>The national regulator would maintain a database of validated technologies (which could be accessed by scheme proponents). |
| **Consistency and coordination** | The formalised NRWRF and Environmental Water Quality Regulators Standing Committee would facilitate best practice information sharing between regulators.<br>There would be incentives for jurisdictions to implement the guidelines in a more consistent and comprehensive manner—with the intention of minimising (but still allowing for) local variations. | The regulators' panels (supported by the NWQMU) would be tasked with developing model guidance to help jurisdictions in converting guidelines to regulations within existing jurisdictional arrangements. This guidance will recognise and provide flexibility to address regional and locational requirements in the application of nationally developed performance values.<br>A national, legally applicable National Water Quality Risk Management Framework based on the 12 elements of the ADWG and AGWR would be established.<br>The NWQMU would be responsible, with support from scientific advisory committees and collaborating with the regulators' panels, for developing and maintaining the national framework.<br>There would be independent reporting and review of jurisdictional implementation of the national framework and the national guidelines. | The national regulator would administer and enforce nationwide legislation pertaining to urban water quality. |
| **Administration and enforcement** | The states and territories and local councils would retain their current responsibilities in administering and enforcing regulatory requirements, but greater clarity would be provided for easing industry navigation. | The states and territories would retain their current responsibilities in administering and enforcing regulatory requirements.<br>Local councils would have a reduced and clearer role in approving new water and wastewater treatment systems.<br>The NWQMU would administer the development and coordination of a national certification framework for water treatment operators (currently under way by the Water Industry Skills Taskforce). | Undertaken by the national regulator. |

The directions for reform outlined above have essentially focused on how the appropriateness and effectiveness of regulation surrounding urban water quality could be improved. Ensuring that regulated entities have the capacity to meet regulatory requirements is the subject of a number of separate, recent initiatives and reports, and is thus not considered here. Examples of these recent initiatives and reports include:

- the Productivity Commission's ongoing review into Australia's Urban Water Sector
- *Review of regional water quality and security*, prepared for Infrastructure Australia; the review makes a series of recommendations to improve the performance of regional water utilities
- national certification framework for potable water treatment operators, currently being developed by the NWC.

The urban water sector may see merit in a particular direction for reform, or prefer elements across each of the reform directions. While we have undertaken a high-level assessment of the reform directions and identified a preferred direction for reform, the intention of this report is not to prescribe a solution for the urban water sector, but to provide focus to the current debate and allow for all issues to be considered in future reform diagnosis.

The high-level assessment of the reform directions focused on:

- effectiveness of reforms in managing risks to public health and the environment
- costs—specifically, one-off implementation costs, ongoing administration costs to government, and compliance costs to industry and customers
- likely practicality/acceptability to jurisdictions.

A summary of the high-level assessment is shown in Table 3. Greater detail about the results of the high-level assessment is provided in Chapter 5.

Table 3: Summary of high-level assessment

| | Risk management | Costs | | | Practicality / acceptability | Overall score |
|---|---|---|---|---|---|---|
| | | One off implementation costs | Administrative costs to government | Compliance costs to industry | | |
| Bolster current arrangements | ✓ | x | ✓ | ✓ | ✓✓✓ | ✓✓ |
| Greater cross-jurisdictional coordination | ✓✓✓ | xx | ✓✓ | ✓✓ | ✓✓ | ✓✓✓ |
| A national water regulator | ✓✓ | xxx | ✓✓✓ | ✓✓✓ | xxx | ✓ |

Chapter 5 also provides some guidance on the steps that would need to be taken if government and industry chose to pursue the preferred direction for reform.

# 1 Review context

## 1.1. Scope and purpose of the review

The National Water Commission (NWC) engaged PwC Australia (PwC) to undertake a review of current water quality regulatory approvals processes and current implementation practices across Australia, with a focus on institutional and governance frameworks for efficient and effective regulation of urban water quality. The objectives of the review are to:

- assess the overall performance of the urban water quality regulatory framework in Australia
- identify, assess and categorise particular challenges and impediments associated with current practices
- identify options for rectifying the identified problems
- provide recommendations on best practice water quality regulation arrangements for all urban water sources
- present a summary and road map on the case for reform, including supporting evidence.

The review considers best practice regulatory approaches and has a particular focus on the institutional issues and decisions that need to be considered for efficient and effective regulation of urban water quality. The complete Terms of Reference for the review are provided in Appendix A.

The initial intention of the review was to explore all water quality regulatory arrangements governing all water supply scales and risks, including water supply from wastewater, urban waterways, stormwater and groundwater.

However, given the weight of feedback from stakeholders as to what are the key issues (and, to a lesser extent, the literature that was analysed), the review tends to focus on:

- requirements relating to public health as opposed to environmental health
- issues around risk management processes (particularly those in the guidelines developed under the National Water Quality Management Strategy (NWQMS), which is generally seen as the 'central mechanism for water quality management in Australia') and the associated implementation and enforcement of these processes—and to a lesser extent, people and product standards.

The regulation of wastewater, stormwater and waterway health is captured in this report to the degree in which these aspects transect the regulatory and approval pathways for safe water supply. The reform directions offered in this report, however, are primarily informed by the circumstances surrounding the regulation of urban water quality from the perspective of human health.

### 1.1.1. Definitions

Discussions on urban water can be hampered by terminology. Some of the key terms used in this report are defined in Table 4.

Table 4: Definitions of key terms[3]

| *Term* | *Definition* |
|---|---|
| **Centralised system** | A system that provides water supply or wastewater services to a metropolitan or regional urban area. |
| **Decentralised system** | Treatment technologies and/or management systems at the scale of multiple buildings; e.g. cluster, neighbourhood, precinct, suburb, but not city scale (Mitchell et al. 2008). |
| **Groundwater** | Water occurring naturally below ground level (whether in an aquifer or otherwise), or water occurring at a place below ground that has been pumped, diverted or released to that place for the purpose of being stored there. Groundwater does not include water held in underground tanks, pipes or other works. |
| **Managed aquifer recharge** | The process of adding a water source such as recycled water or stormwater to aquifers under controlled conditions for withdrawal at a later date, or used as a barrier to prevent salt water or other contaminants from entering the aquifer (CSIRO 2009). |
| **On-site systems** | Treatment technologies and/or management systems at the scale of an individual lot (Mitchell et al. 2008). |
| **Recycled water** | Water collected from any wastewater stream and treated to a quality that is 'fit for purpose' for further use, such as industrial use, irrigation, third pipe, or human consumption. |
| **Stormwater** | Rainwater that runs off impervious surfaces (e.g. rooftops, roads, pavement) during or after rainfall. |
| **Stormwater harvesting** | Involves the collection of rainwater entering or from the stormwater drainage system (JHL Civil 2010). |
| **Wastewater** | Any water that has been used and then discarded as a waste stream, usually having suffered some loss of quality. |
| **Wastewater management** | The process of dealing with wastewater, generally by treating it and discharging it back into the built or natural environment. |
| **Water quality** | Denotes the 'biological, chemical and physical characteristics of water', usually in respect to its suitability for a particular purpose (Water-technology.net 2010). |

## 1.2. Review approach and report structure

For this review, PwC undertook four key steps. First, we sought to obtain a comprehensive understanding of the regulatory framework for urban water quality in Australia. We achieved this primarily by undertaking a detailed stocktake of regulatory frameworks for urban water quality across all states and territories and the Australian Government. This stocktake focused on key pieces of legislation, regulatory authority, policy drivers and key guidelines, codes and standards. The results of the stocktake can be found in Chapter 2, Appendix C and Appendix D.

Second, to help us identify possible areas of reform in the regulation of urban water quality in Australia, we sought to develop a 'best practice' regulatory framework for the regulation of public and environmental health and the management of risks. To achieve this, we analysed the literature on best practice regulation in both Australia and overseas. We also analysed the history of regulatory reform in three comparator sectors in Australia—food safety, rail safety and electrical safety. Chapter 3 details our best practice regulatory framework.

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[3] Unless otherwise stated, the definitions listed here are consistent with those in the NWC's Water Dictionary: *http://dictionary.nwc.gov.au/water_dictionary/pdf/WaterDictionary.pdf*

Third, we sought to identify how existing regulatory arrangements—particularly those relating to approval pathways and associated requirements—could be reformed to better meet public and environmental health objectives. We achieved this by distilling the best practice framework developed in Chapter 3 into a series of key evaluation principles. We then used these evaluation principles to determine the extent to which existing regulatory arrangements for urban water quality are aligned with best practice. To inform this analysis, we drew on stakeholder consultation (including formal submissions from regulators; see Appendix B for more detail), an extensive review of available literature, and the stocktake of existing arrangements outlined in Appendix C and Appendix D. Chapter 4 provides the findings from our analysis.

Lastly, we sought to provide options and a preferred approach to reforming urban water quality regulation in Australia. We developed these options by drawing on stakeholder consultation, as well as the best practice literature. In addition to identifying a preferred approach, we also detailed a reform road map to provide guidance for future reform efforts in the regulation of urban water quality.

# 2 Overview of existing arrangements

Approximately 88 per cent of Australia's population lives in urban areas (WHO 2010). Their water is supplied, and wastewater and residuals managed, through a complex and interrelated system of infrastructure and treatment processes, including engineered and natural systems. This system encompasses both centralised elements (e.g. mains water distribution and wastewater collection systems) and on-site elements (e.g. on-site rainwater and septic tanks, or other small treatment systems). In more recent times, there has been a growth in the uptake of decentralised systems, which are usually smaller than centralised systems, but larger than on-site systems and present a wide range of risks that require managing. They may service a cluster of homes or an entire subdivision. There is a spectrum of risks across on-site systems, centralised systems and decentralised systems.

Maintaining the quality of water produced and distributed by the urban water system is important in contributing to two key objectives:

- Public health and safety—ensuring that water is safe for human consumption and contact, primarily in terms of its microbiological and chemical composition.
- Environmental health—minimising the impact of water collected and/or discharged in urban areas on marine and inland aquatic ecosystems. Governments are also increasingly taking account of ecological footprints, life cycle analysis and greenhouse gas emissions levels associated with decisions on water system enhancements.

Given the importance of these goals, government has long played a role in regulating the quality of urban water in Australia. It does so through a complex set of regulatory and non-regulatory requirements. These requirements can variously cover:

- processes (e.g. the Australian Drinking Water Guidelines, or ADWG, incorporate the Framework for the Management of Drinking Water Quality. Comprising 12 elements, this framework was 'developed to guide the design of a structured and systematic approach for the management of drinking water quality from catchment to consumer, to assure its safety and reliability'.) (NHMRC & NRMMC 2004)
- people (e.g. the Victorian Department of Health recently released the Victorian Framework for water treatment operator competencies. Developed collaboratively with the water industry, this provides 'a minimum competency framework for those directly involved in water treatment activities'.) (Victorian Department of Health 2010)
- products (e.g. AS/NZS 1546.1:2008 On-site domestic wastewater treatment units—Septic tanks).

## Roles and responsibilities

Constitutional responsibility for the management of water resources lies with the states and territories. The regulation of urban water quality has thus tended to be state and territory focused and representative of the legislative histories and practices of each jurisdiction. For example, the regulation of drinking water in Western Australia and South Australia is based on the existence of a single water authority in each state. In contrast, the regulation of drinking water in Queensland is based on a historical reliance on local councils to provide water services. Appendix C and Appendix D provide more detail about regulatory arrangements across the states and territories.

Reflecting its broad and multifaceted nature, responsibility for the regulation of different aspects of urban water quality resides with a range of agencies at the state and territory level. The number of agencies varies across jurisdictions. For instance, in New South Wales, five

agencies are involved in the regulation of urban water quality for public and environmental health purposes plus Sydney Water Corporation, Hunter Water Corporation and a range of local councils. In Victoria, only two agencies are involved (plus local councils). The portfolios most commonly responsible for the regulation of urban water quality include health, environmental protection, natural resources management and building/planning (Table 5).

Table 5: Summary of state and territory agencies involved in the regulation of urban water quality

| *Australian Capital Territory* | *New South Wales* | *Northern Territory* | *Queensland* |
|---|---|---|---|
| • ACT Health<br>• ACT Planning and Land Authority<br>• Environmental Protection Authority<br>• Territory and Municipal Services | • NSW Health<br>• Department of Environment, Climate Change and Water<br>• NSW Office of Water<br>• Department of Primary Industries<br>• Independent Pricing and Regulatory Tribunal<br>• Department of Planning<br>• Sydney Water, Hunter Water, and local councils | • Department of Health and Families<br>• Department of Lands and Planning (Building and Advisory Services)<br>• Department of Natural Resources, Environment and the Arts | • Department of Infrastructure and Planning<br>• Office of the Water Supply Regulator (Department of Environment and Resource Management)<br>• Environmental Protection Agency (Department of Environment and Resource Management)<br>• Queensland Health<br>• Local councils |
| *South Australia* | *Tasmania* | *Victoria* | *Western Australia* |
| • Department of Health<br>• Environmental Protection Authority<br>• Natural Resources Management Board<br>• Stormwater Management Authority<br>• Planning SA<br>• Local councils | • Department of Justice (Building Control Branch)<br>• Department of Primary Industries, Parks, Water and Environment<br>• Department of Health and Human Services<br>• Environmental Protection Authority | • Environmental Protection Authority Victoria<br>• Department of Health<br>• Department of Planning and Community Development<br>• Local councils | • Department of Health<br>• Department of Environment and Conservation<br>• Department of Water<br>• Environmental Protection Authority<br>• Planning WA<br>• Local councils |

The legislative foundations of the state and territory regulatory frameworks are similarly multifaceted and vary from jurisdiction to jurisdiction (see Appendix C and Appendix D for more detail). National guidelines exist (primarily those produced under the NWQMS—see below for more detail) and these provide a degree of commonality across the jurisdictions. State and territory implementation of the guidelines, however, varies. Some jurisdictions, for instance, include adherence to key national guidelines as a licence condition for water authorities. Other jurisdictions, meanwhile, refer to the national guidelines, but do not enforce their adherence.

As Table 5 also highlights, local councils are a key element of some state and territory regulatory frameworks for maintaining urban water quality. Generally speaking, they can have a role in:

- providing water services (such as is the case in Queensland and regional New South Wales)
- approving the installation of on-site and decentralised systems as part of the development approval process
- requiring the installation of on-site and decentralised systems as part of their land-use planning responsibilities, and/or
- providing waterway health and catchment management functions.

Notwithstanding the general state and territory focus, there has been a long history of national and Commonwealth involvement in the regulation of urban water quality. For instance, in 1992, the Commonwealth and state and territory governments agreed on the NWQMS—a national framework of policies and principles to improve the management of water quality across Australia. The underlying objective of the NQWMS is 'to achieve sustainable use of the nation's water resources by protecting and enhancing their quality, while maintaining economic and social development' (ANZECC and ARMCANZ 1994). It was this objective that has provided the umbrella for, and/or guided, the development of such guidelines as the:

- ADWG—although it should be noted that the National Health and Medical Research Council (NHMRC) first publishing drinking water quidelines in 1972
- Australian Guidelines for Water Recycling (AGWR)
- Australian and New Zealand guidelines for fresh and marine water quality.

In 2004, the Council of Australian Governments (COAG) signed the Intergovernmental Agreement on a National Water Initiative (NWI). The overall objective of the initiative is 'to achieve a nationally compatible market, regulatory and planning-based system of managing surface and groundwater resources for rural and urban use that optimises economic, social and environmental outcomes' (NWC 2010). The NWI has a section on urban water reform, including commitments around providing 'healthy, safe and reliable water supplies' and encouraging 'the reuse and recycling of wastewater where cost effective'.

In 2009, COAG adopted the National Urban Water Planning Principles to provide guidance to governments in managing 'the supply/demand balance of a reticulated supply for an urban population' (DSEWPC 2010). These principles commit Australian governments to 'consider the full portfolio of water supply and demand options', having regard for all environmental and social externalities.

In addition to the initiatives outlined above, there are many Commonwealth agencies, ministerial councils[4] and other bodies involved in the area of urban water policy development and regulatory reform (see Appendix C for more detail). These bodies include:

- National Resources Management Ministerial Council (NRMMC) and the National Resources Management Steering Committee—the peak ministerial body for national resources management issues

[4] Drawing on a review by Allan Hawke in 2010 of its ministerial councils, the Council of Australian Governments has recently agreed to a comprehensive reform plan for a new system of ministerial councils. Under the new system, enduring issues of national significance will be addressed through standing councils, while critical and complex issues will be addressed through limited-life select councils. The number of ministerial councils will be nearly halved, from 40 to 23.

- Environmental Protection and Heritage Council (EPHC)—the peak ministerial body for environmental protection issues
- Working Group on Climate Change and Water—established under COAG, reports to the NRMMC and Natural Resource Management Standing Committee
- NHMRC—a key source of advice on public health issues relating to urban water quality
- Department of Sustainability, Environment, Water, Population and Communities—leads the implementation of actions under the NWI Implementation Plan, oversees the Australian Government's Water for the Future initiatives, and oversees the NWQMS
- NWC—responsible for driving progress towards the sustainable use of Australia's water resources under the NWI. The NWC also advises COAG and the Australian Government regarding the progress of jurisdictions against the NWI
- National Recycled Water Regulators Forum (NRWRF)—promotes information sharing for the consistent implementation of the AGWR and seeks to improve communication between state and territory regulators.

## Broader aspects of the regulatory framework

### *Codes*

In addition to state and territory legislation, regulations and guidelines regarding water quality, there are a range of industry codes and international standards regarding certain aspects of water quality regulation.

The Water Services Association of Australia has developed a number of national codes[5] for water and sewerage infrastructure, including:

- Sewage Pumping Station Code of Australia (WSA 04-2005)—this code covers the planning, design and contribution of pumping stations and pressure mains.
- Water Supply Code of Australia (WSA 03-2002)—this code covers the planning, design and construction of transfer, distribution and reticulation systems.
- Vacuum Sewerage Code (WSA 06-2008)—this code concentrates on the planning, design and construction of vacuum sewers.
- Pressure Sewerage Code of Australia (WSA 07-2007)—this code includes the planning, design, products and materials of reticulation networks.
- Conduit Inspection Reporting Code of Australia (WSA 05-2008)—this code focuses on asset condition assessment of conduits such as sewers, sanitary and stormwater drains.

The NSW Water Directorate is an independent group that provides focused technical information to NSW councils on water and sewerage operations. The directorate has developed a number of publications, manuals, guidelines and protocols for member councils, including:[6]

- Operations and Maintenance Manual for Water Supply Service Reservoirs—this manual is for local government authorities operating and maintaining water supply service reservoirs, to ensure reliable and cost-effective operation of these facilities

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5 Water Services Association of Australia, National codes list, *www.wsaa.asn.au/Publications/NationalCodes/Pages/NationalCodesList.aspx*

6 Water Directorate, Technical publications, *www.waterdirectorate.asn.au/technical_pub_index.html*

- Backflow and Cross Connection Prevention Guidelines—these guidelines are designed to assist local water utilities to meet legislative requirements to minimise the risk of backflow and cross connection in their water supply systems
- Interim Blue-Green Algae Management Protocols—this publication details revised NHMRC alert level limits in the 2009 Australian Drinking Water Guidelines
- Sewage Treatment Plants Buffer Zone Land Use Planning Guidelines—these guidelines detail how buffer zones may vary to suit local conditions and address the development requirements in buffer zones around sewage treatment plants
- Operations and Maintenance Manual for Sewage Treatment Plants—this manual provides advice and a template to help councils develop operations and maintenance procedures specific to their own situation.

The American Water Works Association Research Foundation is a non-profit organisation that sponsors research regarding drinking water standards. Research sponsored by the foundation may look at treatment, distribution, monitoring and analysis, water management and health.

In addition to industry codes, the International Organization for Standardization (ISO) publishes international standards regarding water quality. The ISO standards include:

- ISO 31000 Risk management—principles and guidelines
- ISO 9001 Quality management systems—requirements
- ISO 14000 Environmental management
- ISO 22000 Food safety management systems—requirements for any organisation in the food chain.

There also numerous ISO standards regarding different aspects of water quality and activities relating to drinking water supply systems and wastewater systems.

### *Catchment management*

Catchment management is managed differently across the states and territories:

- In New South Wales there are thirteen catchment management authorities (CMAs) established under the *Catchment Management Authorities Act 2003* (NSW). The CMAs are responsible for managing natural resources at the catchment scale, including preparing and implementing catchment action plans. The CMAs are also responsible for administering and managing native vegetation consents under the *Native Vegetation Act 003* (NSW).
- In Victoria, catchment management is established under the *Catchment and Land Protection Act 1994* (Vic). Under the Act, Victoria is divided into ten catchment regions, with a CMA established for each region. CMAs are provided with regional waterway, floodplain, drainage and environmental water reserve management powers under the *Water Act 1989* (Vic).
- In South Australia, catchment management is defined in the *Natural Resources Management Act 2004* (SA). This legislation defines the role of a state natural resource management council and eight regional boards. Each board is responsible for implementing its respective natural resource management plan.

- Catchment management in Western Australia is the responsibility of the Natural Resource Management Council. The council provides the government with high-level strategic advice and integrated policy advice on the sustainable management of land, water and biodiversity resources across the state.
- The Australian Capital Territory Government has established the ACT Natural Resource Management Council. The role of the council is to provide community leadership and guidance to the government on investments in natural resource management in the territory.
- Tasmania's Natural Resource Management Council advises government on matters relating to natural resource management. This advice is given in accordance with the Tasmanian Natural Resource Management Framework and the *Natural Resource Management Act 2001*.

In the Northern Territory and Queensland catchment management activities are undertaken as part of the broader work of the relevant water and natural resources departments.

### *Other relevant Acts*

The *Competition and Consumer Act 2010* (Cwlth) includes provisions requiring corporations to act in accordance with applicable industry codes, which can include mandatory and voluntary industry codes (s. 51AD).

In addition to the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth), states and territories have developed a variety of strategies (e.g. Victoria's Biodiversity—Sustaining Our Living Wealth, Victoria's Biodiversity—Directions in Management, NSW Biodiversity Strategy (currently in draft), and Building Nature's Resilience: A Draft Biodiversity Strategy for Queensland).

## Ongoing reform

It is important to note that the broader framework surrounding the regulation of urban water quality undergoes continuous reform. The recent establishment of the NRWRF is a case in point. While the forum is informal, it demonstrates a need and commitment at the state and territory level—supported by the Commonwealth—to enhance jurisdictional interdependencies and regulatory consistency in light of challenges emerging from the implementation of the AGWR. Other areas of recent or ongoing reform in the regulation of urban water quality include:

- the NWC Water Industry Skills Taskforce is seeking to develop a national certification framework for drinking water system operators
- the Water Recycling Centre of Excellence is developing a national validation framework for water recycling, to be used by both private and public proponents of water recycling systems
- the Standards Australia WS-13 Committee is developing a national domestic greywater standard
- the NWQMS Contact Group is reviewing the NWQMS package.

## Assessment

By and large, the existing regulatory arrangements for maintaining urban water quality in Australia have been reasonably effective in meeting relevant government public health and safety objectives. The findings from recent government and industry assessments of urban water utilities (NWC & WSAA 2010, NWC 2009) demonstrate that:

- 'Australia's performance in providing safe drinking water remains high'—in 2009–10, 92 per cent of water utilities across Australia reported 100 per cent compliance with relevant microbiological standards.
- Many utilities have improved performance in the management of sewer overflows, and the combination of increased treatment standards and recycling targets have led to improvements in the quality of wastewater discharge to the environment. That said, in some cases performance in meeting overflow standards across Australia remains inconsistent and there are examples of illegal connections and sewerage breaks resulting in the occurrence of dry weather exfiltration.
- Urban waterway health is subject to numerous regulatory requirements, including sewage discharge licensing, stormwater run-off quality, catchment management plans, development control approvals and environmental planning instruments. Who is responsible for providing the health of urban waterways and the role of water-sensitive urban design in providing waterway health values remains unclear.

In addition, the Australian Water Association's recent *State of the water sector* (AWA/Deloitte 2010) survey found that:

- 80 per cent of respondents thought that 'water quality/health regulation in their state is very or quite effective'
- 56 per cent of respondents thought that 'environmental regulation in their state is very or quite effective'.

It is also important to mention that stakeholders consulted as part of this review widely support the ADWG and AGWR. These guidelines were seen to represent international best practice in terms of providing a framework for managing water quality effectively, regardless of the source.

These positive aspects notwithstanding, there are current and emerging risks to urban water quality. Infrastructure Australia, for instance, in its recent *Review of regional water quality and security*, highlights that 'water utilities servicing regional communities struggle to implement and comply with the [ADWG]—this is particularly so for smaller water utilities' (AECOM 2010). A key factor behind this non-compliance 'is the absence of the necessary skills, experience and knowledge in water in many regional communities'—coupled with the fact that the ADWG is not mandatory in all jurisdictions (AECOM 2010). The Infrastructure Australia review echoed the findings of the 2008 *Inquiry into sustainable urban water supply and sewerage services for non-metropolitan NSW*. This found that 17 of the 106 non-metropolitan water utilities in NSW failed 'to meet the microbiological water quality requirements of the [ADWG]', and that there had been '22 boil water alerts over the 25 months to June 2008' (Armstrong & Gellatly 2008). Regional water utilities are not the only area of concern—a number of cross-connections have occurred in recent years (between potable water mains and recycled water in separate systems) in major metropolitan water systems, such as Sydney and Melbourne (Sydney Water 2005, Melbourne Water 2007).

In light of these current and emerging risks, it is the purpose of this review to identify how the existing arrangements for regulating urban water quality could be reformed to better meet the government's public and environmental health objectives. This review seeks to achieve this

goal by first identifying what a ‘best practice’ regulatory framework for the regulation of public and environmental health and the management of risks looks like.

Second, this review distils the best practice framework into a series of key evaluation principles and uses these evaluation principles to determine the extent to which existing regulatory arrangements for urban water quality are aligned with best practice (see Chapter 4). The findings from this application of the best practice frameworks are then used to identify options and a preferred approach to reforming urban water quality regulation in Australia (see Chapter 5).

# 3 Best practice framework

Health and safety has traditionally been seen as an appropriate objective for government intervention across a range of aspects of Australian society. As a consequence, governments have considerable experience in developing and implementing regulatory frameworks to achieve health and safety goals, as well as reforming these frameworks to enhance the effectiveness and efficiency of government action. Drawing on this experience (and the broader academic literature), it is possible to identify a best practice framework for the regulation of public and environmental health and the management of risks.

This chapter details this best practice framework and its separation of functions across policy development, hazard and risk assessment, and regulatory decision making and administration. To provide greater context around the process of regulatory reform, this chapter also details the regulatory approaches and reform experience of three comparator sectors: electrical safety, food safety and rail safety.

It is important to note that the framework in this chapter encapsulates a risk-based approach to regulation—'the development of decision-making frameworks and procedures to prioritise regulatory activities and deploy resources, principally relating to inspection and enforcement, based on an assessment of the risks that regulated organisations pose to the regulator's objectives' (Black 2010).

While there is strong support for the risk-based approach to regulation (it was endorsed, for example, by the Hampton Review in the United Kingdom, and is coming into focus for an increasing number of other OECD countries; Hampton 2005, OECD 2010), the risk-based approach is not without its limitations. It places, for instance, considerable emphasis on the risk assessment process and the quality of information supporting the risk assessment. This notwithstanding, 'most regulators and policy-makers, at least in the Anglo-Saxon world, would regard it as approximating best practice in terms of where to allocate most of their resources'.[7]

## 3.1. Rationale for government intervention

As the COAG guideline on *Best practice regulation* attests, an 'important first step before considering any [form of government intervention] is to examine closely whether there is a problem, and to make an initial decision on whether any action is required' (COAG 2007). The rationale for government intervention in maintaining urban water quality is essentially grounded in the hazards and risks that exist across Australia's urban water system. In this context, *hazard* refers to any 'biological, chemical, physical or radiological agent that has the potential to cause harm' (NHMRC & NRMMC 2004). Examples of hazards include:

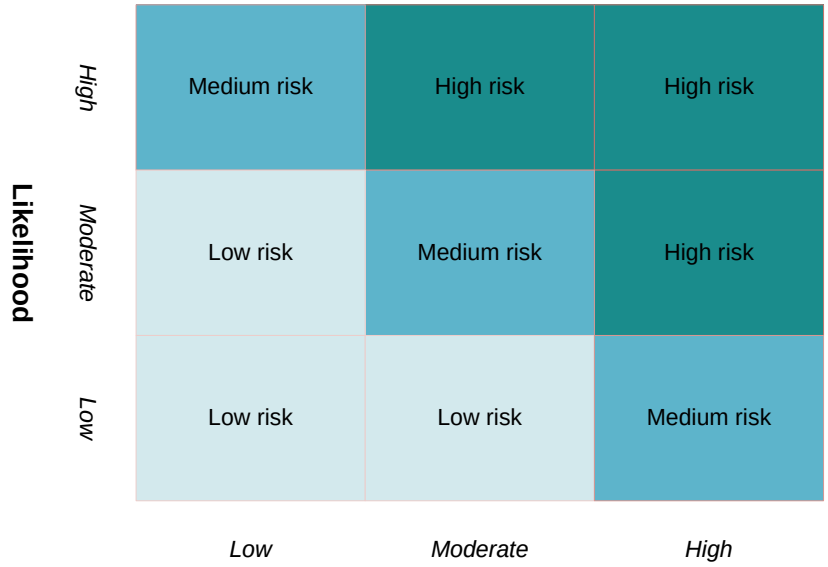
- cryptosporidium—a species of protozoan, some strains of which are important waterborne human pathogens due to their resistance to conventional disinfection practice using chlorine.
- cyanobacteria—bacterial species capable of producing toxins that may have detrimental health effects on humans and animals. These organisms pose significant water quality and public health challenges to many water systems in Australia. Cyanobacterial blooms pose an environmental hazard as well as a human health hazard.

[7] Neil Gunningham, reviewer comments.

- mercury—a metal which, in certain forms (e.g. elemental mercury vapour, methyl mercury) is highly toxic to humans. Mercury compounds can contaminate water as a result of mining operations (current or historical), industrial emission or spills.

Not all hazards are created equal. Different hazards pose different levels of risk. Some are more likely than others to harm exposed populations or receiving environments. Some may also have greater consequences than others (in terms of the severity of the harm they can cause) (Figure 1). It is the combination of these two factors (likelihood and consequences) that determines the risk profile of a particular hazardous event for a given hazard.

Figure 1: Levels of risk




Each water and/or wastewater system has a risk profile that is dependent on its size and the level of exposure of its consumers to potentially harmful constituents in the water. The level of management intervention demanded for any system should be commensurate with the risk; otherwise, there is a chance that systems with high, inherent risk might not be adequately protected from contamination events or, conversely, that systems with modest risk profiles might be overly protected. In terms of the different risk profiles:

- On-site systems typically only service one household or the occupants of one building. The risks associated with on-site water supply systems (e.g. rainwater tanks) are generally low, although risks can increase in the context of on-site recycling systems (as households may not have the technical capacity to monitor and operate sophisticated treatment systems effectively).
- Centralised systems generally have the advantage of greater access to resources and technical capacity to ensure the required water quality. These systems tend to be more complex, but the implications of system failure are potentially more severe since they service large numbers of people.
- Decentralised water management systems (DWMSs) generally have higher risk profiles than on-site systems (given that they service a larger number of people) and are subject to many of the limitations that have been identified for on-site systems. They are also more likely to have a higher risk profile than centralised systems given the variability in quality of available source water (i.e. stormwater). Other risks associated with DWMSs include:

- Technical competence—who is responsible for operating, maintaining and monitoring the DWMS? Does the body corporate have adequate competencies to operate a DWMS?
- Interaction with centralised systems—is the DWMS connected to the broader water network? If so, who is responsible for ensuring that cross-contamination does not occur in either direction and that the (gravity-fed) functionality of the existing sewerage network is not impeded?
- Long-term ownership—who owns the risk of liability should an incident occur and who is responsible for the infrastructure and its long-term maintenance should a private operator cease from operating it?

Maintaining water quality thus requires, for the most part, a risk management approach. The key focus is ensuring that sufficient processes are in place to mitigate risks, prioritising actions, and allocating resources on the perceived risk profile of different hazards. The ultimate goal is to steer 'a sensible course between the extremes of failing to act when action is required and taking action when none is necessary' (NHMRC & NRMMC 2004).

The key question is whether there is a need for government to intervene in the management of water quality risks. Generally speaking, governments intervene to change behaviour in social or market transactions, believing that 'unregulated behaviour would lead to inferior outcomes' (VCEC 2010). In the context of water and wastewater operators, is water quality likely to be maintained in line with societal expectations in the absence of government intervention?

On the one hand, private incentives exist to ensure that treated water and wastewater does not negatively affect human and/or environmental health. These incentives include:

- Potential cost of reputational damage—causing illness or environmental contamination is likely to damage the reputation of water and wastewater operators. Such reputational damage may limit the providers' future competitiveness (including its ability to expand operations) and/or encourage greater regulatory oversight of its actions.
- Potential cost of legal action—individuals or firms affected by poorly treated water or wastewater may decide to pursue claims against the relevant operators in the civil courts.
- Maintaining own health—some operators (particularly those responsible for on-site and decentralised systems) will be the direct consumers of their treated water/wastewater. They thus have a direct incentive to maintain water quality to protect their own health.

While these private incentives are relatively strong, there is reason to expect that they may not always be sufficient to ensure that water quality is maintained in line with societal expectations. Specifically, market failures exist which are likely to mean that private incentives will not sufficiently ensure the achievement of social goals. These market failures include:

- Externalities—not all of the costs associated with insufficiently treated water/wastewater on human and environmental health are directly borne by those providing and/or treating water. These costs include:
  - medical costs (paid by both individuals and government)
  - lost productivity caused by illness
  - lost earnings associated with environmental degradation
  - costs associated with the remediation of contaminated land
  - reductions in amenity and the broader value that the community places on a protected environment.

- Imperfect information—individuals will not always be able to make fully informed decisions about water quality in their best interest, because:
  - there is a limited link between water quality and its sensory characteristics (i.e. those discernible through sight, smell, taste and touch), the most common means by which people judge product quality
  - most individuals lack the technical knowledge and expertise to interpret available information
  - the cost of obtaining additional information is likely to be prohibitive for most individuals.

The existence of these market failures suggests that there is an underlying rationale for government intervention in managing risks to water quality.

## 3.2. Best practice framework

As outlined above, not all of the costs associated with insufficiently treated water or wastewater are directly borne by those providing and/or treating the water. Furthermore, imperfect information means that individuals will not always be able to make fully informed decisions about water quality in their best interests. These factors provide a prima facie case for government intervention in managing risks to water quality.

The key question for government thus becomes: how can it most effectively and efficiently intervene to manage risks to water quality? The Productivity Commission suggests governments can achieve this outcome by basing their regulatory frameworks on the following four levels:

- policy development
- hazard and risk assessment
- developing a risk-management approach
- administration.

The remainder of this chapter will build on and expand these four levels, drawing on the broader national and international literature on best practice regulation. It is important to note that examples relevant to the water sector are provided in the next chapter, once the best practice framework has been applied to the regulation of urban water quality.

### 3.2.1. Policy development

This is the foundation level of the framework proposed by the Productivity Commission. Its purpose is:

- to identify what society's goals are regarding water quality
- to articulate these goals in the form of policy that will direct and drive action at the other levels of the regulatory framework.

There are four broad principles that should govern the policy development component of a regulatory framework.

## Roles and responsibilities should be clear

Governance arrangements surrounding policy development and the broader regulatory framework should be clear, with broad agreement and recognition about who is responsible for what.

## Policy objectives should be measurable

Responsible policymakers should develop clear objectives to drive the broader regulatory framework. These objectives should be framed in a manner (i.e. they should be specific, focused and measurable) to allow internal and external monitoring of the government's progress in achieving the objectives (Department of Finance and Deregulation 2009).

## Policymakers should adhere to best practice regulatory principles

In developing policy, government should adhere to best practice regulatory principles. Key among these are:

- Undertaking robust regulation impact assessments in a transparent manner—including the use of cost-benefit analysis and the publication of consultation and decision regulatory impact statements (RISs). The *Best practice regulation handbook* (Australian Government 2007) and COAG's Best Practice Regulation provide guidance about undertaking RISs in a national/state context.
- Subjecting policy to ex post monitoring and review—including the early development of performance measurement frameworks to ensure government is in a strong position to judge the performance of particular policies or programs.
- Consulting widely and regularly with relevant stakeholders—including the establishment of advisory committees. Appendix F of COAG's Best Practice Regulation provides guidance on effective consultation techniques.

## Consideration should be given to policy and regulatory harmonisation, where relevant

A key focus of the COAG regulatory reform agenda and the National Partnership Agreement to Deliver a Seamless National Economy is to reduce 'inconsistent regulation across jurisdictions'. Harmonisation is seen as vital to 'improve business efficiency and the competitiveness of the national economy, reduce red tape, improve labour mobility and enhance productivity' (COAG 2009).

While harmonisation may be a worthy goal as a general concept, there are some areas of regulation where the benefits of reducing inconsistencies are likely to be greater than others. The Productivity Commission (2005) maintains that support for a national regulatory system is more likely when:

- 'there are significant inter-jurisdictional spillovers associated with the provision of a good or service at the sub-national level (for example, interstate transport systems)
- there are readily identifiable areas of shared or common interest or sizeable economies of scale and scope arising from central provision or organisation (for example, defence, international or external affairs and social welfare support)

- a diversity in rules or regulations is likely to give rise to high transaction costs with insufficient offsetting benefits (for example, regulation of companies, transport, the financial sector and trading provisions covering weights and measures)
- there is scope for mobility of capital and people across jurisdictions to undermine the fiscal strength of the sub-national level of government (for example, as arises with the income, capital gains and corporate tax bases; or with welfare entitlements).'

At the policy development level, national harmonisation can be encouraged through:

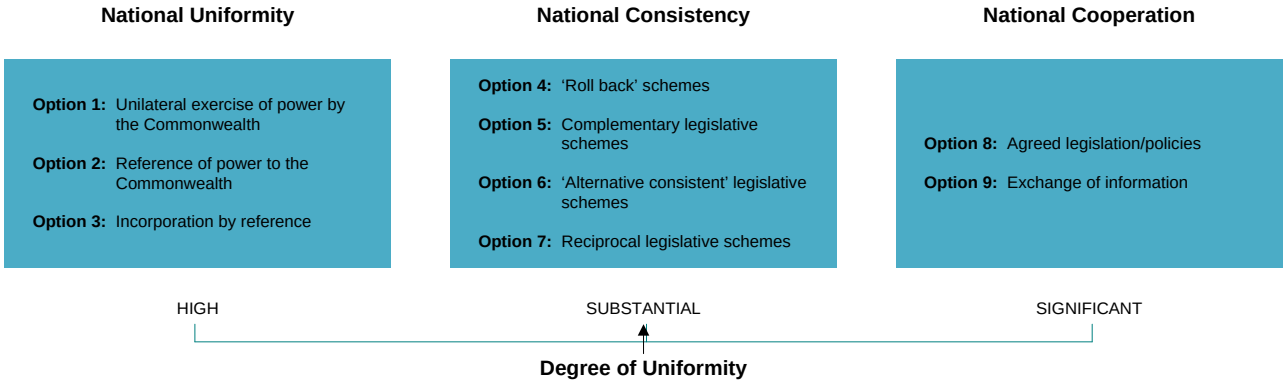
- Legislative arrangements—jurisdictions can adopt a number of legislative measures to reduce regulatory inconsistencies, including:
  - the states and territories referring a matter to the Commonwealth
  - national model legislation
  - applied law schemes (Parliamentary Counsel's Committee 2008).
- Institutional arrangements—an 'effective means' of achieving national coordination in the absence of the states and territories referring their powers to the Commonwealth is 'to assign responsibility to a ministerial council established under the auspices of COAG' (Productivity Commission 2008).

It is important to note that national harmonisation is generally not achieved overnight. As the comparator sector discussion below highlights, achieving national harmonisation generally occurs over long time frames (generally decades), and involves numerous intermediate steps (e.g. agreeing on mutual recognition before moving towards the development of a single, national code). Furthermore, there is no universal conception of what a nationally harmonised regulatory framework should look like. For instance, the regulation of electrical safety has achieved a degree of national harmonisation without essentially any involvement from the Commonwealth or any specific reduction in state and territory responsibilities. Alternatively, rail safety regulation is being nationally harmonised through the creation of a single, national regulator that will eventually be responsible for all aspects of regulation—including administration and enforcement.

Figure 2 outlines the alternative families of options that are available to achieve greater policy and regulatory harmonisation. Examples of these options include:

- Incorporation by reference—in the context of urban water quality, this could occur if the states and territories reference NWQMS guidelines in their urban water quality legislation. The regulation of food safety currently uses the incorporation by reference approach, where the states and territories call up the *Food standards code*.
- Complementary legislative scheme—this would involve one state or territory enacting legislation relating to urban water quality, and the remaining states and territories applying this legislation as the law in their jurisdictions. The regulation of rail safety is currently governed by an applied legislation scheme.
- Exchange of information—this would involve relevant state and territory regulators exchanging information, with the intention of creating a common understanding and basis for interjurisdictional cooperation. The NRWRF is an example of this approach.

Figure 2: Families of options for achieving harmonisation




Source: ACG (2003)

It is important to note that harmonisation is not just a concern during policy development. As Neil Gunningham states, 'for harmonisation to be effective in its objectives, it must extend to the implementation and maintenance of harmonised legislation as well as to its enactment, and it must ensure a consistent approach to compliance support, inspection and enforcement'.[8] The goal of harmonisation can be supported by:[9]

- Assessing jurisdictional performance—how are jurisdictions performing in achieving agreed harmonisation objectives? The key with jurisdictional assessments is to ensure that:
  - they are undertaken against agreed goals, objectives and targets
  - effective indicators (or benchmarks) are established to allow for meaningful interpretation of performance results
  - they are undertaken periodically and as independently as possible (either through a jurisdictional peer review process, or through an independent agency specifically tasked with the role—similar to the role currently played by the COAG Reform Council in monitoring performance of the national agreements, or that undertaken in the publication of the national performance reports for urban utilities by the NWC).
- The use of accountability mechanisms, such as:
  - securing heads-of-government-level agreement (formalised by an intergovernmental agreement) and COAG oversight to prioritise the goal of harmonisation among jurisdictions
  - including stakeholders in decision-making structures (e.g. high-level advisory bodies)
  - providing effective coercive mechanisms and incentives—there is a weight of evidence that incentives can play a strong role in securing regulatory reform (national transport policy and national competition policy in Australia are two examples) (Citi & Rhodes 2007, Wilson & Moore 2006). Incentives can take the form of sanctions for underperformance or financial payments to encourage performance.
- Arrangements aimed at institutionalising harmonisation—in other words, to make regulatory harmonisation sustainable beyond the immediate period of reform. Such arrangements can include:
  - ensuring regulators have sufficient resources to implement and enforce regulation in line with agreed harmonisation principles and objectives

[8] Neil Gunningham, reviewer comments.

[9] The following section draws heavily on advice provided by Neil Gunningham in his reviewer comments.

- shaping regulator behaviour 'on the ground' through guidance material (and potentially associated assessments of adherence to the guidance material) to encourage consistency in implementation and enforcement
- promoting mutual learning and best practice
- developing harmonised policies, procedures, protocols and arrangements
- ensuring regulators have sufficient competencies to operate effectively. As Gunningham notes, 'an inspectorate that lacks the relevant competencies will be incapable of enforcing legislation effectively, irrespective of what regulatory approach it adopts'.[10]

Box 2 provides an outline of the benefits that can be realised from greater regulatory consistency and harmonisation.

Box 2 Benefits of harmonisation

Three primary benefits can be realised from greater regulatory consistency and harmonisation:

- A reduced regulatory burden on businesses operating across different states and territories and, in some cases, local councils—as these businesses can reduce the investment required to understand and comply with different regulatory regimes and instead focus on just one set of requirements.
- Reduced costs incurred by government in administering multiple regulatory frameworks. As VCEC notes, 'multiple regimes are likely to lead to duplication of administrative costs in running the various schemes. In addition, each jurisdiction may be required to run its own separate information and education programs to explain the regulations' (VCEC 2011).
- 'Market fragmentation and the failure to capture the benefits from economies of scale' (VCEC 2011). Inconsistent regulatory frameworks may fragment the Australian market into a series of smaller markets, hindering cross-jurisdictional transactions and opportunities for business to achieve economies of scale.

## 3.2.2. Assessing hazards and risks

The purpose of this aspect of the framework is to identify hazards to water quality and assess the level of risk they pose to exposed populations and/or receiving environments. Risk assessment is an important part of the overall regulatory framework. It can help address 'the threshold issue of whether or not governments should intervene', and the type of intervention (Victorian Department of Treasury and Finance 2007). Specifically, it can help determine:

- 'whether the risks that government intervention is intended to address are of significant magnitude compared with other risks
- the extent to which government intervention reduces the initial risk problem (i.e. the effectiveness of the proposed government response)' (Victorian Department of Treasury and Finance 2007).

Risk assessment thus plays a strong role in influencing the next level of the regulatory framework: developing a regulatory reform framework that ensures uptake of risk management approaches.

The literature highlights a number of principles that should govern the assessment of hazards and risks. These principles can be grouped around the concepts of:

- responsibility—who will be responsible for identifying hazards, hazardous events and assessing risks?
- conduct—how should the hazard and risk assessments be conducted?

[10] Neil Gunningham, reviewer comments.

## Responsibility

Establishing who is responsible for identifying hazards and assessing risks is essential for the effective operation of a risk-based regulatory approach. Key principles that should govern this process include:

- The roles and responsibilities of the body or bodies chosen to identify hazards and assess risks should be clear to all relevant stakeholders—this is necessary to maintain accountability, and prevent regulatory gaps and overlaps.
- The role of hazard and risk assessment should be kept separate from policy development and risk management. As the Productivity Commission (2008) notes, hazard and risk assessment is 'essentially a science-based function'. It is thus desirable to keep this role separate from policy making ('to ensure assessments are confined to the facts') and the development and administration of risk management standards (which generally requires different skill sets and greater recognition of policy settings and community expectations).
- In areas of regulation that cross jurisdictions and where harmonisation is seen as an important goal, a national body would ideally be given responsibility for the assessment of hazards and risks (although not necessarily the development and administration of approaches to manage the assessed risks). A national body is preferred because it:
  - avoids duplication in risk assessments—which represents an inefficient allocation of government resources
  - prevents divergence in risk assessments—which can increase regulatory uncertainty and compliance costs for businesses operating across states and territories
  - is likely to be better placed 'to maintain and build greater technical expertise, rather than have this scarce resource scattered amongst multiple jurisdictions and multiple agencies' (Productivity Commission 2008).

## Conduct

There are essentially three overarching features of an effective and efficient risk assessment scheme. These include:

- Principles about how risk is assessed should be clear. These principles should take into account relevant policy objectives and ideally be framed around the concepts of reducing overall risks 'to levels acceptable to the community, taking into account the associated costs and benefits' (Productivity Commission 2008).

  Clearly, it is not possible for governments to provide a completely 'risk-free' society, or to prevent every possible event that might cause harm. While, in many cases, risk regulation will have large and important benefits, the direct and indirect costs imposed by regulatory approaches may not be as immediately obvious. Moreover, it needs to be recognised that regulation consumes scarce resources. Risk regulation that is relatively ineffective or costly will divert resources from other applications (Victorian Department of Treasury and Finance 2007).
- Assessment effort associated with particular hazards 'should be commensurate to their relative risk' (Productivity Commission 2008).
- The hazard and risk assessment scheme should operate cost effectively—taking into account methodologies to assess risk, and the use of other national and international assessments, where appropriate.

## 3.2.3. Developing a risk-management approach

Once policy objectives have been articulated and risks assessed, the next step for government is to identify the 'best' means of managing the identified risks. Government has a range of options available to it—including the possibility of taking no action at all, and allowing industry to manage risks itself.

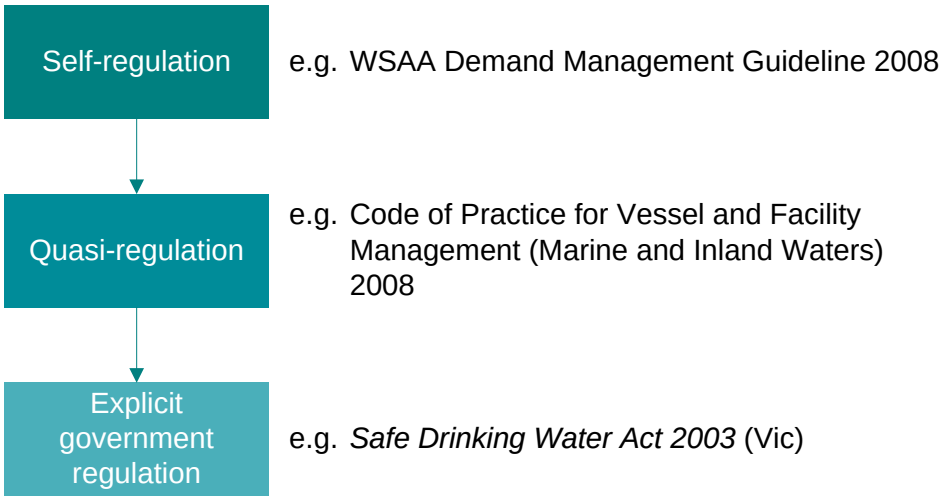
The range of available best practice regulation guidelines (such as those produced by the Office of Best Practice Regulation (OBPR) and the Victorian Department of Treasury and Finance) provide clear advice about the process agencies should follow in introducing new regulation. Rather than replicating this advice, this section will focus on three key aspects that government should consider in deciding how best to manage an identified risk. These aspects include:

- possible forms of government intervention—what are the options for government in seeking to manage an identified risk?
- means of determining the 'best' form of intervention.

### Possible forms of government intervention

As noted by the Commonwealth Interdepartmental Committee on Quasi-regulation (1997), regulation 'can usefully be considered as a spectrum' (see Figure 3). At one end lies self-regulation. This has no government involvement, and 'is generally characterised by industry formulating rules and codes of conduct, with industry solely responsible for enforcement' (Australian Government 2007).

Figure 3: A simplified spectrum of regulation




At the other end of the spectrum lies explicit government regulation. Also referred to as 'black-letter law', this 'comprises primary and subordinate legislation' (Australian Government 2007). Explicit government regulation 'attempts to change behaviour by detailing how regulated parties should act, and it generally imposes punitive sanctions (such as fines or even custodial sentences) when there is non-compliance with the regulation' (Victorian Department of Treasury and Finance 2007).

Between the two ends lies what is known as quasi-regulation or 'grey-letter law'. This 'includes a wide range of rules or arrangements where governments influence businesses to comply, but which do not form part of explicit government regulation' (Australian Government 2007). It can take many forms 'such as codes of practice, advisory notes, guidelines, and

rules of conduct, issued by either non-government or government bodies' (Commonwealth Interdepartmental Committee on Quasi-regulation 1997).

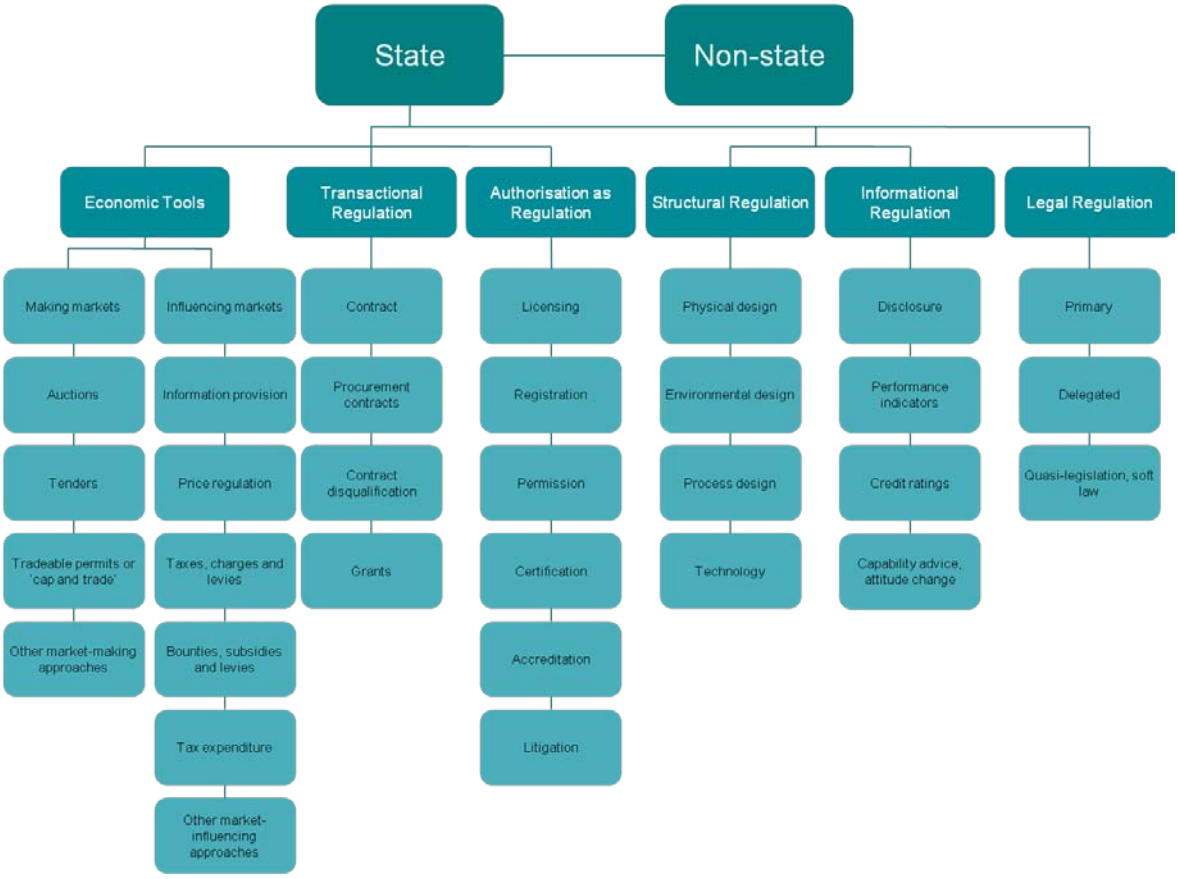
Broadly speaking, regulation can be:

- prescriptive (i.e. highly detailed and specific)
- performance based (i.e. specifying what output or outcome must be achieved for compliance to be met)
- principle based (as under goal setting general duties)
- process based (e.g. requiring particular steps to be undertaken during the management of a regulated activity).

In practice, however, regulation generally involves some combination of all four types.[11]

Figure 4 provides an overview of the types of regulatory tools available to government. A missing 'tool' from this diagram is 'taking no specific action'. It is important to recognise that government intervention may not always represent a net benefit. In some circumstances, taking no action (and relying on 'the market in conjunction with existing general liability law … and insurance laws') may prove to have the greatest expected net benefit (Office of Best Practice Regulation 2009).

Figure 4: Tools of regulation




Source: Freiberg (2010)

11 Neil Gunningham, reviewer comments.

## Choosing a form of government intervention

'Net benefit' is an overarching concept to help government determine the best form of intervention to manage an identified risk. As the OBPR notes, government policy would ideally be Pareto efficient—that is, it would make 'at least some people better-off, while making nobody worse-off' (Office of Best Practice Regulation 2009). In reality, however, such policy is unlikely to exist, and 'a requirement for Pareto efficiency would result in policy inertia'.

The expected net benefit of a policy thus represents a more practical goal for government policy. Rather than aiming for no costs, net benefit seeks to ensure that the expected benefits of a policy are likely to outweigh the expected costs. In estimating net benefit, government should focus on all costs and benefits—economic, as well as social and environmental—and ultimately choose the form of government intervention that offers the greatest expected net benefit.

Cost-benefit analysis provides a general framework for assessing the expected net benefit of a proposed regulatory approach. This quantitative method is the preferred approach of the OBPR and its state and territory counterparts. It is important to recognise, however, that cost-benefit analysis does have its limitations as an analytical approach. Key among these are:

- 'Benefits often can be more difficult to quantify than costs' (UNEP n.d.).
- There is no universal view about what discount rate should be used to establish a net present value, or whether discounting is acceptable in analysing the costs of some regulatory areas. As the OECD states, 'This unacceptability arises from the fact that distant future costs and benefits may appear as insignificant present values when discounting is practised. In turn, this appears to be inconsistent with notions of intergenerational fairness' (OECD 2006).

According to the Productivity Commission, risk in a broad sense plays an important role in determining whether a form of government intervention is likely to generate net benefit. As it states: 'There is more likely to be a net benefit if regulation is tailored to the risk posed by [the hazard] in a particular circumstance … rather than the blunter approach of intervening whenever there is a hazard' (Productivity Commission 2008).

There is also a range of advantages and disadvantages of the key regulatory types—that is, for self-regulation, quasi-regulation and explicit government regulation—and suitable conditions for their use, as highlighted in Table 6.

Table 6: Advantages, disadvantages and suitability of different regulatory types

| | *Advantages* | *Disadvantages* | *Suitable conditions for use* |
|---|---|---|---|
| **Self-regulation** | • lower administration costs for government and compliance costs for industry<br>• allows for innovative behaviour of industry participants<br>• improved credibility (and potentially greater compliance) because rules are developed by business, not imposed by governments<br>• uses the expertise and experience of those in the targeted industry | • may be used to create restrictions on competition, or implicit barriers to entry and trade<br>• credibility of sanctions may be low in the absence of legislative backing<br>• imposes monitoring costs on industry or relevant professional association | • the problem is a low-risk event, of low impact or significance<br>• the problem can be fixed by the market<br>• there is no strong public interest concern—in particular, no major public health or safety concern |
| **Quasi-regulation** | • reduced resource burden on government to develop/administer the regulation<br>• uses the expertise and experience of those in the targeted industry<br>• encourages industry or professional association to take greater responsibility for the behaviour of its members | • may be used to create restrictions on competition, or implicit barriers to entry and trade<br>• danger of regulatory 'capture', whereby government agencies promote the interests of the regulated parties at the expense of the community at large<br>• can create confusion about regulatory requirements<br>• due to its general convenience and lack of scrutiny, sometimes used as 'backdoor regulation' | • there is public interest in government involvement, and the issue is unlikely to be addressed by self-regulation<br>• there is need for an urgent, interim response<br>• when there are advantages in the government engaging in a collaborative approach with industry, with industry having strong ownership of the scheme |
| **Explicit government regulation** | • regulatory certainty<br>• industry-wide coverage<br>• enforcement via legal sanction likely to lead to higher levels of compliance | • greater administration costs for government and compliance costs for affected parties<br>• less flexibility<br>• significant time lags in development and implementation<br>• can encourage more and more regulation | • problem is high risk and/or of high impact/significance<br>• government requires the certainty provided by legal sanctions<br>• universal application is required<br>• there is a systematic compliance problem that requires effective sanctions |

Sources: Office of Best Practice Regulation (2009), Victorian Department of Treasury and Finance (2007)

In terms of choosing a particular regulatory approach (i.e. prescriptive, performance-based, principles-based or process-based), there are no hard-and-fast rules. Performance-based regulation offers benefits where 'actual performance can be clearly defined, measured, evaluated and verified'.[12] Process-based regulation may be preferred if government believes that considerable gains could be achieved by improving the decision-making or management of regulated entities in line with best practice (e.g. OH&S regulatory reforms were primarily aimed at ensuring companies undertook sufficient planning to achieve health and safety outcomes for workers). Lastly, prescriptive regulation can have advantages when regulated

[12] Neil Gunningham, reviewer notes.

entities may lack sufficient capacity (either in terms of technical knowledge or financial resources) to identify for themselves effective and/or efficient means of achieving regulatory outcomes.[13] The Building Code of Australia, for instance, is performance based, but includes 'deemed-to-satisfy' provisions that map out exactly how builders can achieve each particular performance outcome.

Identified levels of risk can also play a role in determining appropriate regulatory approaches. For example, regulators may prefer to rely on quasi-regulation to manage the risks associated with low-risk schemes, while relying on more prescriptive and explicit regulation for high-risk schemes. The key is to ensure that there is sufficient flexibility built into the regulatory framework to accommodate local variability, but within a broader government approach.

A final set of guidance about how government can choose a form of government intervention is provided by the Better Regulation Task Force. Reporting to the Prime Minister of the United Kingdom, the task force identified five principles of regulation. While these are directed to the development and application of regulation, they are equally useful to inform and shape compliance and enforcement guidelines.[14] The five principles are:

1 proportionality—'Regulators should only intervene when necessary. Remedies should be appropriate to the risk posed and costs identified and minimised'.

2 accountability—'Regulators must be able to justify decisions and be subject to public scrutiny'.

3 consistency—'Government rules and standards must be joined up and implemented fairly'.

4 transparency—'Regulators should be open and keep regulations simple and user-friendly'.

5 targeting—'Regulation should be focused on the problem and minimise side effects' (Better Regulation Task Force 2005).

### 3.2.4. Administration

The purpose of this level is to ensure that the chosen approach to managing an identified risk is administered and enforced as effectively and efficiently as possible. There are two key issues government should consider in seeking to achieve this objective:

- determining what level of government should be responsible for administration
- best practice principles to guide agencies in administering regulation.

#### Level of government

Choosing an appropriate level of government can play an important role in ensuring that regulations are administered effectively and efficiently. Key factors that can help inform this decision include:

- Constitutional responsibility—what level of government has constitutional responsibility for the area of regulation?
- Locational advantage—'if knowledge of local conditions and preferences is crucial to ensuring regulatory effectiveness and efficiency, it may be more appropriate to have sub-national regulators administering the national scheme' (Productivity Commission 2008).

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[13] Neil Gunningham, reviewer notes.
[14] Neil Gunningham, reviewer notes.

- Economies of scale—there may be efficiencies in administering regulation through a national body, rather than relying on eight state and territory bodies.

The 'subsidiary principle' is also frequently highlighted as a means of improving the effectiveness and responsiveness of government. This principle states that 'responsibility for a particular function should, where practicable, reside with the lowest level of government' (Productivity Commission 2005).

## Best practice principles

The literature provides a range of best practice principles to guide agencies in administering regulations. This section will focus on two key sets of principles—the first relates to the institutional characteristics of 'good' regulators and the second to regulator behaviour.

### *Institutional characteristics*

Several conditions enable regulators to perform well, including:

- effective internal and external governance arrangements—the Victorian Competition and Efficiency Commission quotes the State Services Authority in noting that 'Poorly conceived governance arrangements can be costly to the community by undermining the effectiveness of regulators and, ultimately, the achievement of important public policy goals' (VCEC 2010)
- clear objectives and roles—this helps ensure that regulation is only used where and when necessary, regulation uncertainty is reduced, and the agency is able to assess its performance and undertake workforce planning effectively
- well-designed regulatory instruments, backed up by sufficient powers to enforce compliance—for example, the ability to sanction non-compliant firms or individuals
- adequate resources and competent staff
- guidance about how to administer and enforce regulation.

### *Regulator behaviour*

IN 2005, Sir Phillip Hampton reviewed the regulatory system of the United Kingdom (United Kingdom Department for Business, Innovation and Skills 2010). He devised eight principles that he believed form the basis of effective regulatory behaviour. These principles are:

- regulators, and the regulatory system as a whole, should use comprehensive risk assessment to concentrate resources on the areas that need them most
- regulators should be accountable for the efficiency and effectiveness of their activities, while remaining independent in the decisions they take
- no inspection should take place without a reason
- businesses should not have to give unnecessary information, nor give the same piece of information twice
- the few businesses that persistently break regulations should be identified quickly and face proportionate and meaningful sanctions
- regulators should provide authoritative, accessible advice easily and cheaply
- regulators should be of the right size and scope, and no new regulator should be created where an existing one can do the work

- regulators should recognise that a key element of their activity will be to allow, or even encourage, economic progress and only to intervene when there is a clear case for protection.

## 3.3. Comparator sectors

To further inform the analysis of best practice regulation and the management of risks to public and environmental health, the NWC asked PwC to examine the regulatory arrangements of three comparator sectors—food safety, rail safety and electrical safety—and their respective experiences in attempting to achieve best practice reforms. The results of our analysis are provided below, including a discussion of key learnings.

### 3.3.1. Key learnings

Our analysis of the comparator sectors reveals that there is no single model for achieving reform. Electrical safety, for instance, has been able to achieve a significant degree of harmonisation through state and territory collaboration and the uniform reliance on a key Australian Standard (i.e. the Wiring Rules). Food safety, meanwhile, has benefited from a more direct Commonwealth presence and the institutional arrangements surrounding the intergovernmental agreement process, yet the states and territories still play a strong role in regulatory direction and administration. Lastly, rail safety is on a path towards the establishment of a single legislative framework, with the states and territories conferring powers to a national body.

It is also clear that achieving greater harmonisation of regulatory frameworks is neither simple nor instantaneous. Food safety, for example, has been the subject of reform over the past three decades and still remains a work in progress. National regulatory reform should be seen as a journey with much iteration.

The experiences of the comparator sectors suggest that urban water quality enjoys a number of strengths in relation to its readiness and suitability for regulatory reform. These include an underlying set of national guidelines, greater national collaborations (such as the NRWRF) and (as discussed in Chapter 2) a willingness to consider future reform regulatory frameworks. Examination of the comparator sectors also highlights a number of potential obstacles to achieving greater harmonisation of urban water quality regulation. These include:

- the broad range of portfolios and agencies involved in urban water quality regulation (for the most part, the regulation of food safety, electrical safety and rail safety belonged to one portfolio or agency in each jurisdiction, respectively)
- likewise, there are numerous ministerial councils and standing committees that have a responsibility for aspects of urban water quality policy and regulation—this can diffuse efforts to streamline reform, particularly if harmonisation is seen as a priority by one ministerial body and less so by another
- the absence of significant cross-jurisdictional trade in water and related services—the existence of a national market generally encourages greater regulatory harmonisation—a useful impetus for reform.

Other key learnings about achieving best practice regulatory reform that emerged from our research of the comparator sectors—particularly our consultations with Food Standards Australia New Zealand (FSANZ), the National Transport Commission (NTC), and the Electrical Regulatory Authorities Council (ERAC) include:

- Recognise accumulated expertise at the state and territory level—in areas where the states and territories have traditionally played a strong regulatory role, attempts at reform should recognise, and seek to leverage, this existing expertise.
- Use COAG if possible—some regulatory areas (such as electrical safety) are the responsibility of a variety of ministers from different portfolios. Even though it can be busy and meets less frequently, COAG is seen as an ideal forum to progress major national reforms.
- The importance of national capacity around policymaking and standards setting—the three comparator sectors highlight the importance of pursuing a national approach to policymaking, either in the context of an informal arrangement (such as ERAC) or through a formal ministerial council process. A national approach allows states and territories to leverage off each other's knowledge and experience—strengthening, in turn, the policymaking process. Likewise, the comparator sectors demonstrate the benefit of a national standards-setting process—particularly given the economies of scale that can be achieved, and the strong foundation that national standards provide in terms of harmonisation.
- Engage stakeholders early—when developing regulation or policy, it is vital to get stakeholders involved at the ground level. This will ensure that the regulation/policy development process can be informed by the widest possible range of opinions and evidence, and prevent stakeholders from feeling that they are being presented with a fait accompli (which can generate resentment and intransigence). When developing regulation or policy, for instance, the practice of the NTC is to establish a stakeholder advisory group, comprising those stakeholders that are likely to be significantly affected by the proposed regulation/policy.
- With increasing harmonisation comes increasing formality—ERAC provides a mechanism for state and territory regulators to collaborate and cooperate over electrical safety. It has traditionally been an informal body, with few underlying rules and processes. However, with an ongoing push to increase harmonisation across jurisdictions, there has been a need to put in place rules of association to formalise decision making and roles and responsibilities.
- Recognise the impact that an agency's portfolio can have over its direction and activities—generally speaking, food safety bodies in developed countries are typically located in either the health or agriculture portfolios. Whereas health tends to encourage a greater focus on public health, agriculture tends to encourage a greater focus on food promotion.
- Work closely with standards bodies—to take one example, the Wiring Rules are a key element of the electrical safety regulatory framework. These are developed and maintained by Standards Australia. It is important for ERAC to ensure that commercial considerations do not overtake safety issues in the standards review process. To this end, ERAC maintains a close relationship with Standards Australia, which has meant that the resulting standards have typically been acceptable to all jurisdictions.

### 3.3.2. Food safety

The regulatory framework for food safety in Australia is cross-jurisdictional. The states and territories have constitutional responsibility for the domestic production and sale of food. The powers of the Australian Government are more limited, relating primarily to the import and export of food.

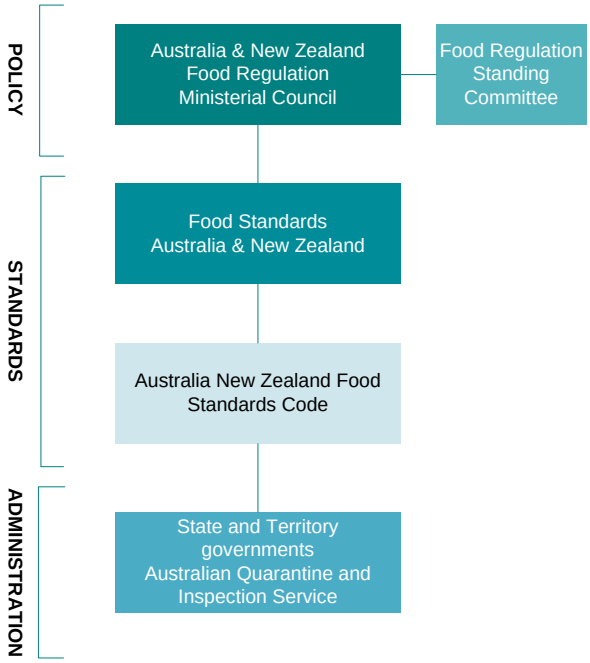
In November 2000, COAG signed an Intergovernmental Agreement on Food Regulation. This document committed the governments of Australia to implement a 'co-operative national

system of food regulation' (with a focus on harmonising regulatory approaches and standards) and empowered the Australian Government to coordinate the national system (COAG 2002). The food regulation agreement also requires the states and territories to adopt a Model Food Act as the basis for their respective food Acts. The Model Food Act contains both 'core' provisions (that the states and territories are obligated to implement) and 'non-core' provisions (that can be removed or amended, if desired).

In addition to its domestic provisions, the food regulation agreement further integrates the Australian and New Zealand food regulatory systems; a process that began with the signing of the Australian New Zealand Closer Economic Relations Trade Agreement in 1983, and the Joint Food Standards Setting Treaty in 1995 (Productivity Commission 2009).

The Australia and New Zealand Food Regulation Ministerial Council is the overarching body responsible for the development of policy and guidelines for setting domestic food standards, and approving proposals for food standards (Figure 5). It is supported by the Food Regulation Standing Committee—a high-level officials group that provides advice on policy, standards and stakeholder engagement.

Figure 5: Food safety regulatory framework




Responsibility for developing food standards lies with FSANZ. This bi-national body is also responsible for developing and maintaining the Australia New Zealand Food Standards Code. This 'is a collection of individual food standards', covering food production (general and food-specific), food hygiene and primary production and processing (FSANZ 2010). The state and territory governments have incorporated the Food Standards Code (subject to amendments) into their respective food Acts. They are thus responsible for the administration and enforcement of food standards in their jurisdictions. The Australian Quarantine and Inspection Service also plays an enforcement role in ensuring that imported foods comply with the Food Standards Code.

The Food Standards Code is supported by a number of guidelines. The purpose of these is to help regulators and industry interpret and implement the code in the context of higher-risk foods (e.g. seafood and dairy foods).

## Regulatory principles and approaches

The Food Standards Code was originally a prescriptive document. It was, in essence, a recipe—dictating what ingredients certain food products should contain. During the mid-1990s, the code underwent a significant revision, which included a shift towards a more performance-based approach to regulation. The emphasis was now on producers and manufacturers to provide healthy and safe food, rather than meeting specific guidelines about food composition.

FSANZ places heavy emphasis on the principle of minimum necessary regulation and the OBPR guidelines on best practice regulation. Every change to the Food Standards Code is subject to a regulatory impact statement (RIS), though not all RISs require approval from OBPR. FSANZ also regularly evaluates its standards against predetermined benchmarks.

FSANZ seeks to manage scientific and technological uncertainty by investing in research and development of food safety issues and longer-term studies of food safety trends. The goal is to ensure that the organisation remains aware of latest scientific developments (particularly as they relate to controversial issues of food safety) and is in a position to anticipate likely emerging food safety issues (and possible regulatory responses). FSANZ estimates that the organisation spends slightly more on research and development and longer-term studies than it does on developing standards and maintaining the Food Standards Code—a sign of the effort that the organisation dedicates to these activities. FSANZ also leverages its strong international linkages to help manage and reduce scientific and technological uncertainty.

## Reform of food regulation

As the Productivity Commission (2009) notes, the regulatory framework for food safety has been the subject of significant revision over the past three decades. The ultimate goal of these reform attempts has been the simplification and harmonisation of Australia's food regulations. In 1998, for instance, the Australian Government commissioned a review of the food regulation system. Chaired by Dr Bill Blair, the review found that the 'regulatory framework for food in Australia [was] complex and fragmented' (Food Regulation Review Committee 1998). It consisted of 'approximately 150 Acts and associated regulations', which were 'administered and/or enforced by numerous Commonwealth departments and statutory bodies, over 40 state and territory agencies and departments and over 700 local governments'. The Blair Review recommended the establishment of an 'integrated and co-ordinated food regulatory system', which was to be underpinned by nationally uniform laws and 'minimum, effective, performance and risk-based regulation' (Food Regulation Review Committee 1998).

The governments of Australia sought to implement the recommendations of the Blair Review through the 2000 Food Regulation Agreement. Ten years on, it is clear that, while significant progress has been made in improving Australia's food safety system, aspects of the regulatory framework are still in need of reform. The Productivity Commission notes in its recent benchmarking report of food regulation:

- While 'the focus in written food regulations has shifted from prescriptive regulation towards outcome and training requirements' over the past 10 to 20 years, there is still a heavy reliance on prescriptive regulation in some areas (e.g. primary production and processing).
- Regulatory harmonisation is 'incomplete and progress is variable'—'the Commission observed a number of regulatory differences which either result in variable burdens being imposed on businesses in different jurisdictions and/or increase the costs of doing business across jurisdictions' (Productivity Commission 2009).

The commission did highlight, however, that '[r]isk profiling, including compliance histories and inherent risks posed by different types of businesses were used by most of the regulators, including both core state regulators and local councils' (Productivity Commission 2009).

When analysing the regulatory framework for food safety it is important to recognise:

- the complexity of the Australian food system, which comprises hundreds of thousands of players (across manufacturing, retail and restaurants) and involves 10 jurisdictions
- that, despite its limitations, the Australian food safety regulatory framework is considered best practice internationally.

### 3.3.3. Rail safety

Constitutional responsibility for the regulation of transport resides with the states and territories. As a consequence, the Australian Government (and the Australian Capital Territory, which does not have a significant rail industry) does not regulate for rail safety.

Rail safety regulation 'is relatively new to Australia, having been around for approximately 15 years. Before that time, railways were government-owned and vertically integrated, so the railways were directly accountable to government for safety' (NTC 2009a). Following the restructuring and privatisation of major elements of Australia's rail system, the Australian Government, the states and the Northern Territory signed an Intergovernmental Agreement on Rail Safety in 1996. The purpose of this agreement was 'to establish a cost-effective, nationally consistent approach to rail safety which ensured there was no barrier to the entry of third party operators' (NTC 2008).

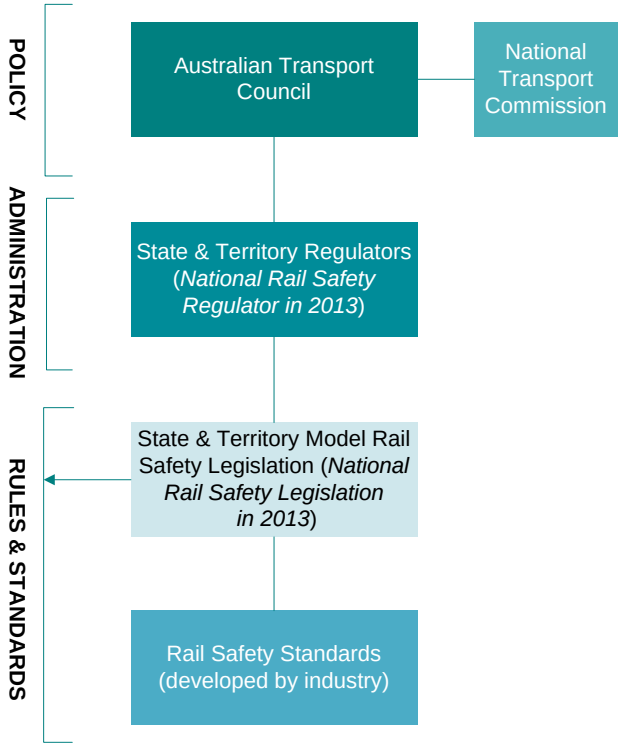
In 2006, the NTC developed a reform package for rail safety in Australia. This package essentially comprised model rail safety legislation to be adopted by the states and the Northern Territory. As at April 2009:

- 'Victoria, South Australia and New South Wales had implemented legislation based on the model rail safety Bill
- legislation was before the Queensland Parliament
- Tasmania and the Northern Territory aim to introduce legislation as soon as possible
- status of the legislation in Western Australia is unclear' (NTC 2009a).

The Australian Transport Council has ultimate responsibility for the development of rail safety policy and regulation in Australia. It is supported by the NTC, which was established in 1991 'to develop and coordinate regulatory reform for nationally consistent road transport policies and laws' (NTC 2010). Regulatory agencies across the states and the Northern Territory are responsible for administering and enforcing rail safety legislation and standards (Figure 6).

In 2009, following the Australian Transport Council's endorsement of the 2008 National Transport Policy Framework, the council and COAG approved the establishment of a National Rail Safety Regulator in 2013. This body will assume the responsibilities of the current state and territory rail safety regulators (covering accreditation, monitoring and compliance, data collection and education, and supporting ministers and departments), and administer a single, national rail safety Act. The legal and governance arrangements for the rail safety regulator have yet to be determined.

Figure 6: Rail safety regulatory framework




The rail safety regulatory framework is based on a co-regulatory (or performance based) approach. This involves the government setting safety goals, with regulated entities left to determine how they will achieve these goals. As the NTC notes, co-regulation 'is generally thought of as a middle ground between highly prescriptive regulation, which is less flexible for industry and governments, and self-regulation, which reduces industry attention to public goods such as safety' (NTC 2008).

The co-regulatory approach is also heavily focused on risk. Co-regulation essentially provides government with a means to 'risk-manage the risk management of individual enterprises' (Gunningham 2004). Rail safety risks vary across:

- above-rail operations (which 'are aligned with the nature of the rail operation—passenger transport, freight, resources transport, tourism and heritage; and circumstances [location]—metropolitan, regional, remote')
- below-rail operations (which relate to 'train control, maintenance and asset management, new infrastructure, complexity, interfaces and access issues') (NTC 2009a).

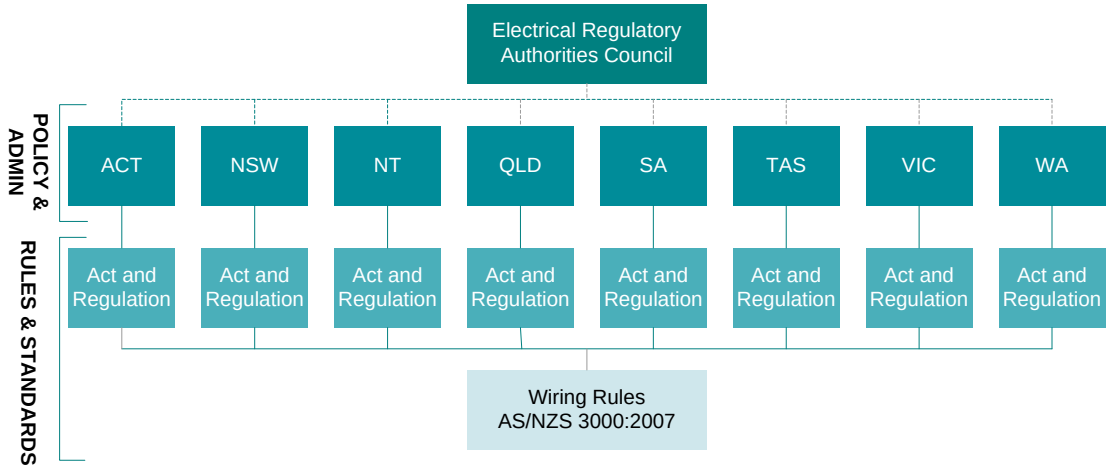
Passenger rail is seen as posing 'the highest risks to public safety', whereas remote-level crossing accidents are seen as posing the greatest financial risks (NTC 2009a).

### 3.3.4 Electrical safety

In Australia, the states and territories have responsibility for the regulation of electrical safety, supply and efficiency. Each jurisdiction operates nominally independent regulatory frameworks for electrical safety—comprising separate legislation and agencies or bodies responsible for the development and administration of policy and regulation (Figure 7). There are connections between the regulatory frameworks of each state and territory, namely:

- ERAC—an informal body (it 'exists through cooperative action and has no executive power'), ERAC consists of the regulatory authorities responsible for electrical safety, supply and energy efficiency across Australia and New Zealand. Meeting biannually, ERAC's mission is to strive 'for a uniform regulatory environment for electrical activities, for the purposes of achieving acceptable levels of electrical safety, supply quality and energy use efficiency' (ERAC n.d.).
- Relevant standards—electrical safety regulations across the states and territories are heavily reliant on the Australian/New Zealand Wiring Rules (AS/NZS 3000:2007). This standard thus provides a degree of consistency and commonality across regulatory frameworks.

Figure 7: Electrical safety regulatory framework




Similar to other codes relating to the built environment, the Wiring Rules are performance based. That is, the standard specifies performance-based fundamental safety requirements that must be met, but without prescribing work practices to achieve these safety outcomes.

# 4 Application of the framework

As Chapter 2 showed, the existing regulatory arrangements for urban water quality in Australia have been reasonably effective in achieving public and environmental health outcomes. Nevertheless, there are some current and emerging concerns about the quality of urban water, particularly regarding the performance of regional utilities and the ability of the sector to manage emerging risks.

The purpose of this review is to identify how existing regulatory arrangements—particularly those relating to approval pathways and associated requirements—could be reformed to better meet public and environmental health objectives. This chapter contributes to the achievement of this objective by assessing urban water quality regulation in Australia from a best practice perspective—focusing on whether there is any scope for greater efficiency (in terms of the allocation of public resources and the impact of regulation on industry) and whether current regulation is the most effective means of achieving public and environmental health objectives.

In order to assess current regulatory arrangements, PwC has distilled the best practice framework outlined in Chapter 3 into a series of key evaluation principles. These have then been used to determine the extent to which existing regulatory arrangements for urban water quality are aligned with best practice. The evaluation principles are:

- Consideration should be given to policy and regulatory harmonisation, where relevant.
- Governance arrangements should be clear, with broad agreement and recognition about roles and responsibilities.
- The role of risk assessment should be kept separate from policy development and, where regulation crosses jurisdictions, harmonisation is important.
- Regulators should adhere to best practice principles in choosing regulatory approaches to manage risks.
- Regulators should have adequate resources and competent staff.

The evaluation principles are relatively high level, reflecting the nature of the review. We have, however, sought to reflect more specific elements of the best practice framework in our discussion about options for future reform.

Data sources that informed our application of the best practice framework include:

- a stocktake of regulatory frameworks for urban water quality across all states and territories and nationally (Appendix C and Appendix D provide greater detail about the findings from this stocktake)
- consultations with regulators, industry, and water quality scientists and researchers. Regulators were also asked to provide submissions to the review. We have quoted these, where possible
- documentary analysis of existing reports and studies into the management and regulation of urban water quality in Australia, plus available policy documents
- written comments provided by peer reviewers on an earlier version of this review.

Given the weight of feedback from stakeholders as to what are the key issues (and, to a lesser extent, the literature that was analysed), the analysis in this chapter tends to focus on:

- requirements relating to public health as opposed to the environment

- issues around risk management processes (particularly those in the guidelines developed under the NWQMS, which is generally seen as the 'central mechanism for water quality management in Australia') and the associated implementation and enforcement of these processes—as opposed to people or product standards.

The findings from our application of the key evaluation principles are discussed below.

## 4.1. Policy and regulatory harmonisation

As detailed in Section 3.2.1, there is a strong COAG focus on reducing inconsistent regulation across jurisdictions. It is important to recognise, however, that harmonisation should not be pursued for its own sake. Rather, harmonisation is likely to generate greater benefits if:

- 'there are significant inter-jurisdictional spillovers associated with the provision of a good or service at the sub-national level
- there are readily identifiable areas of shared or common interest or sizeable economies of scale and scope arising from central provision or organisation
- a diversity in rules or regulations is likely to give rise to high transaction costs with insufficient offsetting benefits
- there is scope for mobility of capital and people across jurisdictions to undermine the fiscal strength of the sub-national level of government' (Productivity Commission 2005).

Our review has uncovered concerns about the consistency of urban water quality policy and regulation. There are two key issues in this regard. First, while key NWQMS guidelines (like the ADWG and AGWR) have adopted a risk-based approach to maintaining water quality, stakeholders consulted as part of this review noted that there are inconsistencies between the guidelines, particularly regarding specified guideline values for treatment performance. Furthermore, the connectivity between guidelines, particularly as they transect water supply and waterway health protection, remains unclear in a regulatory approval framework. Debate exists within the water industry as to what guideline (and value) should have precedence.

It is important to note that some regulators have questioned whether the ADWG and AGWR are implemented in a competing manner. According to one regulator, the 'AGWR has adopted its risk management framework from the ADWG and in relation to chemical guideline value notes that the values published in the ADWG take primacy'.[15]

Second, guidelines produced under the NWQMS are intended to be flexible documents, in that each jurisdiction is free to implement the guidelines in accordance with its legislative regime and policy objectives. Some states and territories give guidelines legislative backing by incorporating them into their licensing or approval processes. Sydney Water's Operating Licence, for example, states that the corporation 'must manage drinking water quality to the satisfaction of NSW Health in accordance with the *Australian Drinking Water Guidelines* (unless NSW Health specifies otherwise)' (Sydney Water 2010).

Other jurisdictions apply the guidelines on a more ad hoc basis—in some cases, even producing state-based guidelines that build on the NWQMS guidelines. The Queensland Department of Environment and Resource Management, for example, has developed a range of guidelines that build on the NWQMS—including the *Water quality and reporting guideline for a drinking water service*, the *Queensland water quality guidelines*, and the *Water quality guidelines for recycled water schemes*.

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[15] South Australia Department of Health, submission.

A consequence of this flexible implementation of the NWQMS is that it can lead to differences in requirements. As one regulator notes in its submission to the review:

> … whilst the national guidance documents are generally solid, evidence-based documents, implementation at the jurisdictional level tends to be not as uniform as it should be … Trying to achieve national consistency through technical guidelines that are intended to be flexibly implemented is challenging.[16]

This problem is compounded in those areas where local government has responsibility for the approval of water systems. One author notes in the context of recycled water schemes:

> Councils vary in their size, location, capacity and expertise in relation to sewage and recycled water management. There is a large potential for differences in application processes (from fees to information requirements), the extent to which relevant guidelines are applied, conditions of approval, and ongoing operational requirements. There is the possibility of similar recycled water schemes being approved with few conditions in one council area, while another council may require significantly greater approval conditions (Power 2010).

There are examples of key areas of difference between regulatory regimes. For instance, Nubian notes that different jurisdictions have different perspectives of the risks associated with commercial and multi-dwelling greywater treatment systems. Victoria, for instance, does not allow such systems to be installed 'for toilet flushing if the system has a capacity of <5000 litres per day', while in Queensland, 'commercial greywater treatment systems with a capacity of <3000 Lpd, can be used to provide recycled water for toilet flushing with a recycled water quality at domestic levels' (Nubian Water Systems 2010).

Likewise, Power (2010) notes differences in approval processes for on-site wastewater management systems, with some jurisdictions (notably South Australia) requiring all systems to be subject to AGWR, while other jurisdictions impose a size limit for on-site systems, 'above which the system that is installed does not have a specific requirement to be accredited or approved by the central agency'.

Lastly, industry stakeholders during a Water Services Association of Australia focus group said that approval processes for new water systems are maintained separately across the states and territories. Little recognition is given to water systems and their associated technologies that are approved in other jurisdictions.

It is important to note that the extent to which regulatory regimes are inconsistent varies across different aspects of urban water quality. For example, one regulator maintains that it is important to distinguish between the regulatory frameworks surrounding drinking water and recycled water.

> [While] the evolution/development of drinking water regulation has followed a distinct and largely consistent path … The same degree of consistency has not (yet) been observed for recycled water. The influence of timing, the different levels of established regulatory oversight and the diversity of regulatory agencies should be considered as contributing factors.[17]

Inconsistencies between regulatory regimes are seen as having an impact on business. Nubian, for example, contends that

> Currently, it is not possible to manufacture and sell a standard greywater treatment system, whether single dwelling or commercial, which will meet the requirements of all states. For an emerging industry, relying on innovation and requiring significant

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16 Victoria Department of Health, submission.

17 SA Health, submission.

> investment in research and development, this creates an impossible and unnecessary situation (Nubian Water Systems 2010).

Industry stakeholders highlighted the costs involved in replicating validation across the states and territories for systems that were essentially based on the same process barriers and preventive measures.[18]

In an assessment report about future directions for the urban water sector, Jan Bowman comments that the 'regulation of urban water is managed by all three levels of government. The lack of consistency across Australia, either across jurisdictions, or between the various levels of government, is seen by many as a constraint or barrier to reform' (Bowman n.d.).

The Business Council of Australia has recently called for the 'establishment of an Australian water quality regulator', which could be 'tasked with functions that might achieve more efficient water supply outcomes across Australia, including setting a range of technical standards such as the quality of drinking water … Nationally consistent regulation in these areas could reduce costs for businesses complying with differing state rules' (BCA 2010a).

The Water Services Association of Australia similarly noted in its submission to the Productivity Commission inquiry into Australia's urban water sector that '[s]treamlined environmental, public health and economic regulation frameworks are needed to remove the duplication between the states and territories and the Commonwealth' (WSAA 2010).

Box 3 outlines some examples of the impact on industry caused by regulatory inconsistencies.

[18] Water Services Association of Australia focus group.

### Box 3: Example of inconsistencies and industry impacts[19]

**Example one**

'Recycled water schemes of similar size, technology, source water and end use are proposed in adjoining local government areas in NSW. Under the LGA they each require Section 68 approval. The same technology provider, designer and constructor and operator are the proponent in each case. There is no significant difference in either scheme, except the Council where they are located. Scheme A costs $250,000 capex to meet Council requirements. Scheme B costs $650,000 capex. Scheme A costs approximately $3,000 in annual monitoring fees for verification, Scheme B costs around $60,000. Neither respects the principals and findings of the risk assessment. Neither seek advice from the State Departments'.

**Example two**

'No Nationally operating technology or scheme provider can operate a national system for meeting their regulatory requirements. Every scheme at every location needs to be addressed singularly and not corporately to 'adjust' to what is required by the said regulator. This increases business risk for the provider as well as environmental and public health risks—a more complicated system the more likely for a failure at a point. This also makes accreditation to ISO standards more difficult—such as ISO14000, 9001, 22000 or 31000.

'The minimum resourcing cost at the proposal stage to address regulatory issues would be $10,000 and can be as high as $100,000. Once awarded the regulatory cost budget is often blown as requirements change and can not be foreseen. Every regulator has shown that although a guideline or code exists, they change the rules and requirements when they see fit (and at times it is justified—but not often based on the risk assessment). Many contracts have then argued over the cost share of that burden and all look for avenues to exploit loopholes or minimise the cost burden. Once a scheme is operational, often the regulatory costs change again as further requirements are placed—and who is to pay then?'

**Example Three**

'Stormwater harvesting scheme in NSW. Difficult to determine who is the regulator and little direct capacity for NSW Health involvement, although representing a reasonable human health risk. Dispute and discussion held over which NWQMS guideline applies—the ADWG, the AGWR Phase 1 or Phase 2. Lack of alignment of regulatory needs, criteria and performance values and scheme directives. Substantial monitoring program being conducted that is more in-line with a zero risk approach than appropriate risk level. Monitoring, verification, validation requirements (more than $500,000 to date) beyond that justified by the scheme risk assessment. Significant resourcing by the proponent and regulators involved—as all are required depending on the final determination of the regulator body'.

It is important to note regulators are actively seeking to increase harmonisation between jurisdictions. A driving factor behind the formation of the NRWRF was to improve communication between regulators with a focus on recycled water and to encourage the consistent uptake of the AGWR.

Box 2 in Chapter 3 outlined the primary benefits that can be realised from greater regulatory consistency and harmonisation. Table 7 links the identified benefits with the evidence obtained from stakeholders, detailed above.

[19] i-Connexx, reviewer comments.

Table 7: Benefits of harmonisation—urban water quality regulation

| *Benefit* | *Evidence* |
|---|---|
| Reduced burden on businesses operating across jurisdictions | • The Business Council of Australia has recently called for the 'establishment of an Australian water quality regulator', which could be 'tasked with functions that might achieve more efficient water supply outcomes across Australia, including setting a range of technical standards such as the quality of drinking water … Nationally consistent regulation in these areas could reduce costs for businesses complying with differing state rules' (BCA 2010a).<br>• Industry stakeholders highlighted the costs involved in replicating validation across the states and territories for systems that were essentially based on the same process barriers and preventive measures.[20]<br>• 'No Nationally operating technology or scheme provider can operate a national system for meeting their regulatory requirements. Every scheme at every location needs to be addressed singularly and not corporately to 'adjust' to what is required by the said regulator. This increases business risk for the provider as well as environmental and public health risks—a more complicated system the more likely for a failure at a point. This also makes accreditation to ISO standards more difficult—such as ISO14000, 9001, 22000 or 31000'.[21] |
| Reduced administrative costs | • Government stakeholders did not provide direct evidence of the administrative savings that could be realised from greater regulatory consistency and harmonisation.<br>• Both Deere and Bursill maintain, however, that more periodic review of the NWQMS guidelines would encourage more consistent implementation of the guidelines at the state and territory levels (as regulators would have more confidence that the guidelines represented the best available science). This, in turn, would discourage jurisdictions from 'produc[ing] their own guideline documents'[22] (as is currently the case)—allowing for administrative savings to be made. |
| Reduced market fragmentation | • '… regulation of urban water is managed by all three levels of government. The lack of consistency across Australia, either across jurisdictions, or between the various levels of government, is seen by many as a constraint or barrier to reform' (Bowman n.d.).<br>• 'Currently, it is not possible to manufacture and sell a standard greywater treatment system, whether single dwelling or commercial, which will meet the requirements of all states. For an emerging industry, relying on innovation and requiring significant investment in research and development, this creates an impossible and unnecessary situation' (Nubian Water Systems 2010). |

## 4.2. Clarity of governance arrangements

Governance arrangements for urban water quality regulation in Australia are relatively opaque. A key reason for this is the multidisciplinary and complex nature of urban water quality. As discussed in Chapter 2, urban water quality touches on many areas of legislation—including public health, environmental protection, plumbing and land-use planning. As a consequence, the development and administration of urban water quality regulation involves all three levels of government (i.e. Commonwealth, state/territory and local), and various agencies within each jurisdiction (e.g. a state's environmental protection agency and department of health).

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20 Water Services Association of Australia focus group

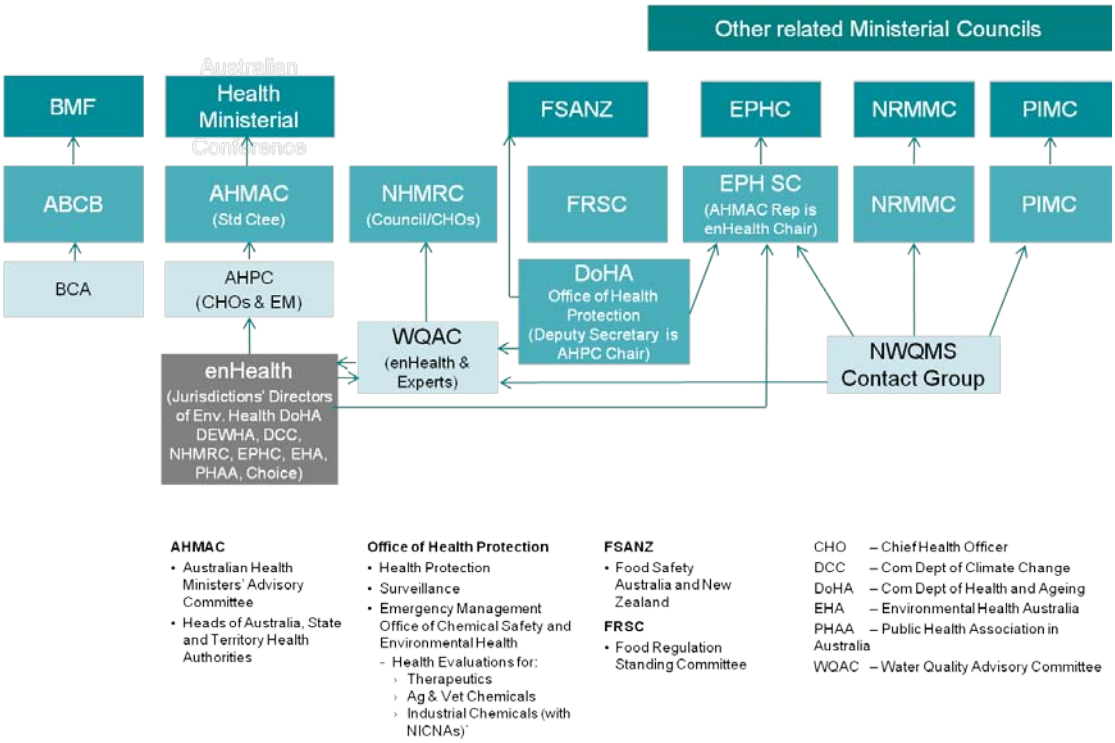
21 i-Connexx, reviewer comments.

22 Dan Deere and Don Bursill, reviewer comments.

The roles and responsibilities of these agencies, and the relationships between them, 'are complex' and can sometimes lack clarity (Bowman n.d.). Industry stakeholders noted that even they, as water professionals with considerable experience in the sector, did not have a clear picture of the governance arrangements for urban water quality.[23] This ambiguity is particularly acute in the context of recycled water. Proponents of such schemes, for example, are required to navigate the regulatory frameworks surrounding environmental protection, human health, water pricing, and plumbing.

Figure 8 is based on analysis conducted by Bowman 'to show the key Ministerial Councils, Standing Committees and working groups associated with health-related WQ management issues' (Bennett 2008). It highlights the complexity of the intergovernmental arrangements surrounding the regulation of urban water quality.

Figure 8: Example of 'map' of groups involved in health-related water quality matters




As Bowman (n.d.) notes, not only are the governance arrangements of the urban water sector complex, 'policy drivers often lack clarity'. Key issues of concern include:

- The role of health ministers in the development and maintenance of the NWQMS guidelines—while a significant proportion of the guidelines are concerned with health-related matters, the Australian Health Ministers' Advisory Council has an indirect and informal advisory role in the NWQMS process (Bowman n.d.).
- The relationship and alignment between national policy initiatives and bodies—Bowman notes that water quality policy is being driven by a range of actors at the national level, including COAG (and its Working Group on Climate Change and Water), the NRMMC and EPHC, the NWC and NWI, and the Department of Sustainability, Environment, Water, Population and Communities. 'Clearly understanding of the drivers of reform at the national level is difficult due to the number of agencies involved' (Bowman n.d.).

[23] Water Services Association of Australia focus group.

Industry stakeholders also highlighted the absence of clear legal framework in water quality regulation. While the sector has historically been characterised by a close and cooperative working relationship between public health officials and water service providers, the water quality accountabilities of providers has not always been consistently articulated.

Some jurisdictions are strengthening their regulatory framework and oversight, but others continue to find themselves only part way along the path of independent regulation (or in some cases applying it inconsistently within their jurisdictions). A clear articulation of water quality expectations is essential if health is to be assured in all parts of the community (particularly regional areas where funding may not be a priority). This need will grow in importance as new markets and water providers emerge.

In addition to general principles of competitive neutrality and clarity of regulation, a further key issue is a lack of certainty in the context of new and/or complex systems (e.g. a private company operating a sewer mining facility for irrigating playing fields) about who owns the risk in the event of system failure—the regulator, the operator or the affected party? Industry expressed concern that failure to cater for these new approaches and market participants poses multiple risks: health and environmental, economic distortion (if different systems/operators have different requirements), or through a disincentive on investment in new systems.

## 4.3. Hazard and risk assessment

At present, there are two key areas of hazard and risk assessment in the regulation of urban water quality. The first of these is the development of guideline values (for chemical hazards) and performance targets (for microbial hazards). These are foundation elements of the regulatory framework surrounding urban water quality. They represent 'the concentration or measure of a water quality characteristic' that either does not result in any significant public or environmental health risk, or does not reduce the acceptability of water to consumers (NHMRC & NRMMC 2004). In other words, they represent the minimum level of performance that regulated entities should adhere to in producing water for public and/or environmental consumption.

Guideline values and performance targets are currently developed at two levels. First, during the production of the NWQMS guidelines (particularly the ADWG and AGWR). Second, some state and territory regulators also play a role in developing guideline values, as part of their jurisdictional water quality frameworks. State and territory guideline values either pre-date the ADWG/AGWR or relate to hazards or risks above and beyond those listed in the NWQMS guidelines. Furthermore, there are some instances where local councils have also enacted criteria for water quality.[24]

The second area of hazard and risk assessment is undertaken in the context of specific systems. System-specific risk assessments generally draw on situational factors—such as the site of the system, catchment risks, the nature of the water source, and whether the existing or proposed treatment technologies and process barriers are or will be adequate to deal with the estimated risks involved to achieve the guideline values in the relevant NWQMS guidelines or in any relevant jurisdictional requirements.

It is important to note that system-specific risk assessments should be a collaborative exercise between regulators and proponents/operators. In many situations, the involvement of

[24] I-Connexx, review comments.

resource or catchment managers may be needed to achieve the required outcomes for the water quality management plan of the system under consideration.

There may be scope to consolidate the development of guideline values and performance targets currently being undertaken across the states and territories. The appropriateness of developing mandatory, national guideline values and performance targets, however, is questionable, given:

- uncertainty about the transferability of risk assessment values to other regions
- intellectual property rights and confidentiality concerns with data sharing
- uncertainty and inconsistency around risk thresholds that govern the quantum of site-specific validation requirements.

Another issue is the regularity with which the NWQMS guidelines are updated. Our consultations raised concerns about the review process for the NWQMS guidelines. Research stakeholders in particular noted that key guidelines such as the ADWG were intended to be supported by a rolling review process, which would reflect new scientific and technical discoveries as they emerged. In reality, reviews of the NWQMS guidelines are generally undertaken on a sporadic basis. The ADWG, for instance, is currently being reviewed and was previously reviewed in 2004.

The key reason highlighted by stakeholders for why the NWQMS guidelines are not reviewed as regularly as intended is a lack of resources within the NRMMC, EPHC and NHMRC. Deere notes, for example, that:

> At present, the national guideline development process almost entirely plagiarises volunteer inputs from state departmental staff, including those from state-owned utilities. As an example, with respect to the ADWG, the development of the guidelines now rests almost entirely on the volunteer input of one key person in particular, without whom the guideline development process would probably collapse completely.[25]

The NHMRC notes, however, that:

- the process of developing the ADWG draws on the expertise of many national and international experts and is supported by the Water Quality Advisory Committee, which comprises 10 to 12 people
- while much of the guidelines work is drafted by volunteers, a great deal is contracted out to consultants
- all guidelines produced by the NHMRC must undergo comprehensive public consultation and final clearance through its council (and the NRMMC) before release.

This absence of a systematic process to ensure that the NWQMS reflects emerging science and addresses known knowledge gaps ultimately threatens the effectiveness of the broader regulatory framework surrounding urban water quality. If regulators perceive the guidelines as being out of date or in any way inadequate, they are more likely to create their own requirements and, as part of this, may adopt more of a 'zero risk' approach.

Both Deere and Bursill note, for instance, that more regular review would ensure that the guidelines would 'become credible and valued nationally' and 'avoid any need for local jurisdictions to produce their own guideline documents'.[26]

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[25] Dan Deere, reviewer comments

[26] Dan Deere and Don Bursill, reviewer comments.

Infrequent updating of the NWQMS guidelines also ensures that the relationship between science, policy and practice remains fragmented in the context of urban water quality. As stakeholders noted during consultations, new chemical and biological contaminants are continually materialising as our scientific understanding and capability grows. Without periodic review of the NWQMS guidelines—or the institutional presence of such bodies as the Water Quality Advisory Committee—the pathway for ensuring timely communications of new risks and scientific approaches to manage these risks into regulatory decision making is suboptimal.

## 4.4. Concept of net benefit

As discussed in Section 3.2.3, net benefit is a key concept in the best practice regulatory literature—providing an overarching structure to assess and prioritise possible forms of government intervention.

It is beyond the scope of this review to undertake a bottom-up review of each regulatory requirement to assess whether current regulatory arrangements represent the greatest net benefit for achieving urban water quality outcomes. Rather, there are other indicators that suggest the concept of net benefit could be further embedded in the development of approaches to manage water quality risks. These reasons are described below.

### The quality of regulatory impact assessments varies across jurisdictions

All jurisdictions have committed to subject new legislation or regulation to a regulatory impact assessment process. This is a key tenet of best practice regulatory reform. According to COAG (2007), the regulatory processes of all Australian governments should adhere to the following principles:

1. establishing a case for action before addressing a problem;
2. a range of feasible policy options must be considered, including self-regulatory, co-regulatory and non-regulatory approaches, and their benefits and costs assessed;
3. adopting the option that generates the greatest net benefit for the community;
4. in accordance with the Competition Principles Agreement, legislation should not restrict competition unless it can be demonstrated that:-
    a. the benefits of the restrictions to the community as a whole outweigh the costs, and
    b. the objectives of the regulation can only be achieved by restricting competition;
5. providing effective guidance to relevant regulators and regulated parties in order to ensure that the policy intent and expected compliance requirements of the regulation are clear;
6. ensuring that regulation remains relevant and effective over time;
7. consulting effectively with affected key stakeholders at all stages of the regulatory cycle; and
8. government action should be effective and proportional to the issue being addressed.

The quality of regulatory impact assessment processes, however, varies across jurisdictions. According to the Business Council of Australia's *2010 scorecard of red tape reform*, jurisdictions' regulation-making systems received scores ranging from 3 to 7 (out of 10). As the business council states: 'The 2010 Scorecard found that overall much more can be done at all levels of government to ensure that regulation-making processes are robust and deliver good regulatory outcomes. While some jurisdictions have improved their performance, all

jurisdictions must continue to reform their processes to ensure that regulation is subject to appropriate “checks and balances”, consultation and transparency’ (BCA 2010b).

Supporting the Business Council of Australia’s assessment, industry stakeholders questioned the extent to which some urban water quality regulatory measures had been subject to a rigorous cost-benefit analysis.[27] Issues were specifically raised in the context of environmental conditions relating to sewage overflows. Some stakeholders maintained that regulators did not seem to base their requirements for improvements in sewerage infrastructure to prevent overflows on any real assessment of whether the costs of such improvements were worth the benefits, or what the actual environmental and public health impacts of sewage overflows are. Industry stakeholders noted that, in one case, a water service provider had been required to spend considerable sums on sewage overflow improvements with no discernible impact or benefit (Box 4 provides further detail about the costs associated with preventing sewer overflows).[28]

### Box 4: Regulation of wastewater overflows

‘In 1998, the Environmental Impact Statement for Licensing Sewerage Overflows outlined long-term targets for dry and wet weather overflows and a program of works to achieve overflow reduction. Wet weather overflows were found to adversely impact the suitability of recreational waters for swimming and visual amenity.

‘At the time, the program cost was estimated at around $2 billion with a long-term timeframe of 2021, and estimated progress at about $100 million per year. It identified up to $1.6 billion to reduce the impact of wet weather overflows. This was thought to be affordable provided price increases were approved by IPART.

‘Since 1998, Sydney Water has invested approximately $1.3 billion in dry and wet weather overflow reduction. The 2010 cost estimates for achieving the long-term targets across all systems range from $4 to $6.5 billion. This excludes works completed or scheduled to 2015 and no deterioration works.

‘There have been significant improvements in beach water quality. The latest ratings for recreational uses for all but one beach are ‘good’ or ‘very good’.

‘Community expectations have also changed in the last 10 to 12 years. There are significant challenges in delivering wet weather overflow abatement solutions in urbanised environments. Land availability is restricted and community acceptance of major infrastructure projects, where benefits may be marginal is low. Sydney Water’s experience is that this has significant impacts on the costs and timeframes for project planning, environmental and planning approvals and the delivery of works’.

Source: WSAA (2010)

It is also important to note that, in some jurisdictions, local government plays a role in regulating aspects of urban water quality (primarily through the development approval process). Local government activities, however, are not required to (and generally do not) undertake regulatory impact assessments. It was noted by industry stakeholders during consultations that some local governments had begun requiring the installation of decentralised water systems as a condition for development approval without a complete assessment of the costs and benefits of such a requirement—or with any requirement that systems must actually be operated once installed. Further, the costs and benefits of decentralised initiatives to local councils may include development capacity, flood alleviation and pollution prevention—yet it may be difficult for such impacts to be easily estimated at the local level as part of an individual approval.

## Not all regulatory requirements are commensurate with risk

There is considerable agreement that a focus on risk offers the best approach to maintaining urban water quality. It is seen as ensuring that limited government and business resources can be allocated to maintain urban water quality as effectively and efficiently as possible. It should also be noted that the key elements underpinning the ADWG and AGWR are broadly

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[27] Water Services Association of Australia focus group.

[28] Water Services Association of Australia focus group.

supported and appear to provide processes to manage a wide range of risks to water quality effectively, regardless of the source.

At present, not all regulatory requirements appear to be fully commensurate with risk. In some cases, regulatory requirements appear to be insufficient relative to risk. For instance:

- In the Australian Capital Territory, ACT Health has responsibility for ensuring on-site wastewater management systems meet the territory's public health and safety quality standards. ACT Health exercises this responsibility not through a direct approval process, but by commenting on development applications forwarded to it by the ACT Planning and Land Authority. Under this system, 'it is possible for [on-site wastewater management] systems to be installed without the knowledge of ACT Health, particularly if a development application is not required' (e.g. if a system is being retrofitted in an existing building) (Power 2010).
- A regulator noted that '[r]egulation of wastewater disposal may not be commensurate with risk—i.e. relatively less regulated than recycling of water though it is more widespread'.[29]
- Stakeholders generally questioned whether existing regulatory frameworks were sufficient to manage the risks posed by decentralised systems. It was noted that there is a strong push to encourage the installation of decentralised systems (particularly from an urban planning perspective). Yet, the risk posed by these systems to public or environmental health is in some cases potentially unregulated. In Victoria, for example, recycled water systems in buildings and office blocks can pose a high risk to public health and safety, but do not appear to be regulated at present (unless irrigation is also involved).
- Concerns were also raised about whether the lifetime risks of decentralised systems had been adequately considered and addressed by regulators. For example, there remains a lack of clarity about:
  - Who owns a decentralised system once it is installed (e.g. the developer, the body corporate, or the relevant utility)?
  - Who will be responsible for ensuring the viability and continued operation of the system over its useful life? From a legal perspective, who will be liable in the event of a system failure? Utility and government stakeholders were particularly concerned that they could be seen to have ultimate responsibility for decentralised systems (due to their role in approving the installation of the systems or their responsibilities as 'provider of last resort') and thus face the risk of class actions if the systems failed.
  - Will operators of decentralised systems have to meet any technical and competency requirements (e.g. in the form of a licence or accreditation)?
  - Will decentralised systems be covered by a 'provider of last resort' system? A regulator noted in its submission that:

    The need for incumbent utilities and other operators to be able to provide services of last resort in the event that a decentralised system fails has important implications for the extent to which such systems can avoid infrastructure costs (a claim that is often made but can be difficult to substantiate in practice).[30]

Some of these risks may be able to be managed through the land-use planning process. For example, conditions attached to a development approval must be complied with and can be ongoing requirements.

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29 Western Australia Department of Water, submission.

30 New South Wales Office of Water, submission.

In other cases, regulatory requirements appear to be disproportionate relative to risk. For instance:

- The regulatory requirements for on-site wastewater treatment systems in some jurisdictions appear excessive—potentially acting as a barrier to the installation of such systems. For example, Power notes that:

  > SA has had a requirement for all on-site domestic systems to use the AGWR. System monitoring requirements are reduced in proportion to this public health risk that accompanies the different exposure profiles. Water for high-exposure uses such as toilet flushing must meet the final quality criteria, the technology needs to be proven, and the systems require online monitoring. In these scenarios, the cost has been seen as too expensive; therefore, people have opted to carry out bucketing of greywater rather than install a treatment system. The lack of accreditation processes for water recycling within on-site systems has, in this case, discouraged the uptake of wastewater recycling on a single household level (Power 2010).

- The validation and on-going testing requirements for centralised recycled water systems in some jurisdictions are significant (such as those surrounding the Western Corridor Recycled Water Project in Queensland)—some stakeholders questioned the extent to which these were driven by political concerns rather than underlying judgements about the risk posed by such systems. Likewise, stakeholders questioned the extent to which those regulatory requirements (for on-site and decentralised systems, as well as centralised) imposed by states and territories above and beyond the NWQMS guidelines were commensurate with risk and reflected best available science.

- Stakeholders questioned whether policy bans on indirect potable reuse around Australia were undertaken in the context of a comprehensive risk assessment and management process.

- i-Connexx highlights an example of a local council seemingly pursuing a 'zero risk' approach with reference to a greywater system in New South Wales:

  > 16kL/day facility from a greywater source for toilet flushing in NSW. Approval to operate submission received several comments regarding verification, validation and site controls from the Local Council. The verification and validation interpretation was not reflective of the risk assessment nor interpreted the NSW guidelines correctly. It was not subject to comment from the State Departments. The Local Council continue to pursue a course of zero risk and a heavy monitoring burden with no effective basis. The process cost approximately 3 times as much as was in accordance with the risk assessment, and took more than 18 months.
  >
  > Due to the transition to a body corporate during the subsequent approval to operate stage, it was difficult to discern between what the manufacturer/installer and the plumber were responsible for, and the final site owner responsibilities. This delayed the approval process with Council and an operating contract is still not signed by the body corporate. The Council planning process required the installation, but makes no mandates regarding operation.[31]

## Reporting requirements in some jurisdictions are imposing additional costs on industry

Industry stakeholders consulted as part of the review noted that water quality reporting requirements in some jurisdictions could be duplicative and an increasing burden on water operators. In Queensland, for example, stakeholders noted the expansion of reporting requirements. Depending on their location, size and level of service offerings, operators in Queensland can be required to provide:

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[31] I-Connex, reviewer comments.

- management plans, annual reports and/or annual audited reports around drinking water quality, strategic assets, system leakages, customer service standards, water notice to occupiers, recycled water, total water cycled and water efficiency
- national performance indicators under the National Performance Reporting Framework
- water data to the Bureau of Meteorology, the Queensland Department of Infrastructure and Planning, and Department of Environment and Resource Management
- for south-east Queensland operators, weekly, monthly and quarterly reports to the Queensland Water Commission and regular reports to the grid manager
- incident reporting.

Stakeholders were concerned that much of this reporting appeared duplicative, was based on different reporting time lines, and was costly to provide. Questions were also raised about the extent to which some reporting information was actually needed by regulators and how well current reporting frameworks align with risk management and reporting requirements. It is important to note that regulatory agencies in Queensland have recently committed to work more closely with the water industry in Queensland to rationalise and streamline current reporting requirements.

## 4.5. Regulator capacity

A foundation stone of effective regulation is ensuring that regulators have adequate resources and competent staff. In the context of this review, the issue of regulator capacity focuses on whether regulators have adequate resources and capabilities to administer and meet the objectives of risk-based water quality frameworks in terms of:

- Staff numbers—do government agencies have access to sufficient staff to meet growing demands for managing urban water quality risks and ensure that proposed water supply schemes meet relevant standards and guidelines?
- Technical expertise—do government agencies and industry have staff with sufficient technical knowledge to apply and interpret relevant standards and guidelines? This is particularly an issue with recycling schemes, which can involve emerging contaminants and advanced treatment technologies being proposed under innovative schemes and commercial arrangements.
- Supporting systems—do regulators have access to sufficient knowledge, information and systems to make effective and efficient decisions?

Our research to date has revealed concerns over the capacity of regulators. From the perspective of the regulators themselves, the key issue is that the 'expansion of water supply options within urban water supply systems (for either drinking or non-drinking applications)', combined with the complexity of water quality issues (requiring agencies 'to assess the social, health and environmental consequences of the increased array of supply options'), are placing increasing resource pressures on already overstretched regulatory bodies.[32] As a consequence, '[m]ost regulatory agencies are under-resourced, either in relation to staff or technical expertise'.[33]

From an industry perspective, some regulators (particularly those in health in some jurisdictions) were seen as having a sufficient understanding of the technical issues relating to

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[32] South Australian Department of Health, submission; Victorian Department of Health, submission.

[33] Victorian Department of Health, submission.

water quality. They lacked, however, adequate staffing numbers to ensure speedy interaction with industry, or to monitor and enforce compliance effectively.[34]

Other regulators (such as some of those in environmental protection in some jurisdictions) were seen to be staffed by more junior personnel, who often lacked sufficient knowledge of the technical aspects of water quality. This was seen to have implications for ensuring compliance with the underlying regulations. Warnken, Johnston and Guilding (2009) also suggest that a lack of technical expertise and supporting systems is generating uncertainty among regulators about the reliability of on-site wastewater management systems for strata and community titles. This uncertainty can, in turn, hinder the certification of new technologies, suppressing the market for wastewater management systems.

The consequences of insufficient regulator capacity were seen as including:

- '… there can be significant delays in assessing and approving new water supply options, and there is a lack of expertise to assess the social, health and environmental consequences of proposed supply augmentations. The potential result is that the effectiveness of the regulatory oversight is compromised'.[35]
- The ability of regulators to conduct risk assessments and prioritise regulatory approaches could be compromised, 'potentially expos[ing] water resources and the community [to] high risk events. This can result in risk adverse regulators placing onerous requirements on developers which can hinder innovation'.[36]

Concerns have also been raised (in both the stakeholder discussions and the broader literature) about the capacity of local governments. Councils generally face resourcing constraints (e.g. due to limits to their ability to raise their own revenue and dependence on other levels of government for income). They are often given responsibility, however, to approve large wastewater management systems. Power (2010) notes in her recent examination of water recycling regulation in Australia:

> … in some jurisdictions the regulation of on-site wastewater management includes a size limitation, either volume or [equivalent persons], above which the system that is installed does not have a specific requirement to be accredited or approved by the central agency. This leaves a large amount of responsibility with local councils for approval of entire treatment processes.

### 4.5.1. Training and capacity gaps

In their submissions to the review, a number of regulators highlighted a range of training and development gaps that exist across both regulators and the water industry. These include:

- Application of the AGWR—'There remains a lack of knowledge among proponents, smaller regulatory authorities (e.g. local councils) and consultants on the application of the guidelines for the protection of environmental and public health. There would be value in developing training resources to help such stakeholders understand and implement/ comply with the national guidelines. In particular there is a need for specific training and subsequent certification of operators and auditors for recycled water schemes'.[37]

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34 Water Services Association of Australia focus group.
35 Victorian Department of Health, submission.
36 Western Australian Department of Water, submission.
37 New South Wales Office of Water, submission.

- ‘Assessing and implementing water sensitive urban design techniques and methods’, including ‘how well they do or do not work’.[38]
- The link between planning and water quality—‘to ensure that water quality risks/standards are adequately assessed and considered at each stage of the planning process’.[39]
- Skills issues around the ageing workforce, competition for staff from the mining industry, and a ‘rapid expansion of major water infrastructure projects’.[40]

### 4.5.2. Regulator guidance

A significant amount of work is being undertaken across Australia to improve guidance and information on water quality. Examples include the Victorian validation guidelines, progress on operator training, the development of a national validation framework by the Centre of Excellence for Water Recycling, and joint NWC/Water Services Association of Australia tools. The challenge is not so much ‘starting from scratch’, but synthesising and integrating the work being done and filling what gaps remain.

One issue frequently raised during consultations was that of the quality of supporting material provided around the NWQMS guidelines. While such guidelines as the ADWG and AGWR were seen as impressive documents—with strong scientific foundations and an appropriate focus on risk—they were seen as inaccessible (in terms of being overly academic and poorly structured) for proponents of on-site and decentralised systems. Stakeholders also contended there are some information gaps that can hinder the effective use of the guidelines by proponents of on-site and decentralised systems. Key gaps highlighted by stakeholders include:

- While the ADWG and AGWR highlight the need for operators to use a risk-based approach to maintaining urban water quality, they do not provide sufficient guidance about how operators can and should develop and implement such an approach.
- While the ADWG and AGWR require that operators identify hazardous events, the guidelines do not provide any real sense about how operators should be doing so.
- The guidelines lack a rigorous process for applying likelihood and consequences values—key concepts underlying a risk-management approach. As a consequence, operators tended to identify (and plan for) risks on a subjective and inconsistent basis.

It is important to recognise that urban water in Australia is overwhelmingly distributed through centralised systems by large, state-owned entities that have significant capacity and resources to understand and implement water quality requirements. As Deere notes, ‘Organisations with a good capacity have no problems with the ADWG and AGWR—quite the contrary, they are seen as excellent documents by many’.[41] In this context, it is possible that stakeholder concern about information gaps in the NWQMS guidelines relate more to the underlying capacity of the proponents/operators in question, rather than the guidelines themselves.

A further issue relating to regulator guidance concerns information on validating treatment processes or technologies around recycled water. Validation lies at the core of the new national approach to water recycling and other alternative sources of water (as articulated by the AGWR). In essence, rather than rely on end-point monitoring, validation requires water

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38 Western Australian Department of Water, submission.
39 Western Australian Department of Water, submission.
40 Victorian Department of Health, submission.
41 Dan Deere, reviewer comments.

operators to ensure that quality values and targets are technically able to be met at each stage of the treatment process. However, while the AGWR 'provides an overview of the concept of validation, and the need to do it', the guidelines provide 'very limited information on how to validate' (Power 2010). Further, jurisdictions are at varying stages of performance reporting, with some reporting against the risk-based framework in the ADWG and others still reporting against end-point monitoring. As Power notes, the 'lack of tools in the AGWR to support the validation requirements is a significant issue. This lack is especially relevant to new or novel technologies, and is one of the main concerns raised during discussions and during the [National Recycled Water Regulators Forum] meetings'. For example, there is no central database of credible performance data (that could apply to both generic unit operations and to pieces of proprietary equipment), or an agreed protocol for testing the performance of items of equipment.

The need for a validation database was supported by a number of stakeholders. For instance, a regulator noted in its submission:

> there is a concern that no central database of proven validation approaches exists. This is increasing the cost to proponents of validating recycling technologies. [The Office of Water] considers that this is an important area where national coordination could add value … Current project specific validation requirements impose costs on proponents and may hinder the uptake of recycling, especially for smaller schemes where it can be hard to justify the cost of validating the process to ensure it achieves the required water quality. The development of a database of recycling technologies and their ability to achieve certain water quality outcomes would help reduce the cost for proponents and support the uptake of safe recycling technologies.[42]

[42] New South Wales Office of Water, submission.

# 5 A vision and road map for urban water quality reform

The quality of urban water in Australia is governed by a complex set of regulatory and non-regulatory requirements. These requirements can variously cover:

- processes (e.g. the 12 elements of the framework for managing water quality that underpin the ADWG and AGWR)
- people (e.g. the Victorian framework for water treatment operator competencies)
- products (e.g. Standards Australia's national greywater standard).

While the states and territories have constitutional responsibility for managing water resources in their jurisdictions, requirements for maintaining urban water quality are developed and administered by all three levels of government (Commonwealth, state or territory, and local). Some regulatory requirements are longstanding (e.g. the ADWG has a considerably long provenance). Others, such as those governing recycled water, are more recent.

By and large, the existing arrangements have served us well. The safety of drinking water in Australia, for example, remains high and there have been improvements in the management of sewer overflows. Furthermore, the water industry generally perceives 'water quality / health' regulation to be effective.

This notwithstanding, there are outward signs that the broader regulation of urban water quality in Australia is not equivalent to best practice. Recent reviews, for instance, have highlighted a number of challenges that lie ahead if the urban water sector is to adequately managing current and emerging risks associated with integrating our urban water systems. Core to these challenges are the effective and efficient implementation of the AGWR and ADWG and identifying pathways for transitioning towards a regulatory system based on risk management.

The urban water sector is changing. There are more diversified urban water sources and emerging contaminants from new supply options such as sewer mining, water recycling, stormwater harvesting, greywater reuse, and managed aquifer recharge. Furthermore, there are increasingly complex treatment systems, combined with new institutional arrangements (such as third-party access) and new market players. These developments are placing stress on existing regulatory arrangements for urban water quality

The NWC engaged PwC to undertake a review of the institutional and governance arrangements for urban water quality in Australia. The purpose of the review is to identify how existing regulatory arrangements could be reformed to address identified concerns and manage the growing complexity of urban water quality issues. In doing so, the review will provide greater clarity in the approval pathways for new supply options and greater certainty in the implementation of risk-management frameworks.

PwC sought to meet the NWC's Terms of Reference by:

- mapping and reviewing existing regulatory arrangements (a summary of which is provided in Chapter 2—more detailed summaries are provided in Appendix C and Appendix D)
- developing and outlining a best practice framework for the regulation of public and environmental health and the management of risk (drawing on the broader regulatory literature and the experiences of regulatory reform in three comparator sectors)

- distilling the best practice framework into a series of key evaluation principles, and using these principles to determine the extent to which existing regulatory arrangements for urban water quality are aligned with best practice.

Table 8 summarises the findings of our evaluation. It is important to note that, given the weight of feedback from stakeholders as to what are the key issues (and, to a lesser extent, the literature that was analysed), the review tends to focus on:

- requirements relating to public health as opposed to the environment
- issues around risk-management processes (particularly those in the guidelines developed under the NWQMS, which is generally seen as the 'central mechanism for water quality management in Australia') and the associated implementation and enforcement of these processes—and to a lesser extent, people and product standards.

Table 8: Summary of identified problems

| | *Problem* | *Implications* | *Evidence* |
|---|---|---|---|
| **Governance arrangements** | Governance arrangements and policy drivers for urban water quality are complex and lack clarity. | Uncertainty about roles, responsibilities and policy direction can reduce the overall effectiveness and efficiency of the regulatory regime. | During consultation, a wide sector of water industry professionals noted a lack of clarity across the governance arrangements for urban water quality. |
| **Regulatory requirements** | Inconsistent application of best practice regulatory requirements by states or territories when adopting/legislating in respect of existing NWQMS guidelines | Some regulatory requirements may be inconsistently applied in different jurisdictions and not commensurate with risks involved. | Duplicate validation requirements have been reported to cost small-scale domestic recycling schemes an increase in compliance costs by 200 per cent.<br>Fragmentation between land-use development regulatory instruments and risk management for domestic recycling schemes has been reported. |
| | The NWQMS guidelines require more frequent and regular review and updating. Concerns have been raised that the NWQMS package are guidelines only. | Fragmentation between science, policy and practice leading to suboptimal uptake of new science in guidelines revision.<br>Leads to duplication of research and development effort by jurisdictions (in terms of developing their own requirements) and suboptimal information sharing across jurisdictions in terms of those requirements.<br>Can increase the research and development burden on industry and consumers of water<br>Limits information sharing and the ability of timing injection of science into regulatory frameworks. | Absence of periodic review highlighted by a range of stakeholders.<br>One expert stakeholder notes the lack of resources dedicated to review of the NWQMS guidelines—'at present, the national guideline development process almost entirely relies upon volunteer inputs from state departmental staff, including those from state-owned utilities'.<br>In one case of a stormwater harvesting system, regulatory inconsistencies between agencies were noted as increasing 'monitoring, verification and validation requirements (more than $500,000 at present) beyond that justified by the scheme's risk assessment'.<br>Nubian maintains that 'it is not possible to manufacture and sell a standard greywater treatment system … which will meet the requirements of all states'. |
| **Administration of requirements** | Numerous bodies responsible for regulation of urban water quality at state and territory and local government level. | Jurisdictional bodies often face a growing workload without necessary resourcing and at times compete for scarce technical expertise.<br>Situation exacerbated in recent times by growing complexity of water quality issues, increase resource pressures on regulators. | Both regulators and industry have highlighted the capacity constraints faced by water quality regulators. |
| | Diversity of guidelines resulting in a lack of certainty in the application of specific values.<br>Applicability of the NWQMS guidelines can be challenging for proponents of on-site and decentralised systems. | Pathways for navigation between water supply guidelines and environmental protection guidelines are often not clear.<br>Adherence to different aspects of risk management frameworks between guidelines has been known to cause uncertainty, leading to delays in approval processes. | 'Guideline shopping' has been reported leading to uncertainty and a lack of understanding between industry and regulators.<br>Stakeholders noted that the NWQMS guidelines were seen as challenging documents from the perspective of decentralised system management and regulation. |
| | There is a lack of coordination in the development of tools to support the AGWR.<br>Similarly, there are no formal arrangements for sharing information and coordinating mutual recognition of process barriers and preventive measures that have been validated in other jurisdictions. | Duplicate research and development effort and limited clarity in centralisation of emerging knowledge and tools to support guidelines, including guideline values.<br>Increased costs on proponents, as they are required to duplicate validation efforts across jurisdictions. | Power (2010) notes that the AGWR provide 'very limited information on how to validate'.<br>One regulator notes that 'current project specific validation requirements impose costs on proponents'. |

The existence of the problems detailed in Table 8 suggests the need for reform of Australia's regulatory framework for urban water quality. Feedback from stakeholders provided two parameters to guide future reform.

First, stakeholders highlighted the need for a broader philosophy to guide the reform and general development and maintenance of urban water quality regulation in Australia. Drawing on the best practice framework and the history of urban water quality regulation in Australia, we suggest that the regulation of urban water quality should be guided by the following principles:

- The goal of urban water quality regulation is to protect human and environmental health.
- Central to the goal of urban water quality regulation is risk management.
- Harmonisation is important, but flexibility is required to accommodate the impact that situational factors can have on risks to water quality (and approaches to manage these risks).
- Governance arrangements should be clear, with broad agreement and recognition of roles and responsibilities across water supply, wastewater and waterway health agencies.
- Decision making around urban water quality should be transparent, timely and accountable, with clear mechanisms to leverage the knowledge and experience of industry and the broader scientific/research community.
- Regulatory frameworks should support regulators in managing the complexity of urban water quality issues, and facilitating a multiplicity of supply sources.
- Regulators should adhere to best practice principles in choosing regulatory approaches to manage risks, ensuring that due consideration is given to the costs and benefits of proposed government actions.
- Regulators should have adequate resources and competent staff.

Second, stakeholders proposed two broad directions for reform to address the various problems seen to afflict current regulatory arrangements (as outlined in Table 8). The directions for reform are:

- Option 1: bolster current arrangements. This reform direction essentially retains the existing architecture of urban water quality regulation in Australia. The current arrangements would be strengthened by:
  - providing the NHMRC, NRMMC and EPHC with adequate resources to develop and maintain the NWMQS guidelines
  - developing a framework for achieving mutual recognition arrangements of validation processes and the formation of a body to administer a national database of previously validated treatment processes and exposure barriers
  - providing jurisdictions with incentives to implement national guidelines more consistently
  - formalising the NRWRF (and establishing an equivalent for environmental water quality regulators) to facilitate cross-jurisdictional cooperation and coordination and oversee the administration of a validation framework (currently being developed by the Australian Water Recycling Centre of Excellence).
- Option 2: greater cross-jurisdictional coordination. This reform direction would create new cross-jurisdictional arrangements to facilitate greater consistency and coordination in the regulation of urban water quality across Australia. The key aspects of this reform direction include:

- The establishment of a legally applicable National Water Quality Risk Management Framework, based on the 12 elements of the ADWG and AGWR. The national framework would set out principles, objectives and high-level processes for the management of risks to urban water quality.
- The establishment of a Human Health Regulators' Panel and an Environmental Health Regulators' Panel (building on the NRWRF). These panels would have responsibility for overseeing the development and maintenance of consistency in urban water quality regulation, drawing on other resources outlined below. The regulators' panels would also facilitate other areas of harmonisation, such as establishing a framework for mutual recognition and developing model guidance to help jurisdictions convert guidelines to regulations within existing jurisdictional responsibilities.
- The regulators' panels would be supported by a National Water Quality Management Unit (NWQMU). The purpose of this body is to provide an institutional foundation on which the goals of greater coordination and consistency in urban water quality regulation can be realised. The core responsibilities of the NWQMU would be to develop and maintain the national framework and national water quality guidelines. The NWQMU would also play a role in ensuring that new science is reviewed and incorporated into the revisions of the national guidelines, and identify national priority research to inform guideline revisions.
- Scientific advisory committees would be established under the NWQMU; one to advise on human health and the other on environmental health. They would be tasked with undertaking the technical development and regular review of the values contained in the national water quality guidelines. The scientific advisory committees would comprise technical experts drawn from the NHMRC, state and territory health departments, state and territory environmental protection agencies (EPAs) and industry (such as urban water utilities), as well as academics and research specialists, as required.
- The states and territories would retain their current responsibilities in developing and administering urban water quality regulation,although they would formally agree to implement the national framework and guidelines in a consistent manner (allowing for local variations, where relevant). Incentives would be provided to facilitate consistent implementation and information sharing.
- Local councils would play a reduced and clearer role in approving systems through standardised landuse development controls (e.g. Power (2010) notes that councils approve larger, on-site systems). The creation of standardised development control conditions would rest with the states and territories and be established under a national framework.

There is a third direction for reform to address the identified issues with urban water quality regulation in Australia: the establishment of a national regulator of urban water quality. Under this reform direction, responsibility for all aspects of urban water quality regulation would reside with a single, national body (potentially supported by a network of branch offices in the states and territories). While no stakeholder supported this direction for reform, it is nonetheless described and analysed by this review for completeness and to illustrate the relative trade-offs to such an approach (given the general theme in recent years towards increasing Commonwealth control over certain areas).

Table 9 provides a summary of the three reform directions, and highlights their key areas of commonality and difference.

Table 9: Summary of reform options

| | *Option 1: Bolster current arrangements* | *Option 2: Greater cross-jurisdictional coordination* | *Option 3: A national water quality regulator* |
|---|---|---|---|
| **Key bodies** | NWQMS bodies—NHMRC, NRMMC and EPHC<br>A formalised NRWRF<br>Environmental Water Quality Regulators Standing Committee—an environmental water quality equivalent of the NRWRF<br>State and territory regulators<br>Local councils | National Water Quality Management Unit (NWQMU)<br>Human Health Regulators' Panel<br>Environmental Health Regulators' Panel<br>State and territory regulators<br>Local councils<br>Scientific advisory committees, for human health and environmental health guidelines | A national regulator of water quality |
| **Guidelines and regulations** | The NHMRC, NRMMC and EPHC would continue to develop and maintain the NWQMS guidelines, but would be given adequate resourcing to do so.<br>The formalised NRWRF and Environmental Water Quality Regulators Standing Committee would help in the development of national guidelines—particularly in coordinating the views of regulators for guideline revisions and establishing processes for information sharing. | The regulators' panels would have responsibility for overseeing the development and maintenance of water quality regulations. The NWQMU would be responsible for developing the national water quality guidelines. As part of this, the national unit would manage the regular review and updating of performance values.<br>The NWQMU would establish scientific advisory committees to undertake the technical review and development of the performance values in the national water quality guidelines. The NWQMU and scientific committees would collaborate with the regulators' panels to develop and maintain a practical, enforceable, management framework for water quality management. | The NWQMS guidelines would be incorporated into the regulations (and possibly quasi-regulations) administered by the national regulator. |
| **Validation and approvals** | The formalised NRWRF and Environmental Water Quality Regulators Standing Committee would develop a framework for achieving mutual recognition arrangements for validated values and processes.<br>A national database of previously validated treatment processes and exposure barriers—to be managed by an existing state or territory regulator, with input from the Australian Water Recycling Centre of Excellence and the formalised NRWRF. | The regulators' panels (supported by the NWQMU) would develop a framework for achieving mutual recognition arrangements for validation values and processes.<br>A national database of previously validated treatment processes and exposure barriers—to be managed by the NWQMU, with input from the Australian Water Recycling Centre of Excellence and the regulators' panels. | No need for mutual recognition under a single, national system.<br>The national regulator would maintain a database of validated technologies (which could be accessed by scheme proponents). |
| **Consistency and coordination** | The formalised NRWRF and Environmental Water Quality Regulators Standing Committee would facilitate best practice information sharing between regulators.<br>There would be incentives for jurisdictions to implement the guidelines in a more consistent and comprehensive manner—with the intention of minimising (but still allowing for) local variations. | The regulators' panels (supported by the NWQMU) would be tasked with developing model guidance to help jurisdictions in converting guidelines to regulations within existing jurisdictional arrangements. This guidance will recognise and provide flexibility to address regional and locational requirements in the application of nationally developed performance values.<br>A national, legally applicable National Water Quality Risk Management Framework based on the 12 elements of the ADWG and AGWR would be established.<br>The NWQMU would be responsible, with support from scientific advisory committees and collaborating with the regulators' panels, for developing and maintaining the national framework.<br>There would be independent reporting and review of jurisdictional implementation of the national framework and the national guidelines. | The national regulator would administer and enforce nationwide legislation pertaining to urban water quality. |
| **Administration and enforcement** | The states and territories and local councils would retain their current responsibilities in administering and enforcing regulatory requirements, but greater clarity would be provided for easing industry navigation. | The states and territories would retain their current responsibilities in administering and enforcing regulatory requirements.<br>Local councils would have a reduced and clearer role in approving new water and wastewater treatment systems.<br>The NWQMU would administer the development and coordination of a national certification framework for water treatment operators (currently under way by the Water Industry Skills Taskforce). | Undertaken by the national regulator. |

The directions for reform outlined above have essentially focused on how the appropriateness and effectiveness of regulation surrounding urban water quality could be improved. Ensuring that regulated entities have the capacity to meet regulatory requirements is the subject of a number of separate, recent initiatives and reports, and is thus not considered here. Examples of these recent initiatives and reports include:

- the Productivity Commission's ongoing review into Australia's Urban Water Sector
- *Review of Regional Water Quality and Security*, prepared for Infrastructure Australia; the review makes a series of recommendations to improve the performance of regional water utilities
- national certification framework for potable water treatment operators, currently being developed by the NWC.

The remainder of this chapter describes the three directions for reform in greater detail, and then assesses them—relative to the existing situation—against three criteria:

- effectiveness of reforms in managing risks to public health and the environment
- costs—focusing on one-off implementation costs, ongoing administration costs to government, and compliance costs to industry and customers
- likely practicality/acceptability to jurisdictions.

The chapter concludes by considering some more detailed issues around the preferred approach, and sets out a road map for reform.

## 5.1. Directions for reform

The three directions for reform flagged above are described here in more detail.

### Option 1: bolster current arrangements

Chapter 4 showed that, while the NWQMS guidelines were intended to be reviewed and updated on a rolling basis, the key bodies tasked with developing and maintaining the guidelines do not have sufficient resources to review the guidelines as frequently as would be optimal. As a consequence, state and territory confidence in the NWQMS guidelines can decline—leading eventually to jurisdictions developing additional guidelines and other instruments to address perceived regulatory gaps.

Option 1 would seek to address the issue by ensuring that the key national bodies involved in the development and maintenance of the NWQMS guidelines—the NHMRC, the NRMMC and EPHC—had adequate resources (both in terms of funding and permanent staff) to undertake rolling reviews of all NWQMS guidelines. In addition to providing direct funding to the relevant NWQMS bodies, this may also involve encouraging state and territory regulators to provide relevant staff with sufficient time to participate in the guideline development and review processes.

Organisationally, it may be advantageous to nominate one national body (such as the NHMRC) as having primary responsibility for developing and maintaining the NWQMS guidelines; drawing on the expertise of other bodies (such as the NRMMC, EPHC and NWC) and the states and territories where required. This arrangement would be advantageous from a governance perspective, since one body would have ultimate responsibility for the regular review of the national guidelines. It would also build on the NHMRC's strong reputation in the water quality space. Nominating the NHMRC as the key body responsible for developing and maintaining the NWQMS guidelines would require, however, the confidence of environmental

health regulators that the arrangements between the NHMRC and EPHC are sufficiently robust to address environmental health aspects of water quality regulation.

Another organisational change under Option 1 would be to establish the NRWRF as a formal standing committee, as well as establishing an equivalent standing committee comprising environmental water quality regulators. The purpose of such a move would be to provide the NRWRF and environmental water quality regulators with a stronger foundation for achieving regulatory reform—in the form of dedicated institutional architecture for pursuing coordination objectives, supported by formal rules and processes. The ERAC case study in Chapter 3 highlighted the benefits of greater formalisation as a driver of harmonisation. It is not envisioned that the NRWRF and the Environmental Water Quality Regulators Standing Committee would be formalised/created through an intergovernmental agreement or similar process. Rather, the bodies could be formalised/created through signing memorandums of understanding between the states and territories (and the Commonwealth, where relevant). These documents would outline the agreed roles, responsibilities and governance arrangements of both bodies.

The functions of the formalised NRWRF and the Environmental Water Quality Regulators Standing Committee could include:

- facilitating best practice information sharing, discussing new water and wastewater treatment technologies, and providing input into the water quality research agenda (e.g. through liaison with key research bodies)
- advising on the conversion of guideline values into regulation
- overseeing the administration of a validation framework (currently being developed by the Australian Water Recycling Centre of Excellence)
- advising on the operation of the national validation database (see below).

It is important to note that members of the NRWRF have expressed their preference for the forum to remain informal. There is a view that formalising the NRWRF would act as a disincentive for ‘frank and fearless’ discussion, and potentially encourage a shift in the membership of the NRWRF away from those who are intimately familiar with the operation and application of regulations to senior policy people.

A concern highlighted by Power in her review of regulatory frameworks surrounding on-site wastewater management and recycled water systems is that there is ‘a lack of tools in the AGWR to … support … validation requirements’ (Power 2010). A possible solution to this issue highlighted by stakeholders is the creation of a national database of previously validated treatment processes and exposure barriers. This database could inform both regulators and proponents about what has worked in the past, and how they may seek to design/validate a new water system.

An existing state or territory regulator would be given responsibility for developing and maintaining this database; potentially through a shared-funding arrangement with other states and territories. In developing the national database, the responsible state or territory regulator would draw on the expertise and input of the Australian Water Recycling Centre of Excellence and the formalised NRWRF. There would also need to be:

- agreement as to acceptable variances to systems or processes (i.e. so that minor adjustments do not trigger the need for re-validation)
- a common set of agreed validation processes and requirements.

Another tool to support the validation and broader approval process would be the establishment of mutual recognition arrangements for validation processes. The formalised

NRWRF and Environmental Water Quality Regulators Standing Committee would have responsibility in the first instance for proposing a framework for achieving mutual recognition arrangements for validated values and processes.

All other aspects of the existing arrangements would remain. Specifically, state and territory regulators would continue to develop and enforce/administer their own requirements for risk management. The states and territories would also retain responsibility for subjecting new water quality requirements to an RIS process. The Australian Government, however, would seek to develop incentive mechanisms to encourage states and territories to implement the guidelines in a more comprehensive and consistent manner and minimise (but still allow for) local variations. Such incentives could take the form of:

- Regular, independent and public assessments of jurisdictional implementation of the national guidelines (including any variations) by a national body (akin to the COAG Reform Council's current role regarding the national partnership agreements).
- Commonwealth payments tied to an independent assessment of jurisdictional implementation of the national guidelines (similar to the approach undertaken by the Commonwealth regarding National Competition Policy).

## Option 2: Greater cross-jurisdictional coordination

As noted in Chapter 4, the key elements underpinning the ADWG and AGWR are broadly supported and appear to provide processes to manage a wide range of risks to water quality effectively, regardless of the source. Given this broad support, Option 2 seeks to build on the key elements underpinning the ADWG and AGWR. More specifically, Option 2 would involve the conversion of the Framework for the Management of Water Quality (which comprises the 12 elements listed in Box 5) into a legally applicable National Water Quality Risk Management Framework.

Box 5: Twelve elements of the Framework for the Management of Water Quality

Element 1: Commitment to water quality management
Element 2: Assessment of the water supply system
Element 3: Preventive measures for water quality management
Element 4: Operational procedures and process control
Element 5: Verification of water quality
Element 6: Management of incidents and emergencies
Element 7: Employee awareness and training
Element 8: Community involvement and awareness
Element 9: Research and development
Element 10: Documentation and reporting
Element 11: Evaluation and audit
Element 12: Review and continual improvement.

Source: NHMRC & NRMMC (2004)

The national framework would seek to ensure that complying jurisdictions and their regulatory requirements were managing risks to urban water quality in a manner that was consistent with best practice and each other. The national framework would set out:

- principles (e.g. 'Ensuring drinking water safety and quality requires the application of a considered risk management approach'; NHMRC & NRMMC 2004)
- objectives
- high-level processes
- roles and responsibilities.

The national framework will essentially provide regulators with an overarching structure on how they should regulate the management of water quality risks. The national framework will not seek to provide guidance on, or mandate, issues relating to the underlying science of water quality.

The technical aspects of urban water quality will be covered by national water quality guidelines—which will be similar to the current NWQMS guidelines. The national water quality guidelines will inform regulation and, as is described below, efforts will be made to encourage the consistent application of the guidelines in formulating regulations. It is envisioned that the use of a legally applicable, national framework focused on risk management, coupled with voluntary guidelines focused on the science of urban water quality, will allow regulators to strike an appropriate balance between consistency and flexibility (i.e. allowing for local conditions that can affect source water).

Keeping in line with the best practice framework, implementation of the national framework would be subject to periodic and independent review, to encourage greater consistency at the state and territory level.

Responsibility for overseeing the implementation of the national framework would reside with two regulators' panels:

- a Human Health Regulators' Panel—composed of state and territory regulators and Commonwealth bodies with responsibility for, or an interest in, the regulation of the human health aspects of urban water quality
- an Environmental Health Regulators' Panel—composed of state and territory regulators and Commonwealth bodies with responsibility for, or an interest in, the regulation of the environmental health aspects of urban water quality.

The regulators' panels, building on the experience and progress of the NRWRF, would provide the primary forum for intergovernmental deliberation and direction on matters relating to the regulation of urban water quality. It is envisioned that the regulators' panels would primarily comprise senior representatives from the relevant regulators/agencies. Ministerial oversight of the panels would need to be secured through some form of intergovernmental agreement and COAG/ministerial council involvement. Further discussion on the possible governance arrangements for the regulators panels is provided in Section 5.3 below.

The primary difference between the regulators' panels and the formalised NRWRF and the Environmental Water Quality Regulators Standing Committee outlined under Option 1 is that the former are envisioned to be more official bodies than the latter. The regulators' panels would be more official in terms of supporting governance arrangements (e.g. they would be established through some form of intergovernmental agreement and would report directly to relevant ministers) and role (i.e. the regulators' panels would have a clear, dedicated objective of driving decisions with reference to urban water quality in Australia).

In addition to collaborating on the national framework, the regulators' panels would have responsibility for subjecting the national framework to best practice regulation principles and practices (in line with the COAG guidelines), and ensuring that the national framework contained requirements that were broadly commensurate with the risks involved.

Another key area of responsibility of the regulators' panels would be overseeing the development and maintenance of the national water quality guidelines, and ensuring that the guidelines are regularly reviewed (e.g. every five years). It is important to note that the regulators' panels would have a consultative role in informing the development of the national framework.

In addition to these functions, the regulators' panels would have ownership of a range of initiatives to improve the consistency and coordination of urban water quality regulation in Australia. Such initiatives could include:

- Developing model guidance to help jurisdictions convert guidelines to regulations within existing jurisdictional frameworks and responsibilities. The focus of this model guidance will be on ensuring that there is consistent understanding across regulators about how they should use guidelines to develop pragmatic regulations, in the context of regional and locational requirements (such as source water, geography and soil composition, and treatment processes). Again, the emphasis will be on striking a balance between consistency and flexibility at the local or regional level.
- Developing a framework for achieving mutual recognition arrangements for validation values and processes.
- Developing harmonised policies, procedures, protocols and arrangements to guide, and ideally increase, the consistency of administration of water quality requirements at the state and territory level. A key area of focus should be the development of verification protocols to support state and territory regulators in determining whether newly validated processes and technologies, once installed, operated and maintained, are working to specification.

It would also be possible for the regulators' panels to assume responsibility for a range of other functions nominated by stakeholders (but not examined in depth by this report), such as:

- developing and maintaining certifier accreditation schemes for water systems and validation
- developing and maintaining auditor accreditation schemes for water systems and validation (e.g. similar to the Auditor Certification Scheme for Drinking Water Risk Management developed by the Victorian Department of Human Services and run by RABQSA)
- developing a mechanism for dispute resolution arising from contested regulator decisions at the state and territory level.

The regulators' panels would be supported by a National Water Quality Management Unit (NWQMU). The purpose of this body is to provide a core of expertise on which the goals of greater coordination and consistency in urban water quality regulation can be realised. The NWQMU would comprise experts in water quality (relating to both human health and environmental health aspects), guidelines and regulation. Such experts would either be employed on a permanent or contract basis, or seconded from state and territory regulators or relevant Commonwealth bodies.

The core responsibilities of the NWQMU would be the development and maintenance of the national framework and the national water quality guidelines. With reference to the latter, a key role of the NWQMU would be managing and overseeing the regular review and updating of guidelines undertaken in collaboration with the scientific advisory committees (see below).

In addition to these responsibilities, the NWQMU would provide technical expertise and secretarial support to the regulators' panels, particularly with reference to:

- developing model guidance to help jurisdictions convert guidelines to regulations
- establishing a framework for achieving mutual recognition arrangements for validated values and processes

- developing a research plan (with some input from the regulators' panels) to ensure that the broader water quality regulatory framework is supported by the best available science—this research plan would draw on advice from the scientific advisory committees and the state and territory regulators
- providing guidance about legal accountability and ownership of risk for new water and wastewater systems. As noted above, industry expressed concern that there is a lack of clarity about water quality expectations and the ownership of risk in current regulatory arrangements. The establishment of the NWQMU could assist in the development of a more formal framework to provide greater assurance to industry.

Consideration could also be given to the recommendations of the Productivity Commission's draft report of its review into Australia's urban water sector—particularly draft recommendation 11.6:

> Environmental and health regulators should be more transparent and accountable in their decision making. Except in matters where urgent public or environmental safety issues are involved regulators should also publish draft decisions and seek public comment on these. They should publish the reasons for their decisions in a similar manner to economic regulators and governments should consider the development of appropriate decision review mechanisms (Productivity Commission 2011).

The NWQMU could also assume responsibility for tasks where there would be benefits from greater centralisation, such as:

- working with state and territory regulators to help implement the national framework and national water quality guidelines
- developing and coordinating a national certification framework for water treatment operators (building on the work currently being undertaken by the Water Industry Skills Taskforce)
- facilitating the development and maintenance of a national database of previously validated treatment processes and exposure barriers—drawing on the advice and expertise of the Australian Water Recycling Centre of Excellence and the regulators' panels
- developing guidance material to help proponents of on-site and decentralised systems to understand and apply national water quality guidelines.

The NWQMU would also play an important normative role, in acting as a driver of greater consistency and coordination in urban water quality regulation, and ensuring that urban water quality regulation is developed and administered in accordance with best practice principles. The NWQMU could pursue this role by regularly reporting on the consistency of urban water quality regulation across Australia (similar to the reporting undertaken by the Australian Building Codes Board on state and territory variations to the Building Code of Australia), and developing guidance on best practice approaches to regulatory review processes.

To perform its functions effectively, the NWQMU and its constituent parts (such as the scientific advisory committees) would require sufficient funding and resourcing to deliver regular updates and revisions to the national water quality guidelines and the national framework to ensure regulation keeps pace with technological and scientific developments.

Scientific advisory committees would be established under the NWQMU, one to advise on human health and the other on environmental health. These bodies would be responsible for undertaking the technical development and review of the performance values contained in the national water quality guidelines. They would conduct reviews and updates to performance values on a regular and systematic basis. The scientific advisory committees would comprise

technical experts drawn from the NHMRC, state and territory health departments, and state and territory EPAs, along with academic and research specialists as required.

The institutional structures outlined above would need to include some mechanism to ensure sufficient engagement of industry and the broader community. Possibilities include:

- establishing an industry advisory committee (comprising representatives from key industry and stakeholder groups) that would regularly meet and provide advice to the regulators' panels and NWQMU
- inviting representatives from industry as observers at certain meetings of the regulators' panels
- undertaking RISs of major changes to the national framework and the national water quality guidelines in line with the COAG Best Practice Guidelines.

State and territory regulators would continue to develop and enforce/administer their own requirements for risk management. The states and territories would also retain responsibility for subjecting new water quality requirements to an RIS process.

Local councils would play a reduced and clearer role in approving systems through standardised land-use development controls. The development of these control conditions would rest with the states and territories. The NWQMU would ideally play a role in coordinating the development of the control conditions under a national framework.

### Option 3: A national water quality regulator

This option takes the nascent centralisation evident in Option 2 one step further and would involve a single, national regulator assuming complete responsibility for the regulation of urban water quality in Australia. The national regulator would thus not only perform all of the 'national' functions set out in the previous option (e.g. developing a national framework and undertaking RISs), but it would also be responsible for administration and enforcement of urban water quality requirements more broadly.

The national regulator would develop and maintain its own approaches to the validation of technologies, and a register of validated technologies (which could be accessed by scheme proponents). There would be no need for mutual recognition under a comprehensive national approach (by its very nature).

## 5.2. Assessment of reform directions

This section assesses each of the reform directions—relative to the existing situation—according to their:

- effectiveness in managing risks to public health and the environment
- costs—focusing on one-off implementation costs, ongoing administration costs to government, and compliance costs to industry and customers
- likely practicality/acceptability to jurisdictions.

This assessment is undertaken first by discussing the performance of each reform direction against the selected criteria, and then at the end of the section by way of a table that 'scores' each option based on the preceding discussion. The resulting scores suggest the preferred approach.

### 5.2.1. Risk management

Both Option 1 and Option 2 would improve the management of risks relative to the existing situation. Under both options, sufficient resources would be allocated for the regular review of national guidelines. There should be less incentive for the states and territories to develop their own guidelines for aspects of urban water quality covered by the NWQMS. This, coupled with the mutual recognition frameworks developed under Option 1 and Option 2, should free up regulatory resources at the state and territory and local levels. As a consequence, regulators should be able to devote more time to ensuring that their regulatory frameworks are up to date, that regulatory requirements are met, and that sufficient guidance is provided to regulated entities.

Furthermore, both Option 1 and Option 2 include incentive mechanisms to encourage comprehensive and consistent implementation of the national guidelines. This should increase the extent to which the guidelines are picked up and, in turn, make it easier for relevant parties to understand and navigate regulatory frameworks—particularly those parties operating across jurisdictions.

Both Option 1 and Option 2 would also facilitate greater collaboration between regulators (a formalised NRWRF and Environmental Water Quality Regulators Standing Committee under Option 1 and the regulators' panels under Option 2). This should encourage greater information sharing on best practice regulatory approaches and emerging water quality science and risks, mutually strengthening risk management frameworks across the states and territories.

On the whole, however, Option 2 is likely to be more effective than Option 1 in managing risks to public health and the environment. The reasons for this include:

- Option 2 includes more rigorous measures aimed at improving coordination and consistency at the state and territory level (specifically, the development of the national framework, and the development of model guidance to help jurisdictions convert guidelines to regulations). These measures should provide greater clarity (among regulators and industry) about what is required to manage water quality risks in Australia.
- Option 2 will ensure that risk management requirements in each jurisdiction are in line with best practice (i.e. the national framework), and are subject to the rigour of the COAG RIS process. Conversely, it is not clear under Option 1 the extent to which key risk management requirements would be mandated for all suppliers (particularly regional suppliers). As a result, there may continue to be issues around inadequate water quality in regional areas.
- Option 2 will help address capacity issues at the local council level through the development of standardised land-use development controls.

Option 3 offers many of the same benefits as have been identified with Option 2. The key difference relates to administration and enforcement of the national framework. Stakeholders consulted for this report advised of the need for 'on the ground' knowledge of local conditions and preferences when it comes to water quality. According to the Productivity Commission, in such circumstances it may be more appropriate to have subnational regulators administering a national scheme. While it is possible to transfer existing expertise to a national body (e.g. as has occurred with trade measurement), such a move presents a range of challenges, particularly in the short to medium term. For example, it is hard to 'disentangle' such staff from an organisation, there may be greater career opportunities available at the state level, and existing staff may perform a variety of functions for an organisation, not simply those functions that are transferred. Some regulators have indicated that they would not support

nationalisation of administration in this area, which could raise the prospect of any national regulator having to recruit its own staff rather than using existing expertise.

Based on these factors, Option 3 scores somewhat less favourably than the preceding option in terms of risk management (but still represents an improvement over the existing situation).

### 5.2.2. One-off implementation costs

Clearly, Option 1 will have the fewest costs associated with implementation. These would mainly relate to any costs for the states and territories to amend their legislation to facilitate mutual recognition, costs to establish and 'host' a validation database, and costs associated with formalising the NRWRF and establishing the Environmental Water Quality Regulators Standing Committee.

Option 2 would likely have greater implementation costs than Option 1, as it would involve establishing the NWQMU and the regulators' panels, and developing/implementing the national framework, the national water quality guidelines, the mutual recognition framework for validated processes and the validation database.

Option 3, meanwhile, would likely be the most costly to implement, given the need to create a national regulator (including the drafting of relevant referral legislation), to develop a national framework, and to establish the necessary infrastructure and processes to assume responsibility for the administration and enforcement of water quality regulatory requirements across Australia.

Other studies provide an indication of the costs associated with establishing national regulators. For example, the establishment costs of the national rail safety regulator are estimated to be $38 million (NTC 2009b), based on:

- project team to manage establishment
- office fit-out
- recruitment (executive search)
- initial induction and skills training
- information technology database
- records database
- legal advice
- strategic communication with industry.

### 5.2.3. Ongoing administration costs to government

Once implemented, all of the options could conceivably decrease the overall amount of resources devoted to administration relative to the amount currently spent.

Option 1 would increase costs to government somewhat (as greater resourcing is provided to the existing NWQMS bodies—namely, the NHMRC, the NRMMC and EPHC) to ensure the national guidelines are updated more regularly.

In the absence of detailed workforce planning, it is difficult to identify exactly the quantum of additional resources required to support the NWQMS bodies in developing and maintaining the national guidelines. For illustrative purposes, however, if it is assumed that an additional 10 staff would provide the NHMRC, NRMMC and EPHC with the resources needed to review

the national guidelines on a rolling basis, then approximately $1.3 million in additional funding would be required each year.[43]

Costs associated with running and supporting the formalised NRWRF and Environmental Water Quality Regulators Standing Committee would also be likely. These costs would primarily involve travel (e.g. flights and accommodation) and regulator staff time.

The increased costs associated with Option 1 would be offset at the state and territory level, as jurisdictions would have less incentive to develop jurisdictional-specific guidelines and they would have to devote fewer resources to validating technologies or processes (due to the greater use of mutual recognition).

Option 2 would involve ongoing costs to run the NWQMU, the regulators' panels and the scientific advisory committees. Like Option 1, however, these ongoing costs would be offset at the state and territory level (through jurisdictions having less incentive to develop their own guidelines, and devoting fewer resources to validating treatment processes and exposure barriers). State and territory regulators may also be able to save resources by relying on the NWQMU to undertake functions where economies of scale can be realised—such as in developing verification protocols and administering and coordinating a national certification framework for water treatment operators.

The NWQMU is also likely to generate savings by undertaking a single RIS (where relevant) on behalf of all jurisdictions. Having one RIS and associated legislative change saves jurisdictions a variety of costs. Changing legislation or regulations typically involves:

- policy approval:
  - policy officer time
  - departmental approval
  - cabinet approval
- drafting:
  - policy officer time
  - Parliamentary Counsel's drafting time
- legislative approval:
  - the Bill to be read, debated, and approved by legislative assembly or house of representatives
  - the Bill to be reviewed by upper house
  - the Act to be given Royal Assent by Governor or Governor General
- promulgation:
  - printing
  - information and promotional material about changes.

[43] This calculation is based on the assumption that the 10 staff would all be at the APS6 level, and thus would have approximate salary costs of $74 250 per person, and on-costs of $55 750 per person.

To give some examples of illustrative costs:

- in Western Australia, the average cost of legislative amendments drafted in 2003–04 was in the order of $52 000 (DLGRD 2004)
- in the United Kingdom it was estimated that to implement regulatory changes relating to European Works Councils would involve an administrative cost of amending legislation of approximately $400 000 (United Kingdom Department of Trade and Industry 1998).

Taking the midpoint of these ranges suggests that each jurisdiction could save around $225 000 or $1.8 million in total across Australia, every time legislation or regulations must be changed.

Generally speaking, Option 3 would involve the shift of costs that are currently borne directly by the states and territories to the national regulator. There would be costs to government in supporting the national regulator, maintaining national regulation pertaining to urban water quality, and administering and enforcing regulatory requirements across Australia. There would presumably be economies of scale from national enforcement.

### 5.2.4. Compliance costs to industry

Option 1 should reduce some compliance costs to industry by virtue of the fact that it should somewhat reduce differences across jurisdictions in terms of water quality requirements (which will particularly benefit firms operating across jurisdictions), and will avoid proponents having to revalidate previously validated systems and processes (by virtue of the mutual recognition arrangements). Option 2 would further reduce compliance costs to industry (compared with Option 1) in that it would better ensure there is a consistent set of core requirements around the management of water quality risks (through the legally applicable national framework), and provide greater certainty and consistency around guideline values and performance targets (via the model guidance that would be developed). As with Option 1, Option 2 would also deliver savings to proponents through the mutual recognition arrangements around validation. A consistent approach to enforcement (as would occur under Option 3) would provide the greatest certainty to industry. It would thus most significantly minimise compliance costs to industry.

### 5.2.5. Practicality/acceptability

Of the options, Option 1 is likely to be the most acceptable to jurisdictions. For example, numerous stakeholders—and previous reviews—have identified the need for mutual recognition of validated technologies and a database of validated technologies. Furthermore, regular review of the NWQMS guidelines should reduce the incentive for the states and territories to develop their own guidelines and associated instruments.

Conversely, it is difficult to see support for the creation of a national water regulator. Consultations for this report indicated likely opposition to any move to Commonwealth administration and enforcement. The comparator sectors (and consultations with comparator regulators) suggest it is extremely difficult to fully nationalise things like administration and enforcement of requirements.

As for the creation of regulators' panels (supported by a national unit) to develop a national framework based on the 12 elements underpinning the ADWG and AGWR, jurisdictional views tended to vary. It seems there would be more support for the establishment of an NWQMU-type body if the benefits of a more national approach—which still retained a strong state and territory role in water quality regulation—were clearly articulated and communicated.

### 5.2.6. Summary of assessments/identification of preferred approach

A summary of the assessments is shown in Table 10.

Table 10: Summary of assessments

| | Risk management | Costs | | | Practicality / acceptability | Overall score |
|---|---|---|---|---|---|---|
| | | One off implementation costs | Administrative costs to government | Compliance costs to industry | | |
| Bolster current arrangements | ✓ | x | ✓ | ✓ | ✓✓✓ | ✓✓ |
| Greater cross-jurisdictional coordination | ✓✓✓ | xx | ✓✓ | ✓✓ | ✓✓ | ✓✓✓ |
| A national water regulator | ✓✓ | xxx | ✓✓✓ | ✓✓✓ | xxx | ✓ |

On the basis of this assessment, Option 2 would likely have the greatest impact on the effectiveness and efficiency of urban water quality regulation.

The urban water sector may see merit in a particular direction for reform, or prefer elements across each of the reform directions. While we have undertaken a high-level assessment of the reform directions and identified a preferred direction for reform, the intention of this report is not to prescribe a solution for the urban water sector, but to provide focus to the current debate and allow for all issues to be considered in future reform diagnosis.

## 5.3. Road map for reform

The previous sections outlined a series of reform directions for addressing aspects of urban water quality in line with best practice. This section seeks to provide a picture of how the preferred approach could be implemented—taking into account current regulatory arrangements and other, ongoing areas of reform (e.g. the NRWRF and the NWC's development of a national certification framework).

If wanting to begin the pathway for reform, the first step governments should take is to establish a dedicated working group that would report to both the NRMMC and EPHC. This working group would be charged, as a first step, with developing regulatory impact statements necessary for designing the proposed regulatory arrangements and would provide a central point of focus for governments to reach agreement and ensure that progress is being made. The working group would comprise representatives from all jurisdictions, as well as local government, industry (e.g. Water Services Association of Australia and Australian Water Association) and expert and research bodies (e.g. the Australian Water Recycling Centre of Excellence and Water Quality Research Australia). The working group would exist until the regulators' panels and the NWQMU are established and their main functions costed and agreed.

Once the working group has been established, four major tasks need to be undertaken. These are more or less intended to be conducted sequentially, although there remains scope for overlap (particularly regarding the latter tasks). The four tasks are:

- Task 1: agree on a reform direction
- Task 2: establish the regulators' panels and the NWQMU
- Task 3: develop the national framework for management of water quality

- Task 4: develop detailed terms of reference and budgets for NWQMU.

## Task 1: Agree on a reform direction

This is the foundation task of the road map. It will involve Australian governments agreeing on a conceptual design for the new regulatory arrangements. Key areas of discussion and agreement will be:

- what the roles and responsibilities of the regulators' panels will be, and their likely composition (e.g. will representation on the panel be limited to a single jurisdictional representative, or will membership be open to all relevant regulators and agencies?)
- what the roles and responsibilities of the NWQMU will be, and its likely size (in terms of staff)
- how the regulators' panels and NWQMU will be funded (e.g. if through a shared-funding arrangement, what will the basis of this be?)
- what intergovernmental arrangements will be required to support the new regulatory arrangements
- what the likely scope of legislative changes will be (at both the Commonwealth and state or territory level) to establish the regulators' panels and the NWQMU, and to implement the national framework.

The working group would provide the main forum for discussing and reaching agreement about these issues. This task would primarily be informed by this review and its recommendations, as well as subsequent reports and reviews that may be developed to flesh out outstanding or additional areas of inquiry. There would also be benefit for governments in considering other, ongoing reform efforts to determine how these can best be leveraged and/or integrated into the new regulatory arrangements. Possibilities include:

- The Water Industry Skills Taskforce, as agreed by COAG in 2009, is developing a national certification framework for potable water treatment operators. Under the new arrangements, the regulators' panels and the NWQMU would seemingly be strongly placed to certify operators and assume responsibility for maintaining the framework.
- Building on the national validation framework currently being developed by the Australian Water Recycling Centre of Excellence to administer, review and update guideline values as presented by the centre.

## Task 2: Establish the regulators' panels and the NWQMU

This task is centred on establishing the key bodies of the new regulatory arrangements—the regulators' panels and the NWQMU. With reference to the former, key tasks include:

- Agreeing how ministerial oversight of the regulators' panels (and, ultimately, the NWQMU) will be achieved. For example, will the panels report to a ministerial council (or ministerial councils)? Or will they report directly to COAG?
- Determining the rules and processes that will govern the regulators' panels.
- Determining how the NWQMU will interact with the regulators' panels. For instance, what should the corporate reporting requirements for the NWQMU be?
- Drafting and agreeing the intergovernmental basis of the regulators' panels.

A common form of supporting new intergovernmental arrangements is through an intergovernmental agreement. There is a range of methods by which the Commonwealth and

states and territories may give effect to intergovernmental agreements. These methods include:

- agreements with no statutory authority basis
- agreements authorised by legislation to remove any doubts about the validity or authority to make them
- agreements ratified by legislation to transform contractual duties into statutory duties
- agreements ratified in such a way as to enact the agreement as law, thus changing any inconsistent law
- agreements that, although not ratified or enacted by statute, are implemented by new legislation
- agreements that are given constitutional status.

Examples of previous intergovernmental agreements include:

- Intergovernmental Agreement on the Reform of Commonwealth–State Financial Relations
- Intergovernmental Agreement for Rail Operational Uniformity
- Intergovernmental Agreement on a National Action Plan for Salinity and Water Quality.

With reference to establishing the NWQMU, the first step will be to consider the type of body the national organisation should be. More specifically, should a new body be created for the purposes of the NWQMU, or is there an existing body that could assume the roles and responsibilities of the NWQMU. Key issues that need to be considered include:

- Costs/benefits—establishing a new government body is generally more expensive than expanding the responsibilities of an existing one. That said, including water quality in the responsibilities of an existing body may run the risk of diluting regulator focus on water quality.
- Alignment with the roles and responsibilities agreed during Task 1.
- Practicality—it may be easier, for example, to establish a new body, rather than secure stakeholder acceptance of the merits of using an existing body to 'host' the NWQMU.

If an existing body is the preferred option, governments could select an existing body to assume the responsibilities of the NWQMU by either:

- putting the rights to host the NWQMU out to tender and inviting bids from interested parties, or
- purposively selecting an existing body through discussions with identified potential candidates, taking into consideration such factors as the culture, organisational structure and existing competences of each body.

If a new body is the preferred option, governments would need to consider such issues as:

- Whether the NWQMU will be formed under state or territory legislation or Commonwealth legislation. If the latter, will the new body be formed under the *Commonwealth Authorities and Companies Act 1997*, the *Financial Management and Accountability Act 1997*, or the *Corporations Act 2001*?
- The location of the new body.

Ultimately, much more detailed analysis will be required to work through these issues to determine the best approach. For example, a number of stakeholders have indicated

difficulties associated with (and expressed their opposition to) using FSANZ to undertake this role, even though:

- The costs and process of expanding the mandate of an existing body are generally cheaper/easier than creating a new body (or bodies). Governments would be able to take advantage of FSANZ's existing operating arrangements—particularly around office space, staffing structures and supplier relationships.
- FSANZ has a demonstrated track record of developing national standards and addressing risk-management issues in the context of food safety.
- FSANZ already has some exposure to water quality issues, particularly through the requirements in the Food Standards Code around bottled water.
- The regulation of food safety was generally held up by stakeholders as a model for the regulation of urban water quality.

## Task 3: Develop the national framework

To develop the national framework, three main steps would need to be undertaken, First, a technical working group would need to be formed and charged with converting the Framework for the Management of Water Quality that underpins the ADWG and AGWR into a national framework. The technical working group would ideally comprise specialists in process mapping, quality management, the regulation of drinking water and recycled water, and water and wastewater treatment.

Second, the draft national framework would need to be subject to a legislative drafting process to ensure that it is legally effective, of high quality and accessible. This could be undertaken with the assistance of the Commonwealth or a state or territory attorney-general's department, and would require the ongoing feedback and monitoring of the technical working group. Once a draft of the national framework had been developed, it would need to receive preliminary approval from the regulators' panels and the relevant ministerial body.

Third, a draft of the national framework would need to be subjected to an RIS, in line with the COAG guidelines. Feedback from the RIS would need to be reflected in the final version of the national framework, which may require additional assistance/advice from the technical working group and the relevant legislative drafters. The final national framework would need to be approved by the regulators' panels and the relevant ministerial body.

There would need to be regular review of the national framework (e.g. at least once every five years) to ensure that it continues to manage current and emerging risks in the best possible way.

By the same token, given that adoption by reference removes somewhat the power of the states and territories to 'tweak' regulatory arrangements over time, there would need to be a trigger for review of the national framework if, say, two or more jurisdictions requested such a review outside the prescribed review time frame. There would also need to be an agreed basis upon which RISs would be commissioned and responded to in relation to the national framework.

## Task 4: Developing detailed terms of reference and budgets for the NWQMU

This last task would involve considering what other functions should be performed by the NWQMU. In this regard, a number of reform efforts are currently under way (Table 11) that aim—directly or indirectly—to improve urban water quality. The NWQMU should be aware of

these efforts, and support or facilitate them where possible as appropriate. An overview of the road map is shown in Figure 9.

Figure 9: An overview of the road map

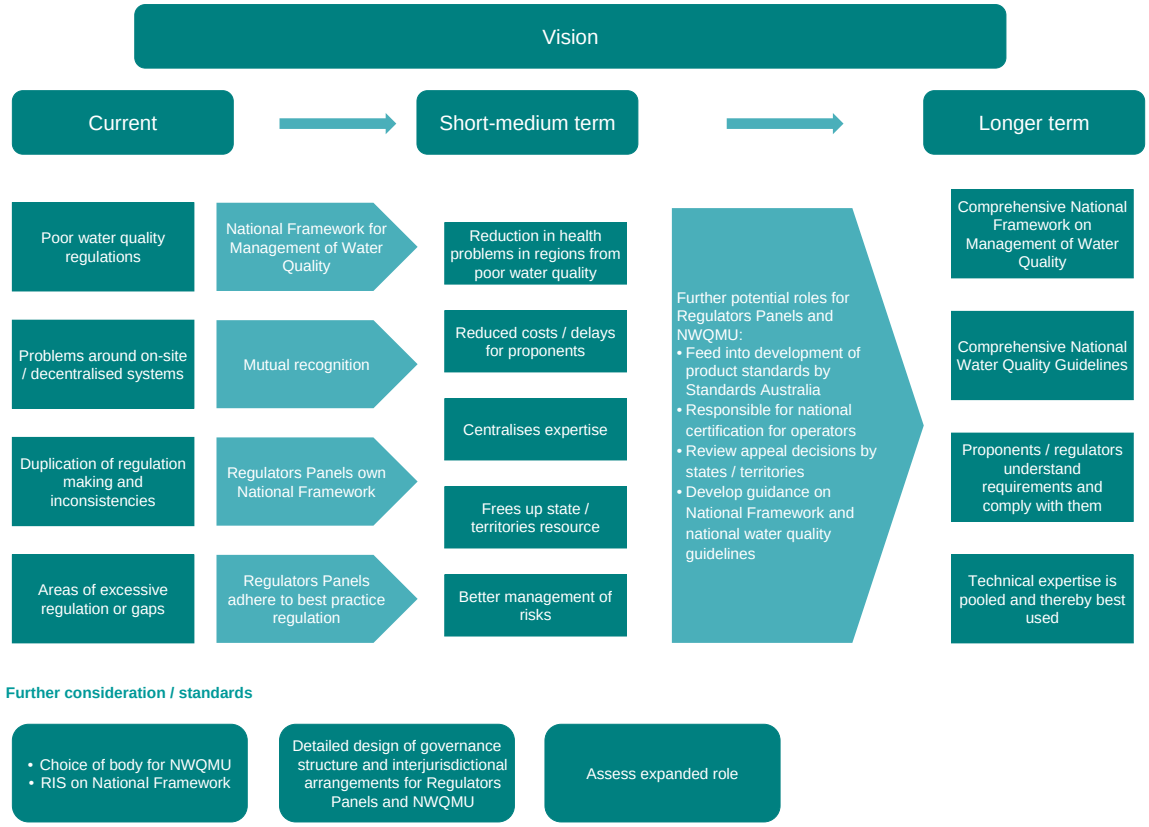

Table 11: Current and broader reform efforts

| *Organisation* | *Reform contribution under way* | *How it fits into proposed regulatory approach (self, quasi, explicit)* | *Road map for integration* | *Time line with decision makers* |
|---|---|---|---|---|
| Water Industry Skills Taskforce | Development of a national certification framework for drinking water scheme operators | Explicit—assurance on operator capacity; greater effectiveness in regulation | Once certification framework developed a national approval body is required to certify operators | 12–18 months—highlight COAG meeting time frames. |
| Water Recycling Centre of Excellence | Development of a national validation framework for water recycling, for use by proponents of water recycling schemes including private and public entities | Quasi—greater efficiency in validation | Needs timely delivery of new science into regulation, i.e. log reduction values, source water profiles, transferable surrogates | 12–18 months—link with Water Recycling Centre of Excellence program timing |
| Standards Australia WS-13 Committee | Development of a national domestic greywater standard | Quasi/explicit?—reduced duplication of low-risk certification of manufactured greywater systems. Reduces duplication of regulatory effort and increases investor certainty | Needs a national body to administer standard. Needs coordination between building codes and human health regulators. | 18 months before standard is drafted and provided to the Building Code of Australia for legislating |
| NWQMS Contact Group | Review of the NWQMS package | Currently self/quasi regulation but big push for mandatory regulation (AECOM 2010) | Feed amendments required to the AGWR and ADWG for consideration | Review currently under way. Must consider key milestones of the review and factor in opportunities for strengthening the guidelines |
| NHMRC Water Quality Advisory Committee | Advises NHMRC on drinking water quality issues relating to national policy | A formal committee established under section 39 of the NHMRC Act | Its future role is unclear but should be considered in any national regulatory body | Need to find out time lines |
| National Recycled Water Regulators Forum | Currently an informal national body made up of plumbing, human health and environmental health regulators—key group in future national reform agenda | Key group to carry forward mutual recognition aspects to validation | Must be consulted in any future regulatory reform effort | Meets once every three months and agenda traverses all national reform interest; next meeting in Darwin March 2011 |

# Appendix A Terms of Reference

The objectives of the review are to:

- Assess the overall performance of the urban water quality regulatory framework in Australia including a reflection of experiences in other risk-based sectors that have undertaken regulatory reform. This will include:
  - description of relevant reforms in comparator sectors as a basis for understanding best practice regulatory frameworks relevant to the urban water quality sector,
  - an assessment of how current urban water quality regulatory arrangements compare relative to other sectors subject to COAG's best practice regulation reform processes, and
  - set out elements of a best practice framework as a basis for identifying gaps, opportunities and reform options to improve the uptake of urban water quality regulation which is efficient and effective.
- Identify, assess and categorise particular challenges and impediments associated with the current approach in detail. This will include detailed consideration of costs and have regard to the potential cost of system failure and class action in the event of system failure. This will be supported by relevant evidence including a comparison between the examples and evidence of the problems across other risk-based regulatory sectors.
- Identify options for rectifying the identified problems. This will include capturing the views across the sector including regulators, practitioners, scientific community and policy makers. This will also include an estimate of costs to the regulatory sector of any proposed regulatory reform options.
- Provide recommendations on best practice water quality regulation arrangements for all urban supply sources with particular regard to efficient and effective national institutional arrangements. This will set out a vision and road map including key issues and decision points for improving regulatory systems.

# Appendix B Stakeholder summary

This appendix provides a summary of the stakeholder consultation undertaken as part of the review.

## 1.1 Focus groups and interviews

| *Stakeholder* | *Method of consult* | *Main points* |
|---|---|---|
| **Dr Mark O'Donohue** ***Australian Water Recycling*** | Teleconference | • Research effort in urban water significant (approx. $500 million over next 5 years); yet uncoordinated, and no real focus on urban water as a holistic system.<br>• Saw benefit of national validation framework to provide support to both industry and regulators. |
| **Dr Fred Leusch** ***Griffith University*** | Teleconference | • Guidelines are good, but they do not really provide guidance on how to apply guidelines or how to undertake a risk-based approach.<br>• Science community and regulators have different mindsets—former can deal with risk and uncertainty, latter can't. |
| **Dr Laurie Besley**<br>**Dr Cheryl Lim** ***National Measurement Institute*** | Face-to-face | • Questioned whether there is enough testing infrastructure to deal with expanded requirements of the recycled water guidelines, and whether national coordination of testing infrastructure is required to deal with the large number of contaminants to be tested. |
| **Phil Krasnostein** ***Nubian*** | Teleconference | • Highlighted the need to balance regulatory requirements with risk—noted that regulators tend to have risk elimination mindset, not risk management.<br>• Also talked about impact that inconsistencies and complexities of regulatory framework had on industry—estimated that regulatory requirements in Victoria added $6 per cubic metre over five years for midpoint greywater system. |
| **John Pritchard** ***Australian Local Government Association*** | Face-to-face | • Capacity of local governments should not be a problem—can always subcontract capacity if they do not have it in house.<br>• Noted that regulatory requirements on local government water providers has increased, while state funding and subsidies to local governments have decreased. |
| **Dr Tarren Reitsema**<br>**Cara Bourne** ***WA Department of Water*** | Teleconference | • Prior to AGRW, inconsistency and uncertainty. Now, less regulatory burden. Need, however, for supporting documents to help explain implementation and compliance. Need, essentially, to translate AGRW for different audiences. |
| **Water Services Association of Australia focus group** ***Various members*** | Focus group | • Regulatory burden seen to be higher regarding recycled water, compared to drinking water—particularly around duplication of validation.<br>• Reporting requirements in some jurisdictions seen to be onerous—reporting same information to different bodies.<br>• Tendency for regulators to go beyond national guidelines—seen as unnecessary and burdensome.<br>• Lack of regulatory best practice—requirements introduced with little assessment of their likely impact or effectiveness—particularly regarding sewer overflows. |

| *Stakeholder* | *Method of consult* | *Main points* |
|---|---|---|
| **National Recycled Water Regulators Forum** ***Various regulators*** | Focus group | • Highlighted a range of issues relating to ministerial oversight, third-party access, financial viability of decentralised operators/systems, and lack of resources provided to regulators.<br>• Noted that parts of government pushing for decentralised/alternative systems, without consideration of public health impacts.<br>• Cost recovery—limited use at state and territory level.<br>• Guidelines are good, but sit at national, high level. Need more guidance about how to implement and enforce guidelines. |
| **Mick Logan** ***Electrical Regulatory Authorities Council*** | Teleconference | • Recognising built-up expertise at the state level.<br>• Importance of working closely with Standards Australia.<br>• With increasing harmonisation comes increasing formality. |
| **Greg Deimos** ***National Transport Commission*** | Teleconference | • Able to manage science/technological uncertainty by framing rail safety regulation at a relatively high level.<br>• In pursuing reform, don't underestimate costs and include all relevant stakeholders as early as possible. |
| **Tony Singer** ***Food Standards Australia New Zealand*** | Face-to-face | • FSANZ manages scientific uncertainty by investing heavily in forecasting/foresighting, to try to identify emerging issues/trends.<br>• The earlier stakeholders are able to contribute to the development of standards/policy/etc, the more likely they will be able to inform the process, and not be surprised (and angry) later on. |
| **Dr Michele Ackeroyd** ***Water Quality Research Australia*** | Teleconference | • Inconsistencies exist across state and territory regulatory frameworks due to the guidelines not being mandatory.<br>• Inconsistencies exist between ADWG and AGRW. Probably not sensible to merge guidelines at this stage, due to sensitivities around using recycled water for drinking water.<br>• Our ability to manage risks limited due to a lack of quantification of hazards and a lack of knowledge about managing known risks. |
| **Dr Stuart Khan** ***UNSW*** | Teleconference | • Importance of maintaining integrity of validation process—a system at one site will have different issues/risks than a similar system at another site, even if they are using the same technology. |
| **Alan Gregory et al.** ***CSIRO*** | Teleconference | • Good to have guidelines in place, but with increasing integration of urban water systems, time to take stock of total approach to managing risks—particularly regarding implementation of guidelines and enforcement.<br>• Heavy reliance on precautionary principle within regulators.<br>• Process to ensure guidelines reflect emerging technologies and knowledge about risk identification and management. |

| Stakeholder | Method of consult | Main points |
|---|---|---|
| **Sascha Moege** ***Local Government Association of NSW*** | Teleconference | • Local government water providers ring-fenced, and cost recover for water services.<br>• Recognition of importance of risk and need for risk-based management—sector moving towards. Government is likely to make adherence to ADWG mandatory.<br>• Some regulatory confusion in multiple regulators, guidelines. |
| **Rob Fearon** ***QLD Water Directorate*** | Teleconference | • Highlighted the regulatory burden placed on operators in Queensland, although noted that the Queensland Government was attempting to streamline reporting requirements. |
| **Kristin Tomkins** ***Housing Industry Association*** | Face-to-face | • Increasing developer interest in alternative water supply. Hurdles include rezoning, water provider approval, and questions over ownership once system built.<br>• Need for better regulatory practice—RISs, etc.<br>• Greater flexibility required for third-party certification of on-site systems. |

## 1.2 Submissions

PwC invited public submissions from relevant regulators across the states and territories, and a number of other parties who expressed interest in contributing to the review. In all, 12 submissions were received; five of which were specifically focused on the jurisdictional summary presented in Appendix D. The remaining seven submissions were received from:

- Kaye Power
- National Measurement Institute
- New South Wales Office of Water
- South Australian Department of Health
- Victorian Plumbing Industry Commission
- Victorian Department of Health
- Western Australian Department of Water.

# Appendix C Jurisdictional summary

This section provides an overview of current arrangements for the regulation of urban water quality in Australia.

## 1.1 Commonwealth agencies and Australian water quality guidelines

### Commonwealth agencies

At the Australian Government level there are a number of agencies, ministerial councils[44] and other bodies involved in the area of urban water policy development and regulatory reform. These roles range from driving urban water reform and overseeing the implementation of urban water policies, to developing guidelines to address urban water quality matters—covering both public and environmental health. These bodies include:

- Council of Australian Governments (COAG)—the peak intergovernmental forum in Australia, comprising state and territory governments and the Australian Government. COAG's role is to initiate, develop and monitor the implementation of policy reforms that are of national significance and which requirement cooperation by Australian governments, including water reform.
- Working Group on Climate Change and Water—established under COAG, and reports to the Natural Resources Management Ministerial Council (NRMMC) and the Natural Resource Management Standing Committee (NRMSC).
- NRMMC—peak government forum for consultation and, where appropriate, integration of action by governments on natural resource management issues.
- NRMSC—supports the NRMMC in the achievement of its objectives and develops cooperative and coordinated approaches to matters of concern to the council.
- Environmental Protection and Heritage Council (EPHC)—established by COAG, the council addresses broad national policy issues relating to environment protection, including the development of Australian Guidelines for Water Recycling (AGWR).
- National Health and Medical Research Council (NHMRC)—is Australia's peak body for supporting health and medical research and, in collaboration with the NRMMC, is responsible for developing the Australian Drinking Water Guidelines (ADWG).

[44] Drawing on a review by Allan Hawke in 2010 of its ministerial councils, the Council of Australian Governments has recently agreed to a comprehensive reform plan for a new system of ministerial councils. Under the new system, enduring issues of national significance will be addressed through standing councils, while critical and complex issues will be addressed through limited-life select councils. The number of ministerial councils will be nearly halved, from 40 to 23.

- Department of Sustainability, Environment, Water, Population and Communities—leads the implementation of actions under the National Water Initiative (NWI)[45] Implementation Plan that relate to urban water issues and oversees the Australia Government's Water for the Future[46] initiatives. It also oversees the National Water Quality Management Strategy (NWQMS), which produces a range of guidelines on drinking water and recycled water.
- National Water Commission (NWC)—responsible for driving progress towards the sustainable use of Australia's water resources under the NWI. The NWC also advises COAG and the Australian Government regarding the progress of jurisdictions against the NWI.
- National Recycled Water Regulators Forum—promotes the consistent implementation of the Australian Guidelines for Water Recycling and improves communication between regulatory agencies.

## National Water Quality Management Strategy

The National Water Quality Management Strategy seeks to provide a national approach to improving water quality in Australia. The strategy has been in place since 1992, and has included the development of a number of policies and guidelines regarding water quality. These guidelines include the ADWG, along with guidelines addressing groundwater management, sewerage systems, effluent management and, more recently, the Australian Guidelines for Water Recycling.

Responsibility for developing, amending and approving the guidelines is split across a number of Commonwealth agencies and ministerial councils. The roles and responsibilities for each of the NWQMS guidelines, including a summary of review mechanisms, if any, is provided in Table 12.

[45] The NWI is Australia's blueprint for water reform. The objective of the NWI is to achieve a nationally compatible market, regulation and planning based system of managing surface water and groundwater resources and urban use that optimises economic, social and environmental outcomes.

[46] Water for the Future is the Australian Government's long-term initiative that seeks to better balance the water needs of communities, farmers and the environment. The initiative includes a number of urban policies and programs including funding for recycling and stormwater capture.

Table 12: National Water Quality Management Strategy guidelines

| *Guidelines* | *Responsible authority/ approval agency* | *Review mechanism* |
|---|---|---|
| ***Drinking water*** | | |
| Australian Drinking Water Guidelines (ADWG) (2004) | NHMRC (in collaboration with the NRMMC) | Rolling revision |
| Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC guidelines) (2000) | NRMMC and EPHC[47] | No formal review process specified in guidelines, although they are currently under revision. |
| Australian Guidelines for Water Quality Monitoring and Reporting (2000) | NRMMC and EPHC | No formal review process specified in guidelines |
| ***Recycled water*** | | |
| Australian Guidelines for Water Recycling (AGWR)<br>Managing Health and Environmental Risks (Phase 1) (2006)<br>Managing Health and Environmental Risks (Phase 2): Augmentation of Drinking Water Supplies (2008)<br>Managing Health and Environmental Risks (Phase 2): Stormwater Harvesting and Reuse (2009)<br>Managing Health and Environmental Risks (Phase 2): Managed Aquifer Recharge (2009) | EPHC (in collaboration with the NRMMC and Australian Health Ministers' Conference) | No formal review process specified in guidelines |
| ***Groundwater*** | | |
| Guidelines for Groundwater Protection in Australia (1995) | NRMCC and EPHC | No formal review process specified in guidelines |
| ***Diffuse and point sources*** | | |
| Australian Guidelines for Urban Stormwater Management (2000) | NRMCC and EPHC | No formal review process specified in guidelines |
| ***Guidelines for sewerage systems*** | | |
| Guidelines for Sewerage Systems: Effluent Management (1997) | NRMCC and EPHC | No formal review process specified in guidelines |
| Guidelines for Sewerage Systems: Acceptance of Trade Waste (industrial waste) (1994) | NRMCC and EPHC | No formal review process specified in guidelines |
| Guidelines for Sewerage Systems: Biosolids Management (2004) | NRMMC | No formal review process specified in guidelines |
| Guidelines for Sewerage Systems: Use of reclaimed water (1999) | NRMCC and EPHC | No formal review process specified in guidelines |
| Guidelines for Sewerage Systems: Sewerage System Overflows (2004) | NRMMC | No formal review process specified in guidelines |

An overview of the key planning legislation and supporting regulations across the Commonwealth and states and territories is provided in Table 13, while Source: Productivity Commission (2010)

[47] In 2001, ANZECC, ARMCANZ and the Ministerial Council on Forestry, Fisheries and Aquaculture was replaced by the NRMMC and Primary Industries Ministerial Council. These two councils subsumed all or part of the work of the three previous bodies. The NRMMC is responsible for water policy, along with other matters.

Box 6 provides a Productivity Commission summary of the roles different levels of government have in planning policy and regulation. Land-use planning can have an importance impact on urban water quality, particularly in terms of catchment management and development approval.

Table 13:Key planning legislation and supporting regulations

| | *Legislation* | *Regulations* |
|---|---|---|
| Commonwealth | *Environment Protection and Biodiversity Conservation Act 1999*<br>*Australian Capital Territory (Planning and Land Management) Act 1988* | Environment Protection and Biodiversity Conservation Regulations 2000<br>Australian Capital Territory (Planning and Land Management) Regulations 1989 |
| Australian Capital Territory | *Planning and Development Act 2007* | Planning and Development Regulation 2008 |
| New South Wales | *Environmental Planning and Assessment Act 1979* | Environmental Planning and Assessment Regulation 2000 |
| Northern Territory | *Planning Act 2009* | Planning Regulations 2009 |
| Queensland | *Sustainable Planning Act 2009c* | Sustainable Planning Regulation 2009c<br>Planning and Environment Court Rules Regulation 2009 |
| South Australia | *Development Act 1993* | Development Regulations 2008 |
| Tasmania | *Land Use Planning and Approvals Act 1993* | Land Use Planning and Approvals Regulations 2004 |
| Victoria | *Planning and Environment Act 1987* | Planning and Environment Regulations 2005<br>Planning and Environment (Fees) Regulations 2000 |
| Western Australia | *Planning and Development Act 2005* | Town Planning and Development (Subdivisions) Regulations 2000<br>Planning and Development (Local Government Planning Fees) Regulations 2000 |

Source: Productivity Commission (2010)

### Box 6: The role of different levels of government

The Australian Government does not have any powers under the Constitution for land planning or related matters, such as natural resource management. However, the Commonwealth is responsible for matters of 'national environmental significance' under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) and, as a consequence, can become involved in specific projects and planning-related matters for regions that cross state or territory borders. In some planning-related matters, such as the planning exemptions and 'fast-tracking' applied to the National Building Economic Stimulus Projects and the Murray–Darling Basin Authority, the Commonwealth has had to rely on the states and territories making amendments to their planning laws.

At a state and territory level, each has its own planning system, complete with statutory, policy and procedural frameworks. The administration of these systems is the responsibility of the respective state or territory government, although some day-to-day decision-making functions are delegated to local government. For example, in New South Wales, the provision of basic infrastructure and services for local communities has been progressively transferred to local councils.

Generally, most planning and development decisions and assessments are made at a local government level. (In the Northern Territory and the ACT, the territory governments absorb most functions undertaken by the local governments in the states.) An exception to this is strategic planning (the identification of desired or future land uses and the implementation of these), which usually involves greater state/territory government direction.

In recent years, state government reform of local government administration generally has seen the centralisation of many planning functions. This has taken various forms including local government amalgamations, creation of 'development corporations' and regional planning bodies, and appointment of planning administrators and/or the taking up of some planning and development decisions by state planning ministers on the grounds of 'state significance'. Some of these planning-system changes have evolved from competition between the states and territories to be attractive to business and draw international and domestic capital. Greater commercialisation of state and local government administration (including planning) units has also occurred along with a move toward the use of 'planning panels' (which may be independent or include local council members) and private certification of buildings and developments.

One outcome of these moves has been a lesser role in some types of planning and development by some local councils and reduced public participation in the planning, zoning and development system.

Source: Productivity Commission (2010)

The ADWG and the different phases of the AGWR are not mandatory and, by themselves, have no formal legal status. All states and territories, however, are encouraged to adopt the approaches described in the guidelines (many refer to them in their legislation). The guidelines are flexible documents, enabling jurisdictions to implement them in accordance with their specific requirements. The guidelines also provide standards and performance targets for water and recycled water characteristics.

In most instances the guidelines developed under the NWQMS incorporate risk-based assessments, which involve assessing risks on the basis of the likelihood for potential problems to arise and the potential impact of those problems. However, the focus on risk-based assessment is more clearly specified in recent guidelines such as the ADWG and specifically the AGWR. Both these guidelines encourage a thorough understanding of the total water system under examination and this in many cases requires a collaborative involvement of a range of players including environmental and health authorities and natural resource managers. This has been an important development, particularly with public water supplies in maintaining public health—especially where the implementation of COAG reforms has led to more commercially oriented water utilities and a separation of natural resources and environmental management away from some of the previously more comprehensive water agencies.

Some guidelines specify review mechanisms (e.g. the ADWG are subject to rolling revision, while guidelines regarding effluent management should be reviewed, at a minimum, every three years), while others do not have a specified review mechanism. More recently, the Australian and New Zealand environment ministers approved the revision of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000 guidelines) on the basis that new data and advances in monitoring and assessment methods have become available.

While the national guidelines seek to improve consistency regarding water quality regulation, there are no binding agreements or incentives regarding the implementation of guidelines under the NWQMS.[48] Further, where the guidelines are implemented, it is recognised that application may vary across jurisdictions, depending on the legislative and regulatory arrangements for water and wastewater management.

## 1.2 Current state and territory regulatory framework

Australian states and territories have introduced a number of measures to address water quality issues across the areas of drinking water, recycled water (including stormwater), wastewater and the environmental protection of water sources. Current state and territory regulatory frameworks are summarised below.

- Take-up of the NWQMS guidelines has varied across Australian states and territories:
  - while some jurisdictions may agree with the application of the guidelines, how these are enforced differs (e.g. Sydney Water is required to abide by the ADWG and AGWR as part of its operating licence), while guidelines in other jurisdictions refer the national guidelines but do not enforce adherence.
- A number of state and territory government agencies are involved in regulating and monitoring water quality across drinking water, recycled water and wastewater. Typically the responsibility of each agency targets a specific area—e.g. drinking water quality is assessed by the relevant health department and environmental impacts are assessed by the relevant environment department.
- In some jurisdictions, local councils play an important role in approving the installation and operation of water and wastewater systems (generally on-site or decentralised systems). Questions have been raised about whether some local councils have the capacity to perform this approval role effectively.
- In each jurisdiction there are guidance materials to help users; however, it is not clear the extent to which these guidelines are duplicative, are comprehensive (e.g. does the guidance cover all aspects relating to urban water quality or just some), or where they impose additional requirements (i.e. more stringent standards) than those required under the national guidelines. There may also be instances where jurisdictions determine that the national guidelines are not sufficient. For example:
  - in the Northern Territory, the Department of Health and Families developed the Northern Territory Recreational Microbiological Water Quality Guidelines 2007. These guidelines were developed on the basis that the NWQMS Guidelines for Managing the Risk in Recreational Water 2005, developed by the NHMRC, did not provide adequate criteria for microbial assessment of fresh waters in the Northern Territory.
- There are data gaps in some jurisdictions that hinder the efficiency of the jurisdictional regulatory regimes. For example, due to a lack of certainty about pollutant load transportation in stormwater during storms, regulators tend to default to using the most risk-adverse values.

[48] J Bowman, Developing Future Directions for the Urban Water Sector: Regulation.

- The approval pathway for water systems is complicated, with proponents generally required to navigate numerous regulators and supporting legislation in each jurisdiction. As a consequence, there is generally a lack of clarity about who signs off on the risk throughout the validation, verification, installation and operations phases of regulation.

## Australian Capital Territory

### *Institutional arrangements*

Several government agencies are involved in the regulation of water quality across the spectrum of drinking water, recycled water and wastewater in the Australian Capital Territory (ACT), including:

- ACT Health
- ACT Planning and Land Authority
- Environment Protection Authority (EPA ACT) (Department of the Environment, Climate Change, Energy and Water)
- Territory and Municipal Services (TAMS).

The role of these agencies may include developing guidelines/codes of practice and approving works. A summary of the involvement of each agency across the different areas of water quality regulation is provided in Table 14.

Table 14: ACT institutional arrangements

| *Area of water quality regulation/ government agency* | *On-site water recycling* | *Water recycling* | *Stormwater harvesting* | *Drinking water* | *On-site wastewater management* | *Wastewater management* |
|---|---|---|---|---|---|---|
| ACT Health | ✓ | ✓ | | ✓ | | |
| ACT Planning and Land Authority | ✓ | | | | | |
| EPA ACT | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Territory and Municipal Services | | | ✓ | | | |

### *Regulatory instruments*

The regulation of water quality across drinking water, recycled water (including stormwater) and wastewater is provided across a range of legislative and regulatory instruments, including:

- *Public Health Act 1997* (ACT)
- *Environment Protection Act 1997* (ACT)
- Public Health Regulation 2000 (section 6.3)
- Building (General) Regulation 2008
- Environment Protection Regulations 1997.

There are some additional guidelines and codes of practice in place in the ACT regarding some aspects of water quality; for example, the Drinking Water Code of Practice 2007

(DWCoP), which is a disallowable instrument made under the *Public Health Act 1997*. The DWCoP specifies the technical requirements for the supply, quality, monitoring of and reporting on drinking water in the ACT. The DWCoP also includes the requirement that utilities meet the aesthetic and health-related guideline values of the ADWG.

There are also Greywater Use guidelines for residential properties in Canberra (2007), which were prepared by ACT Health in consultation with the ACT Planning and Land Authority, Territory and Municipal Services and ACTEWAGL.

There are no other guidelines in the ACT that address water for drinking water, recycled water or wastewater. There is also no specific reference regarding adherence to other national guidelines under the NWQMS.

## New South Wales

### *Institutional arrangements*

In New South Wales, the institutional arrangements for water quality management are slightly different, as both local and state government agencies are involved in overseeing water quality regulation. Key agencies involved include:

- NSW Health
- Department of Environment, Climate Change and Water (DECCW)
- NSW Office of Water
- Department of Primary Industries (DPI)
- Independent Pricing and Regulatory Tribunal (IPART)
- Local council.

The role of these agencies may include developing guidelines/codes of practice, and approving works and monitoring activities. A summary of the involvement of each agency across the different areas of water quality regulation is provided in Table 15.

Table 15: NSW institutional arrangements

| *Area of water quality regulation/ government agency* | *On-site water recycling* | *Water recycling* | *Stormwater harvesting* | *Drinking water* | *On-site wastewater management* | *Wastewater management* |
|---|---|---|---|---|---|---|
| NSW Health | ✓ | ✓ | | ✓ | ✓ | |
| DECCW | | ✓ | ✓ | | | ✓ |
| NSW Office of Water | | ✓ | | | | |
| DPI | | ✓ | | | | |
| IPART | | ✓ | | ✓ | | |
| Local council | ✓ | | | | ✓ | |

*Regulatory instruments*

Regulation for the different aspects of water quality, at the state level, is provided for in the following legislation and regulations:

- *Public Health Act 1991* (NSW) (Part 2B Safety of Drinking Water)[49]
- *Protection of the Environment Act 1997* (NSW)
- *Water Management Act 2000* (NSW)
- *Sydney Water Act 1994* (NSW)
- *Hunter Water Act 1991* (NSW)
- *Water Industry Competition Act 2006* (NSW)
- *Environmental Planning and Assessment Act 1979* (NSW)
- *Local Government Act 1993* (NSW)
- Local Government (General) Regulation 2005 (NSW)
- Local Government (Manufactured Home Estates, Caravan Parks, Camping Grounds and Moveable Dwellings) Regulation 2005 (NSW)
- *Fluoridation of Public Water Supplies Act 1957* (NSW)
- Fluoridation of Public Water Supplies Regulation 2002 (Code of Practice for the Fluoridation of Public Water Supplies 2002) (NSW).

The requirements for certain water utilities are specified under operating licences, which are monitored by IPART. For example, the Sydney Water Operating Licence, which is established under section 12 of the *Sydney Water Act 1994*, specifies the guidelines that Sydney Water must adhere to, including the ADWG and AGWR. The licence also requires Sydney Water to operate in accordance with any other guidelines specified by NSW Health.

DECCW has developed guidelines regarding the application of the NWQMS ANZECC guidelines in NSW. These guidelines do not seek to impose additional requirements, rather to explain the underlying principles for application in NSW.

The New South Wales Government recently introduced the *Water Industry Competition Act 2006*. The core reforms introduced by this Act include:

- 'the establishment of a new licensing regime for private sector providers of reticulated drinking water, recycled water and sewerage services
- the establishment of a third-party access regime for water and sewerage infrastructure
- provisions to authorise IPART to arbitrate certain sewer mining disputes' (NSW Government n.d.).

At the local government level, local councils are responsible for assessing and approving applications for on-site and other wastewater management systems. This responsibility is provided for in the *Local Government Act 1993*. The Local Government (General) Regulation 2005 specifies requirements for approving certain sewage management facilities. There is no specific reference to any of the NWQMS guidelines in the *Local Government Act 1993* or the Local Government (General) Regulation 2005.

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[49] The *Public Health Act 1991* is expected to be repealed and replaced by the *Public Health Act 2010* in 2011.

Other instruments that manage urban water quality in NSW include:

- Management of Private Recycled Water Schemes—Department of Water and Energy, May 2008
- Domestic Greywater Treatment Systems – Accreditation Guidelines, 1999
- NSW Guidelines for Greywater Reuse in Sewered, Single Household Residential Premises, 2007.

Local water utility compliance to the NSW Health Drinking Water Monitoring Program (2005) is required by the NSW Office of Water through the Best Practice Management of Water Supply and Sewerage Guidelines (DEUS 2004).

For stormwater harvesting and reuse (potable), the NSW Government has not developed specific guidelines for using stormwater harvesting as a water source for large-scale potable drinking water supply. In the absence of state guidelines, users are referred to the ADWG, as well as AGWR Phase 2 stormwater guidelines.

## Northern Territory

### *Institutional arrangements*

In the Northern Territory, water quality oversight and regulation is provided by the following government agencies:

- Department of Health and Families
- Department of Lands and Planning (Building and Advisory Services)
- Department of Natural Resources, Environment and the Arts.

A summary of the involvement of each agency across the different areas of water quality regulation is provided in Table 16.

Table 16: Northern Territory institutional arrangements

| *Area of water quality regulation/ government agency* | *On-site water recycling* | *Water recycling* | *Stormwater harvesting* | *Drinking water* | *On-site wastewater management* | *Wastewater management* |
|---|---|---|---|---|---|---|
| Department of Health and Families | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Department of Lands and Planning (Building and Advisory Services) | ✓ | | | | ✓ | |
| Department of Natural Resources, Environment and the Arts | ✓ | ✓ | ✓ | | | |

### *Regulatory instruments*

The regulation of water quality across drinking water, recycled water and wastewater is provided across a range of legislative and regulatory instruments, including:

- *Water Supply and Sewerage Services Act 2000* (NT) (drinking water)
- *Building Act 1993* (NT)

- *Waste Management and Pollution Control Act 1998* (NT)
- *Public Health Act 2005* (NT)
- Public Health (General Sanitation, Mosquito Prevention, Rat Exclusion and Prevention) Regulations 2007
- *Water Act 1999* (NT)
- *Planning Act 1999* (NT).

The Department of Health and Families has developed the Northern Territory Recreational Microbiological Water Quality Guidelines 2007. These guidelines were developed on the basis that the Guidelines for Managing the Risk in Recreational Water 2005, developed by the NHMRC, did not provide adequate criteria for microbial assessment of freshwaters in the Northern Territory.

Other guidelines have also been developed by the Northern Territory Government, including:

- Environmental Health: Guidelines for Private Water Supplies (2009)—these guidelines seek to help operators of small facilities such as caravan parks, roadhouses, and tourist facilities to comply with the requirements of the ADWG
- Environmental Health: Guidelines for Management of Recycled Water Systems (2009)—these guidelines adopt the principles of hazard analysis and risk assessment as specified in the AGWR and seek to provide a framework to manage the public health and environmental risks associated with the use of recycled water.

## Queensland

### *Institutional arrangements*

Several government agencies are involved in the regulation of water quality across the spectrum of drinking water, recycled water (including stormwater) and wastewater in Queensland, including:

- Department of Infrastructure and Planning
- Office of the Water Supply Regulator (Department of Environment and Resource Management)
- Environmental Protection Authority
- Queensland Health.

A summary of the involvement of each agency across the different areas of water quality regulation is provided in Table 17.

Table 17: Queensland institutional arrangements

| *Area of water quality regulation/ government agency* | *On-site water recycling* | *Water recycling* | *Stormwater harvesting* | *Drinking water* | *On-site wastewater management* | *Wastewater management* |
|---|---|---|---|---|---|---|
| Department of Infrastructure and Planning | ✓ | | | | | |
| Office of the Water Supply Regulator | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Environmental Protection Authority | | | ✓ | | | ✓ |
| Queensland Health | | ✓ | | ✓ | | |

### *Regulatory instruments*

The regulation of water quality across drinking water, recycled water and wastewater spans a range of legislative and regulatory instruments. Relevant legislation governing water quality in Queensland includes:

- *Plumbing and Drainage Act 2002* (Qld)
- Standard Plumbing and Drainage Regulation 2003
- *Water Supply (Safety and Reliability) Act 2008* (Qld)
- *Public Health Act 2005* (Qld)
- Public Health Regulation 2005
- Water Fluoridation Regulation 2008
- *Environment Protection Act 2002* (Qld)
- Environment Protection Regulation 2005

In general, the Queensland Government supports the application of the ADWG and related regulations issued under the NWQMS. For example, the Queensland Water Quality Guidelines 2009 (QWQG) apply to Queensland watercourses (including groundwater), and are based on the ANZECC 2000 guidelines and updated when new material becomes available.

The Queensland Government has also developed Queensland Water Recycling Guidelines 2005. The Queensland Government has stated that the guidelines have been aligned with the AGWR (EPA 2005). However, these guidelines reflect requirements at the state government level, and do not address potential approval requirements by local councils.

Further, the Environmental Protection (Water) Policy 2009 outlines the process for determining which water quality guidelines (e.g. national, state, local) to use in water quality planning and decision making. In general, where there is more than one set of applicable guidelines, the most locally accredited guideline information shall take precedence over broader guidelines. On this basis, where the QWQG provides guideline values for Queensland waters that are more localised than the ANZECC 2000 guidelines, the QWQG takes precedence over the (broader) ANZECC 2000 guidelines. However, for a number of indicators, notably toxicants, there is little or no local information. For these indicators the ANZECC 2000 guidelines will remain the principal source of information.

Other relevant guidance material includes:

- Water quality guidelines for recycled water systems, 2009
- Greywater guidelines for councils—a guide to the use of greywater in Queensland, 2007
- Queensland Plumbing and Wastewater Code, 2009.

## South Australia

### *Institutional arrangements*

Several government agencies are involved in the regulation of water quality across the spectrum of drinking water, recycled water (including stormwater) and wastewater in South Australia, including:

- Department of Health
- Environment Protection Authority (EPA SA)
- Natural Resources Management Board
- Stormwater Management Authority.

Local council also plays a role in some water quality matters, such as administering the South Australian Government's policy on Septic Tank Effluent Disposal Schemes and the installation of on-site wastewater treatment systems.

A summary of the involvement of each agency across the different areas of water quality regulation is provided in Table 18.

Table 18: South Australian institutional arrangements

| *Area of water quality regulation/ government agency* | *On-site water recycling* | *Water recycling* | *Stormwater harvesting* | *Drinking water* | *On-site wastewater management* | *Wastewater management* |
|---|---|---|---|---|---|---|
| Department of Health | ✓ | ✓ | | ✓ | | |
| EPA SA | | ✓ | ✓ | | | |
| Natural Resources Management Board | | | ✓ | | | |
| Stormwater Management Authority | | | ✓ | | | |
| Local council | ✓ | | ✓ | | ✓ | |

### *Regulatory instruments*

The regulation of water quality across drinking water, recycled water (including stormwater) and wastewater is provided across a range of legislative and regulatory instruments and includes:

- *Public and Environmental Health Act 1987* (SA)

- Public and Environmental Health (Waste Control) Regulations 2010
- *Development Act 1993* (SA)
- *Environment Protection Act 1993* (SA)
- *Food Act 2001* (SA)
- *Sewerage Act 1929* (SA)
- *Natural Resources Management Act 2004* (SA)
- *Waterworks Act 1932* (SA).

Under the *Environment Protection Act 1993* (SA), the South Australian Government has developed the Environment Protection (Water Quality) Policy 2003. The policy seeks to ensure water quality standards are consistent with the requirements under the NWQMS. This includes setting environmental values and water quality objectives for a range of water sources and promoting best practice environmental management. The policy also seeks to encourage better use of wastewater through a range of measures including recycling.

South Australia is also the only jurisdiction that regulates drinking water via the *Food Act 2001* (SA). This legislation only includes a broad requirement for assuring that drinking water is fit for purpose and it does not provide direction on how this requirement should be achieved or measured.

In 2009 the South Australian Government released a discussion paper regarding a Safe Drinking Water Bill. This Bill seeks to address the lack of clarity in the Food Act and related regulations, and also to reflect best practice as defined in the ADWG.

## Tasmania

### *Institutional arrangements*

In Tasmania, responsibility for the different aspects of water quality is shared across the following government agencies:

- Department of Justice (Building Control Branch)
- Department of Primary Industries, Parks, Water and Environment
- Department of Health and Human Services
- Environment Protection Authority (EPA Board).

A summary of the involvement of each agency across the different areas of water quality regulation is provided in Table 19.

Table 19: Tasmanian institutional arrangements

| *Area of water quality regulation/ government agency* | *On-site water recycling* | *Water recycling* | *Stormwater harvesting* | *Drinking water* | *On-site wastewater management* | *Wastewater management* |
|---|---|---|---|---|---|---|
| Department of Justice (Building Control Branch) | ✓ | | | | | |
| Department of Primary Industries, Parks, Water and Environment | | ✓ | ✓ | | | ✓ |
| Department of Health and Human Services | | | | ✓ | | |
| Environment Protection Authority (EPA Board) | | | | | ✓ | ✓ |

### *Regulatory instruments*

The regulation of water quality across drinking water, recycled water (including stormwater) and wastewater is provided across a range of legislative and regulatory instruments and includes:

- *Building Act 2000* (Tas)
- *Environment Management and Pollution Control Act 1994* (Tas)
- Plumbing Regulation 2004
- *Public Health Act 1997* (Tas)
- *State Policies and Projects Act 1993* (Tas)
- *Land-use Planning and Approvals Act 1993* (Tas)
- *Water and Sewerage Industry Act 2008* (Tas).

The Tasmanian Government has released two guidelines addressing water quality matters under the *Public Health Act 1997* (Tas). These guidelines are the Drinking Water Quality Guidelines 2005 and the Recreational Water Quality Guidelines 2007. Both guidelines reference the relevant national guidelines (e.g. ADWG and Guidelines for Managing Risk in Recreational Water).

The Tasmanian Government has also developed the Environmental Guidelines for the use of Recycled Water in Tasmania 2002. This is the primary reference document for the management of wastewater reuse systems in Tasmania. The guidelines refer to the ANZECC guidelines and the Guidelines for Sewerage Systems—Use of Reclaimed Water. However, they do not refer to the AGWR as they pre-date them.

## Victoria

### *Institutional arrangements*

In Victoria, responsibility for the different aspects of water quality is shared across the following government agencies:

- Environment Protection Authority Victoria (EPA VIC)
- Department of Health

- Department of Sustainability and the Environment (DSE)
- Local council.

A summary of the involvement of each agency across the different areas of water quality regulation is provided in Table 20.

Table 20: Victorian institutional arrangements

| *Area of water quality regulation/ government agency* | *On-site water recycling* | *Water recycling* | *Stormwater harvesting* | *Drinking water* | *On-site wastewater management* | *Wastewater management* |
|---|---|---|---|---|---|---|
| Environment Protection Authority Victoria | ✓ | ✓ | ✓ | | ✓ | ✓ |
| Department of Health | ✓ | | | ✓ | | |
| Local council | ✓ | | | | | |

*Regulatory instruments*

The regulation of water quality across drinking water, recycled water (including stormwater) and wastewater is provided across a range of legislative and regulatory instruments, including:

- *Environment Protection Act 1970* (Vic)
- *Planning and Environment Act 1987* (Vic)
- *Health Act 1958* (Vic)
- *Building Act 1993* (Vic)
- Environmental Protection (Scheduled Premises and Exemptions) Regulation 2007
- *Safe Drinking Water Act 2003* (Vic)
- Safe Drinking Water Regulations (2005) (Vic)
- *Water Industry Act 1994* (Vic) (Melbourne authorities)
- *Water Act 1989* (Vic) (regional authorities).

The EPA VIC has developed guidelines for large-scale recycled water schemes (more than 5000 litres per day). These guidelines include the:

- Guidelines for Environmental Management: Use of Reclaimed Water (2003)—these guidelines incorporated NWQMS Guidelines for Sewerage Systems—Reclaimed Water. The objectives for 'Class A'[50] systems applied by these guidelines, however, are no longer valid, and the Department of Health has adopted a 'fit for purpose' approach as outlined in the AGWR.

[50] 'Class A' recycled water is recycled water required for high-exposure uses including those in residential developments (e.g. dual pipe systems for toilet flushing and garden use), the irrigation of public open spaces where access is unrestricted, and the irrigation of crops that are consumed raw or unprocessed.

- Guidelines for Environmental Management: Dual Pipe Water Recycling schemes – Health and Environmental Risk Management (2005)—these guidelines focus on the management of health and environmental risks associated with dual pipe schemes where water is recycled from large-scale sewage treatment systems.
- Guidelines for Environmental Management Code of Practice—Onsite wastewater management, 2008.

The EPA VIC is also in the process of developing guidelines for the development of risk assessments regarding wastewater discharges to waterways. They are also implementing validation guidelines for Class A schemes.

There are no specific guidelines regarding stormwater, and users are referred to the Australian Guidelines for Stormwater Harvesting and reuse.

Importantly, while utilities must have their statutory Drinking Water Risk Management Plans audited as part of the requirements of the *Safe Drinking Water Act 2003*, recycled water provision is treated differently. Under section 13 of the Dual Pipe Water Recycling Schemes – Health and Environmental Risk Management, Pub. No. 1015, October, 2005, it is a requirement for the manager of a dual pipe scheme to engage an auditor appointed under the *Environment Protection Act 1970* (Part IXD) to undertake a statutory audit of the scheme within 12 months of commissioning and submit an audit report pursuant to section 53V of the *Environment Protection Act 1970* to the EPA.

Moreover in Victoria, there has been clarification over the use of the precautionary principle in catchment management and drinking water supply protection (Davison et al. 2010). The precautionary principle is cited in many instances of contemporary legislation, and therefore case law is an important component of urban water quality regulation and interpretation.

## Western Australia

### *Institutional arrangements*

In Western Australia, responsibility for the different aspects of water quality is shared across the following government agencies:

- Department of Health
- Department of Environment and Conservation
- Department of Water
- Environmental Protection Authority WA (EPA WA)
- Local council.

A summary of the involvement of each agency across the different areas of water quality regulation is provided in Table 21.

Table 21:Western Australian institutional arrangements

| *Area of water quality regulation/ government agency* | *On-site water recycling* | *Water recycling* | *Stormwater harvesting* | *Drinking water* | *On-site wastewater management* | *Wastewater management* |
|---|---|---|---|---|---|---|
| Department of Health | ✓ | ✓ | | ✓ | ✓ | |
| Department of Environment and Conservation | | ✓ | | | | ✓ |
| Department of Water | | | ✓ | | | |
| Environmental Protection Authority WA | | | | | | ✓ |
| Local council. | ✓ | | ✓ | | | |

*Regulatory instruments*

The regulation of water quality across drinking water, recycled water (including stormwater) and wastewater is provided across a range of legislative and regulatory instruments, including:

- *Health Act 1911* (WA)
- Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974
- *Environmental Protection Act 1986* (WA)
- *Metropolitan Water Supply, Sewerage and Drainage Act 1909* (WA)
- *Country Areas Water Supply Act 1947* (WA).

In Western Australia, the Department of Health has developed the Code of Practice for the Reuse of Greywater in Western Australia (2010). The code of practice requires that treated greywater for indoor purposes in multi-dwelling or commercial premises must be operated in accordance with the AGWR (Managing Health and Environmental Risks). The code of practice has been endorsed by the Executive Director Public Health in accordance with section 344A (2) of the *Health Act 1911* (WA).

The Western Australian Government has also developed draft guidelines for the use of recycled water in Western Australia (2009). The draft guidelines are designed to provide a planning and implementation framework for water recycling schemes, and are based on a risk-management framework and apply the '12 element' risk assessment used in the AGWR.

# Appendix D Jurisdictional tables

*Australian Capital Territory*

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
|---|---|---|---|
| ***Recycled water*** | | | |
| On-site water recycling (e.g. household greywater system or small treatment plant) | • ACT Health (Health Protection Service)<br>• ACT Planning and Land Authority<br>• Environment Protection Authority | • *Public Health Act 1997*<br>• Public Health Regulation 2000 (section 6.3)<br>• Building (General) Regulation 2008<br>• Greywater Use: Guidelines for Residential Properties in Canberra | • The *Public Health Act 1997* defines on-site waste management systems as sewage systems that require approval from ACT Health in unsewered areas. ACT Health may require an activity licence.<br>• Under the Public Health Regulation 2000, installation of a septic tank or chemical toilet requires approval from an authorised officer (ACT Health).<br>• Commercial greywater systems are not specifically regulated; however, under the Building (General) Regulation 2008 owners are required to lodge a development application for some buildings.<br>• The Building (General) Regulation 2008 outlines the requirements for plumbing installation and applications. Under the building regulation, development applications for on-site waste management systems are passed to ACT Health. ACT Health assesses the overall design of on-site systems but has no specific procedure for accreditation and will accept accreditation from other states.<br>• Where a development application is not required, it is possible for systems to be installed without the knowledge of ACT Health.<br>• The Environment Protection Authority may become involved when noise or odour is a factor. |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
|---|---|---|---|
| Off-site water recycling (e.g. centralised sewage treatment plant) | • Environment Protection Authority<br>• ACT Health | • *Environmental Protection Act 1997* | • Depending on the size of the scheme, a recycled water scheme will require either an environmental authorisation[51] or a protection agreement.[52]<br>• A protection agreement is required from the Environment Protection Authority for recycled water schemes producing or supplying less than three megalitres of water per year. ACT Health can be involved in the development of the agreement; however, it is not a signatory and does not approve schemes.<br>• Recycled water schemes supplying more than three megalitres of water per year require an environmental authorisation from the Environment Protection Authority and ACT Health.<br>• There are no specific powers in the *Public Health Act 1997* to address recycled water schemes. |
| Stormwater harvesting and reuse—potable and non-potable | • Territory and Municipal Services | | • There are no specific guidelines regarding stormwater quality in the ACT with respect to potable or non-potable use.<br>• The Department of Territory and Municipal Services is responsible for the design and maintenance of stormwater systems.<br>• The Department of Territory and Municipal Services has developed guidelines on Design Standards for Urban Infrastructure Related to Stormwater.<br>• Requirements regarding the discharge of waste into stormwater systems are provided under the Environment Protection Regulation. |
| ***Drinking water*** | | | |
| Drinking water (metropolitan and non-metropolitan) | • ACT Health<br>• Environment Protection Authority | • Public Health (Drinking Water) Code of Practice 2007<br>• Environment Protection | • The Public Health (Drinking Water) Code of Practice 2007 provides a framework for water quality management relating to the supply of drinking water under a Drinking Water Utility Licence in the Australian Capital Territory. |

[51] An environmental authorisation is a form of licence to conduct an activity that has significant potential to cause environmental harm.

[52] An environmental protection agreement is a formal, but non-contractual agreement, between the EPA and a business.

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
|---|---|---|---|
| | | Regulations 1997 | • The Public Health (Drinking Water) Code of Practice 2007 specifies the technical requirements for the supply, quality, monitoring of, and reporting on drinking water in the ACT.<br>• The Environment Protection Regulations 1997 (Schedule 4) also include environmental standards for domestic water supply.<br>• It documents the notification procedures the water utility is required to follow in the event of an incident that poses an imminent serious risk to public health. |
| ***Waterway health*** | | | |
| On-site wastewater management (e.g. septic tank) | • Environment Protection Authority | • *Environment Protection Act 1997*<br>• Environment Protection Regulation 2005 | • Under the Public Health Regulation 2000, installation of a septic tank or chemical toilet requires approval from an authorised officer (ACT Health).<br>• It is the policy of the Environment Protection Agency that installation and operation of a septic/subsoil sewage disposal system must be in accordance with Australia/New Zealand Standard 1547-2000, On-site domestic wastewater management (EPA 2008).<br>• Discharge must meet Schedule 4 of the Environment Protection Regulation 2005.<br>• It is also the policy of the Environment Protection Authority that these systems are located at a minimum distance from waste courses (e.g. no closer than 50 metres to the bank full discharge level of any surface waters nor closer than 300 metres, if such surface waters are a source of potable water supply or 1.5 metres from the groundwater table). |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
|---|---|---|---|
| Offsite wastewater management (e.g. centralised sewage treatment plant) | • Environment Protection Authority | • *Environment Protection Act 1997* | • Under the *Environment Protection Act 1997*, Class A activities include sewage treatment (defined as an activity involving the discharge of treated or untreated sewage or septic tank effluent to land or water and having a peak loading capacity designed for more than 100 persons per day, other than an activity involving the recycling of wastewater where this is no discharge to receiving waters).<br>• To undertake Class A activities, it is necessary to have an environmental authorisation. |

*New South Wales*

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
|---|---|---|---|
| ***Recycled water*** | | | |
| On-site water recycling (e.g. household greywater system or small treatment plant) | • Local council<br>• NSW Health | • *Local Government Act 1993*<br>• Local Government (General) Regulation 2005 | • The *Local Government Act 1993* (s. 68) requires that households receive approval to install and operate on-site wastewater management systems from the relevant local council.<br>– Under the Local Government (General) Regulation 2005, a local council must not approve the installation of certain sewage management facilities unless they have been accredited by NSW Health. This is required for on-site wastewater systems that cater for less than 10 equivalent persons or 2000 litres per day (Power 2010).<br>– For systems that service more than 10 equivalent persons, approval to install and operate a system is provided by the local council. |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
|---|---|---|---|
| Off-site water recycling (e.g. centralised sewage treatment plant) | • Department of Environment, Climate Change and Water (DECCW)<br>• NSW Office of Water (NOW)<br>• NSW Health<br>• Department of Primary Industries (DPI)<br>• Independent Pricing and Regulatory Tribunal (IPART) | • *Protection of the Environment Operations Act 1997*<br>• *Local Government Act 1993*<br>• *Water Management Act 2000*<br>• *Sydney Water Act 1994*<br>• *Hunter Water Act 1991*<br>• *Water Industry Competition Act 2006*<br>• *Water Industry Competition (General) Regulation Act 2008* | • *Protection of the Environment Operations Act 1997* requires that sewerage plants that service more than 2500 equivalent persons or 750 kilolitres per day, and also discharge wastes or by-products, require a licence from DECCW. DECCW generally does not license non-scheduled wastewater recycling systems because they can be designed and operated to avoid pollution.<br>• Recycled water schemes run by local councils must receive approval by the Minister for Water under the *Local Government Act 1993* (s. 60).<br>• Some water utilities defined under the *Water Management Act 2000* (e.g. Gosford City Council, Wyong Council, and the Sydney Olympic Park Authority) also required approval by the Minister for Water.<br>• Hunter Water and Sydney Water are required to supply recycled water in accordance with the relevant guidelines specified by NSW Health, DECCW, NOW and the DPI. These requirements are specified under their operating licence, which is audited by IPART.<br>• Private sector schemes are regulated under the *Water Industry Competition Act 2006*, the *Water Industry Competition (General) Regulation Act 2008*, and the *Local Government Act 1993* (s. 68). These businesses operate under licences issued by the Minister for Water.<br>• Private operators are required to obtain a network operator's licence from IPART to construct, operate and maintain water industry infrastructure. IPART assesses the application and passes it on to NSW Health and NOW for comment and potential conditions of approval. It is then passed to the Minister for Water for final approval of the licence. While private operators require a licence, Exemption Clause 19 does allow water or sewerage infrastructure that is owned and operated on one site to not require a licence if it is owned and operated by the owner of the site. These schemes would be covered under the *Local Government Act 1993* (s. 68) as they are situated on a single premise or require a discharge licence from DECCW. |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
|---|---|---|---|
| Stormwater harvesting and reuse—potable | • Department of Environment, Climate Change and Water<br>• Independent Pricing and Regulatory Tribunal | • Australian Drinking Water Guidelines<br>• *Water Industry Competition Act 2006*<br>• *Water Industry Competition (General) Regulation Act 2008* | • NSW has not developed specific guidelines for using stormwater harvesting as a water source for large-scale potable water supply schemes (DEC 2006a). Users are referred to the Australian Drinking Water Guidelines. |
| Stormwater harvesting and reuse—non-potable | • Department of Environment, Climate Change and Water<br>• Independent Pricing and Regulatory Tribunal | • Australian and New Zealand Environmental Conservation Council Guidelines 2000<br>• *Protection of the Environment Operations Act 1997*<br>• *Environmental Planning and Assessment Act 1979*<br>• *Water Industry Competition Act 2006*<br>• *Water Industry Competition (General) Regulation Act 2008* | • Catchment water quality is a local planning issue, which is captured under environmental regulation under the *Protection of the Environment Operations Act 1997* and the *Environmental Planning and Assessment Act 1979*, along with local council development planning approval processes.<br>• Local councils in NSW may use the development planning process to help prevent impacts to water quality, in accordance with the Australian and New Zealand Environment Conservation Council guidelines published in 2000 (DEC 2006b). These guidelines provide technical methods for assessing and measuring whether waterways support these values. |
| ***Drinking water*** | | | |
| Drinking water (metropolitan) | • NSW Health<br>• Independent Pricing and Regulatory Tribunal | • *Public Health Act 1991* (NSW)<br>• Australian Drinking Water Guideline<br>• *Sydney Water Act 1994*<br>• *Hunter Water Act 1991*<br>• *Water Industry Competition Act 2006*<br>• *Water Industry Competition (General) Regulation Act* | • Under the *Public Health Act 1991* (NSW), NSW Health is responsible for monitoring and managing public health, including regulating and monitoring the safety and quality of drinking water. Memorandums of understanding are created between the water supply provider and NSW Health as a means to define each party's roles and responsibilities.<br>• The Sydney Catchment Authority, Sydney Water and Hunter Water each have operating licences that impose requirements regarding the supply of safe drinking water to consumers. Operating licences are regulatory instruments that seek to protect consumers by setting standards of service that the water supply authority must meet in relation to areas such as reliable supply of |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
|---|---|---|---|
| | | *2008* | safe drinking water, with requirements for monitoring, reporting and planning for drinking water quality. Operating licences are reviewed by the Independent Pricing and Regulatory Tribunal.<br>• Sydney Water and Hunter Water must maintain to the satisfaction of NSW Health a Drinking Water Quality Management Plan outlining a strategy for managing the water quality issues associated with water supply, catchment management and the public health aspects of wastewater disposal and reuse. |
| Drinking water (non-metropolitan) | • NSW Health<br>• NSW Office of Water<br>• Independent Pricing and Regulatory Tribunal | • Best-practice Management of Water Supply and Sewerage Guidelines 2007<br>• Australian Drinking Water Guidelines<br>• *Local Government Act 1993*<br>• *Water Industry Competition Act 2006*<br>• *Water Industry Competition (General) Regulation Act 2008* | • Non-metropolitan water and sewerage providers are encouraged under the Best-practice Management of Water Supply and Sewerage Guidelines 2007 to develop a risk-based plan for monitoring drinking water quality. These guidelines are not mandatory.<br>• NSW Health, through the Drinking Water Monitoring Program, provides drinking-water testing for local councils and local water utilities in regional areas to verify that consumers are receiving safe drinking water. It is the responsibility of the water utility to conduct appropriate operational monitoring, while NSW Health laboratories provide free testing for the recommended number of samples for indicator bacteria and health-related inorganic chemicals. Local water utilities are notified immediately if a water quality result exceeds a 2004 Australian Drinking Water Guidelines value.<br>• Non-metropolitan water quality reporting is provided in the NSW Office of Water's annual *NSW water supply and sewerage: performance monitoring report.*<br>• Water schemes run by local councils must receive approval by the Minister for Water under the *Local Government Act 1993* (s. 60). |
| ***Waterway health*** | | | |
| On-site wastewater management (e.g. septic tank) | • Local council<br>• NSW Health | • *Local Government Act 1993*<br>• Local Government | • The *Local Government Act 1993* (s. 68) requires that households receive approval from the relevant local council to install and operate on-site wastewater management systems. |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
|---|---|---|---|
| | | (General) Regulation 2005 | – Under the Local Government (General) Regulation 2005, a local council must not approve the installation of certain sewage management facilities unless they have been accredited by NSW Health. This is required for on-site wastewater systems that cater for less than 10 equivalent persons or 2000 litres per day (Power 2010).<br>– For systems that service more than 10 equivalent persons, approval to install and operate a system is provided by the local council. |
| Offsite wastewater management (e.g. centralised sewage treatment plant) | • Department of Environment, Climate Change and Water, which incorporates the EPA NSW<br>• NSW Office of Water (non-metropolitan)<br>• Independent Pricing and Regulatory Tribunal | • *Protection of the Environment Operations Act 1997*<br>• *Environmental Planning and Assessment Act 1979*<br>• *Water Industry Competition Act 2006*<br>• *Water Industry Competition (General) Regulation Act 2008* | • The *Protection of the Environment Operations Act 1997* is NSW's primary environmental protection legislation. The Act provides a statutory framework for preventing pollution and licensing waste discharges. Schedule 1 of the Act specifies scheduled activities that require a licence. The EPA NSW is responsible for administering the Act and statutory functions and powers in the Act continue to be exercised in the name of the EPA.<br>• EPA responsibilities include monitoring and regulating wastewater discharges that may affect the water quality of NSW streams, rivers, coastal waters or groundwater; for example, sewerage systems operated by water utilities.<br>• DECCW regulates vegetation clearing (including riparian zones and wetlands) and is accountable for State of the Environment reporting.<br>• Requirements set by the operating licence for metropolitan water service providers include reporting on environmental performance.<br>• The guidelines include the requirement for local water utilities to develop environmental management plans.<br>• The NSW Groundwater Quality Protection Policy (DLWC 1998) provides a set of policy principles for groundwater protection. Under the policy, where a groundwater system is at a high risk from overextraction or contamination, priority will be given to developing a groundwater management plan.<br>• The protection of groundwater from contamination is governed by |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
|---|---|---|---|
| | | | the *Protection of the Environment Operations Act 1997*, which makes it an offence to pollute waters, including groundwater. This Act is administered by the EPA (under DECCW).<br>• Development that may affect groundwater sources may require approvals under the *Environmental Planning and Assessment Act 1979*. |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
|---|---|---|---|
| ***Recycled water*** | | | |
| On-site water recycling (e.g. household greywater system or small treatment plant) | • Department of Infrastructure and Planning<br>• Office of the Water Supply Regulator (Department of Environment and Resource Management) | • *Plumbing and Drainage Act 2002*<br>• Standard Plumbing and Drainage Regulation 2003 | • On-site wastewater management or household systems are regulated under the *Plumbing and Drainage Act 2002*, and the Standard Plumbing and Drainage Regulation 2003.<br>• On-site sewage plants servicing 21 equivalent persons require approval for installation from council and the Chief Executive of the Department of Infrastructure and Planning. Systems must also meet the performance criteria of the Queensland Plumbing and Wastewater Code for water quality and system monitoring and maintenance requirements.<br>• Reuse of treated and untreated greywater is permitted, and the Queensland Plumbing and Wastewater Code sets the water quality requirements depending on the intended end use of the water. The level of treatment determines whether the water can be reused for internal use (e.g. toilet flushing, washing machines or for garden irrigation only).<br>• Households generating more than three kilolitres per day of greywater must install a greywater treatment system.<br>• All single greywater treatment systems with a capacity of less than 50 kilolitres per day must be approved by the Chief Executive of the Department of Infrastructure and Planning and meet the performance criteria of the Queensland Plumbing and Wastewater Code.<br>• Recycled water schemes supplying more than 50 kilolitres per day must obtain approvals from the Office of the Water Supply Regulator before supplying recycled water.<br>• Currently, blackwater cannot be collected and recycled on site; however, the Queensland Government is investigating blackwater reuse and is permitting trials in sewered areas. |
| Off-site water recycling (e.g. centralised sewage treatment plant) | • Office of the Water Supply Regulator<br>• Queensland Health | • *Water Supply (Safety and Reliability) Act 2008*<br>• Public Health Regulation | • The *Water Supply (Safety and Reliability) Act 2008* provides for the safety and reliability of water supply. The Act includes provisions regarding recycled water for two main sources:<br>– sewage and effluent sourced from a service provider's |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
|---|---|---|---|
| | | 2005<br>• Australian Guidelines for Water Recycling | infrastructure[53]<br>– wastewater, other than water mentioned above.<br>• Under the *Water Supply (Safety and Reliability) Act 2008* recycled water providers are required to have an approved recycled water management plan for the supply of recycled water. The plan must be in compliance with the Recycled Water Management and Validation Guidelines, which are based on the Australian Guidelines for Water Recycling. The Water Supply Act requires audits and reviews to be conducted by the recycled water provider. The Office of the Water Supply Regulator may also carry out spot audits and require external audits to be conducted.<br>• Exemptions for recycled water management plans may be granted in some instances, subject to final water quality and appropriate uses (as outlined in the Public Health Regulation 2005).<br>• The *Public Health Act 2005* details Queensland Health's powers with respect to water-related aspects of public health. Queensland Health's powers are limited to those entities covered by the *Water Supply (Safety and Reliability) Act 2008*. Any entities or persons that produce or use recycled water that falls outside the scope of the Act are regulated by local government. Exceptions to this include situations where local government and Queensland Health work in partnership on a public health risk, where local government agrees to hand jurisdiction over to Queensland Health, or where the Chief Executive of Queensland Health is of the view that a public health risk is not being managed appropriately and therefore Queensland Health must step in.<br>• Queensland Health can set standards for recycled water quality under Public Health Regulation 2005 (Part 6A). Queensland Health has set standards for recycled water used to augment drinking water supplies, dual reticulation schemes, and for irrigation of minimally processed food crops. |

[53] Where a service provider includes any party who extracts sewage before it gets to a sewage treatment plant, and can include local government.

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
|---|---|---|---|
| | | | • Queensland Health has the power under the Public Health Act to prosecute a recycled water supplier if they provide recycled water that is not fit for use. |
| Stormwater harvesting and reuse—potable and non-potable | • Department of Environment and Resource Management | • Environment Protection (Water) Policy 2000<br>• Stormwater Quality Control Guidelines for Local Government 1998<br>• Queensland Urban Drainage Manual (2nd edition) 2007<br>• Queensland Water Quality Guidelines 2009 | • The Environment Protection (Water) Policy 2000 is a policy under the *Environment Protection Act 1994*. The policy provides for the development of environmental plans for a local area dealing with total water cycle management including plans about urban stormwater quality management. Urban stormwater quality management plans need to include provisions to improve the quality and flow of urban stormwater in ways that protect the environmental values of water affected by urban stormwater.<br>• The Queensland Government has two guidelines that provide guidance on stormwater management:<br>– Stormwater Quality Control Guidelines for Local Government 1998, which outline the implications for local government of the *Environment Protection Act 1994* and the Environmental Protection (Water) Policy 2007<br>– Queensland Urban Drainage Manual (2nd edition) 2007, which seeks to provide guidance to engineers and designers in the planning and design of urban stormwater systems in Queensland. The manual includes requirements regarding the development of stormwater management strategies and stormwater management plans. Both the strategies and the plans should be consistent with the Environment Protection (Water) Policy and the Environment Protection Act.<br>• The Queensland Government has also released the Draft Urban Stormwater—Queensland Best Practice Environmental Management Guidelines 2009. These guidelines aim to assist developers, catchment manager and governments to manage urban stormwater quantity and quality.<br>• The Queensland Water Quality Guidelines 2009 includes guidelines for urban stormwater. The information includes benchmarks for urban stormwater quality.<br>• At present (November 2010) reuse of stormwater for non-potable purposes is not regulated by the Department of Environment and |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
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| | | | Resource Management or Queensland Health and so, under the Public Health Act, regulatory responsibility for public health effects from such reuse would lie with local government.<br>• Conditions for stormwater reused by a registered water service provider to augment a drinking water supply fall under the drinking water provisions of the *Water Supply (Safety and Reliability) Act 2008* (see below). |
| ***Drinking water*** | | | |
| Drinking water (metropolitan) | • Office of the Water Supply Regulation<br>• Queensland Health—Environment Health Branch (Water Quality Unit) | • *Water Supply (Safety and Reliability) Act 2008*<br>• *Water Fluoridation Act 2008*<br>• Water Fluoridation Regulation 2008<br>• *Public Health Act 2005*<br>• Public Health Regulation 2005 | • The *Water Supply (Safety and Reliability) Act 2008* includes provisions regulating drinking water quality to protect public health, and the legislation applies to service providers registered with the Department of Environment and Resource Management, including those involved in treating, transmitting or reticulating water for drinking purposes.<br>• From 2 January 2009 until an approved drinking water quality management plan is in place, drinking water services providers are required to undertake water quality monitoring and reporting activities in accordance with a notice issued by the Department of Environment and Resource Management.<br>• The requirement for service providers to have an approved drinking water quality management plan in place is being phased in from 1 July 2011.<br>• Drinking water quality management plans must be approved by the Office of the Water Supply Regulator.<br>• A provider that adds fluoride to drinking water supplies must monitor and report in accordance with the requirements of the Public Health Regulation 2005 and the Water Fluoridation Regulation 2008.<br>• Standards for drinking water quality are set by Queensland Health in the Public Health Regulation 2005 (currently limited to *Escherichia coli* and added fluoride). The Department of Environment and Resource Management 'calls up' these standards under the *Water Supply (Safety and Reliability) Act 2008* and has also adopted the health guideline levels in the |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
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| | | | Australian Drinking Water Guidelines as water quality criteria for drinking water. Any exceedance of the Queensland Health drinking water standards or the Department of Environment and Resource Management water quality criteria must be reported to the department.<br>• Queensland Health has the power under the *Public Health Act 2005* to prosecute providers that supply unsafe drinking water. |
| ***Waterway health*** | | | |
| On-site wastewater management (e.g. septic tank) | • Department of Environment and Resource Management | • *Plumbing and Drainage Act 2002* | • The *Plumbing and Drainage Act 2002* regulates sewage treatment works with a peak design capacity of less than 21 equivalent persons (DERM 2010).<br>• Systems with a peak design capacity of more than 21 equivalent persons are regulated under the *Environment Protection Act 1994*. |
| Offsite wastewater management (e.g. centralised sewage treatment plant) | • Department of Environment and Resource Management | • *Environment Protection Act 1994*<br>• Environment Protection Regulation 1998 | • Sewage treatment plants in Queensland are regulated under the *Environment Protection Act 1994* and the Environment Protection Regulation 1998 for release to the environment. The EPA regulates both the Act and regulation.<br>• Sewage treatment works with a peak design capacity of 21 equivalent persons or more require a development approval and a registration certificate as environmentally relevant activity 63—sewage treatment—under schedule 2 of the Environmental Protection Regulation 2008. |

*South Australia*

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
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| ***Recycled water*** | | | |
| On-site water recycling (e.g. household greywater system or small treatment plant) | • Department of Health<br>• Local council | • *Public Health and Environment Act 1987*<br>• Public and Environmental Health (Waste Control) Regulation 1995 | • Under the *Public Health and Environment Act 1987*, any waste that contains human waste and abattoir wastewater requires approval from the Department of Health if it is to be recycled.<br>• Local council approval is required for the installation of on-site wastewater treatment systems that service 50 equivalent persons, and all systems must be approved by the Department of Health (Power 2010). |
| Off-site water recycling (e.g. centralised sewage treatment plant) | • Department of Health<br>• Environment Protection Authority | • *Public Health and Environment Act 1987*<br>• Public and Environmental Health (Waste Control) Regulation 1995<br>• *Development Act 1993*<br>• *Environment Protection Act 1993* | • Under the *Public Health and Environment Act 1987*, any waste that contains human waste and abattoir wastewater requires approval from the Department of Health if it is to be recycled.<br>• Township schemes and private schemes are approved by the Department of Health.<br>• Local councils must obtain approval from the Department of Health for the installation of any system.<br>• EPA approval may also be required in some instances under the *Development Act 1993*. The EPA is typically involved in assessing schemes that service 50 equivalent persons or more in a sensitive area, or more than 1000 equivalent persons in a non-sensitive area. Additional oversight by EPA is required where a scheme services 100 equivalent persons or more in a sensitive area, and more than 1000 equivalent persons in a non-sensitive area.<br>• All schemes of more than 100 equivalent persons (sensitive) or 1000 equivalent persons (non-sensitive) require an authorisation under the *Environment Protection Act 1993*.<br>• The EPA can impose environmental performance agreements on operators of large recycled water schemes.<br>• SA Water provides recycled water to most of the large recycled water schemes. SA Water consults with the Department of Health in developing recycled water schemes (Power 2010). |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
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| Stormwater harvesting and reuse—potable and non-potable | • Environment Protection Authority<br>• Natural Resource Management Board<br>• Stormwater Management Authority<br>• Local council<br>• SA Water | | • Stormwater is not regulated in South Australia. However, there are regulations in the *Public Health and Environment Act 1987* for a stormwater scheme to be shut down if it is causing a public health or environmental health risk.<br>• A number of approval authorities are involved in stormwater management, relating to flood, harvesting and pollution management.<br>• In 2007, the *Local Government Act 1999* was amended to provide for the establishment of the Stormwater Management Authority. However, these provisions relate to the management of stormwater, rather than the quality of stormwater for harvesting and reuse. |
| ***Drinking water*** | | | |
| Drinking water (metropolitan and non-metropolitan) | • Department of Health | • Food Act 2001 | • In South Australia, water is defined as food under the *Food Act 2001*.<br>• The Food Act ensures that food for sale is safe and suitable for human consumption; however, it does not specify guidelines or management strategies for drinking water.<br>• The Department of Health sets directions, formulates policy and strategic planning, and monitors the performance of South Australia's health services and system. In this role, the department is responsible for the administration and enforcement of the *Food Act 2001* to ensure drinking water supplies are safe.<br>• SA Water has developed a Drinking Water Quality Management Framework, developed by the NHMRC and ADWG, and undertakes testing and reporting according to the ADWG. In metropolitan Adelaide, United Water is responsible for the management and operation of water and wastewater systems on behalf of SA Water.<br>• The *Drinking water quality annual report* is produced by SA Water to document the results of water quality testing and detail their performance against the ADWG. SA Water provides this report to the Department of Health, and makes it available to the general public. |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
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| ***Waterway health*** | | | |
| On-site wastewater management (e.g. septic tank) | • Local council | • *Public and Environment Health Act 1987*<br>• *Environment Protection Act 1993*<br>• Environment Protection (Water Quality) Policy | • The South Australian Government has a policy on Septic Tank Effluent Disposal Schemes (STEDS), which relates to wastewater disposal schemes in regional South Australia not operated by SA Water.<br>• The local council is responsible for assessing STEDS.<br>• State legislation guides the installation, licensing and operation of STEDS—this includes the *Public and Environment Health Act 1987* and the *Environment Protection Act 1993* (with further statutory requirements under the Environment Protection (Water Quality) Policy). |
| Offsite wastewater management (e.g. centralised sewage treatment plant) | • Environmental Protection Authority | • *Environment Protection Act 1993*<br>• Environmental Protection (Water Quality) Policy 2003 | • The *Environment Protection Act 1993* provides the regulatory framework to protect South Australia's environment, including water, and provides for the development of the EPA, which also administers and enforces the Act.<br>• The Environmental Protection (Water Quality) Policy 2003 is subordinate legislation supporting the Environment Protection Act. The policy provides for the development of environmental values and water quality objectives for South Australian waters. The policy outlines additional regulations for point source and diffuse pollution to ensure achievement of water quality objectives.<br>• Environmental values are the qualities of waterways that need to be protected from pollution to support healthy aquatic ecosystems and social and economic uses. Environmental values prescribed in the Environmental Protection (Water Quality) Policy 2003 are consistent with the NWQMS and determine the application of water quality criteria.<br>• Environmental authorisations are issued by the EPA under the Environment Protection Act. An environmental authorisation is required before undertaking certain prescribed activities that are outlined in Schedule 1 of the Act. Businesses operating prescribed activities of environmental significance listed in Schedule 1 of the Environment Protection Act require an environmental authorisation from the EPA (prescribed activities |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
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| | | | include those activities relating to wastewater management). Environmental authorisations can take the form of licences and works approvals.<br>• Under the Environment Protection Act, the EPA can require certain monitoring and reporting on licences. |

| Area of regulation | Approval authority or regulator | Instruments | Compliance requirements |
|---|---|---|---|
| ***Recycled water*** | | | |
| On-site water recycling (e.g. household greywater system or small treatment plant) | • Department of Justice<br>• Local government | • *Building Act 2000*<br>• Tasmania Plumbing Code<br>• Plumbing Regulations 2004 | • Under the *Building Act 2000*, on-site wastewater management systems designed with a hydraulic loading of up to 100 kilolitres per day require a Special Plumbing Permit from the permit authority (municipal council) for installation and maintenance (Power 2010).<br>• These systems, typically used in unsewered areas, are required to have a certificate of accreditation granted by the Minister for Justice and Workplace Relations under the Tasmania Plumbing Code.<br>• Council owned and operated systems and purpose-built systems do not require accreditation; however, these systems are still required to meet the same standard to obtain the required permits.<br>• Purpose-built systems need to demonstrate how they meet the performance requirements of the Tasmania Plumbing Code (Tasmania Department of Justice and the Plumbing Advisory Committee).<br>• The Tasmanian Government is in the process of reviewing the State Policy on Water Quality Management 1997. In June 2010, the Tasmanian Government released a response paper detailing its response to public submissions and outlining preferred options for the policy's future (DPIPWE 2010).<br>• The paper indicated that the preferred options for water recycling would be to 'investigate developing best practice management guidelines for the use of domestic greywater systems based on the Australian Guidelines for Water Recycling: Managing Health and Environmental Risks' (DPIPWE 2010). |
| Off-site water recycling (e.g. centralised sewage treatment plant) | • Department of Primary Industries, Parks, Water and Environment (EPA Division) | • *Environment Management and Pollution Control Act 1994* | • The Tasmanian Government, while assessing recycling proposals from plants treating over 100 kL/day, does not directly regulate water recycling schemes.<br>• Local government administers environmental, public health and food safety legislation that requires that effluent reuse activities |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
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| | • Local government | | do not cause public or environmental harm.<br>• Tasmania has recently undertaken a review of its water and sewerage industry and developed the *Water and Sewerage Industry Act 2008*.<br>• Under this legislation, water and wastewater supply systems of 29 councils have been transferred to three (council owned) regional authorities. This regulation will cover the treatment process for recycled water schemes.<br>• The Tasmanian Government is in the process of reviewing the State Policy on Water Quality Management 1997. In June 2010, the Tasmanian Government released a response paper detailing its response to public submissions and outlining preferred options for the policy's future.<br>• The paper did not make any recommendations on preferred options regarding large-scale wastewater recycling. |
| Stormwater harvesting and reuse—potable and non-potable | • Department of Primary Industries, Parks, Water and Environment | | • The Tasmanian Government has no guidelines or regulations governing stormwater harvesting and reuse.<br>• The Tasmanian Government is currently reviewing the *Drains Act 1954* to better manage land drainage, urban land drainage and stormwater drainage systems and to ensure that appropriate on-site wastewater management systems are installed in areas not serviced by reticulated sewerage networks.<br>• The Drains Act does not address issues in relation to stormwater management, such as stormwater harvesting and reuse. The Tasmanian Government is seeking public comment on the Drains Act, which may impede the ability of councils or individuals from harvesting stormwater.<br>• The Tasmanian Government is also reviewing the State Policy on Water Quality Management 1997. In June 2010, the Tasmanian Government released a response paper detailing its response to public submissions and outlining preferred options for the policy's future. Preferred options included the release finalisation and release of the Tasmanian Stormwater Management Strategy (DPIPWE 2010). |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
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| ***Drinking water*** | | | |
| Drinking water (metropolitan and non-metropolitan) | • Department of Health and Human Services | • *Public Health Act 1997*<br>• Drinking Water Quality Guidelines (2005) | • Drinking water supplies are regulated by the Department of Health and Human Services, with the Director of Public Health.<br>• The *Public Health Act 1997* provides a regulatory framework to protect and promote public health and reduce the incidence of preventable illness. In relation to drinking water, the Act requires all parties responsible for managing and supplying water to ensure it does not pose a threat to public health.<br>• The Drinking Water Quality Guidelines (2005) is a statutory instrument issued by the Director of Public Health under the *Public Health Act 1997* to protect public health and facilitate the use of the ADWG. The guidelines contain legally enforceable requirements, recommendations and information relating to the supply of drinking water.<br>• Councils and bulk water authorities are required to prepare and implement a drinking water quality management plan, monitor drinking water quality and provide an annual report to the Director of Public Health. Under the new arrangements in Tasmania, the requirements will now apply to the newly amalgamated regional water corporations.<br>• Drinking water suppliers are also required to report to the Director of Public Health on an annual basis the results of water quality testing. The reports must be written in accordance with the Drinking Water Quality Guidelines 2005.<br>• The Department of Health and Human Services issues a report on the quality of Tasmanian drinking water each year. This report summarises the results from water quality testing reports and provides information on sampling frequency, sampling results and boil water alerts.<br>• Under the Drinking Water Quality Guidelines 2005, drinking water quality management plans must be prepared by all drinking water suppliers and submitted to the Director of Public Health. These plans document physical characteristics and processes of the water supply system, identify hazards and critical control points, |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
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| | | | and document water supply management to prevent threats to public health. |
| ***Waterway health*** | | | |
| On-site wastewater management (e.g. septic tank) | • Department of Justice<br>• Local government | • *Building Act 2000*<br>• Tasmania Plumbing Code<br>• Plumbing Regulations 2004<br>• *Environmental Management and Pollution Control Act 1994* | • Under the *Building Act 2000*, on-site wastewater management systems designed with a hydraulic loading of up to 100 kilolitres per day require a Special Plumbing Permit from the permit authority (municipal council) for installation and maintenance.<br>• These systems, typically used in unsewered areas, are required to have a certificate of accreditation granted by the Minister for Justice and Workplace Relations under the Tasmania Plumbing Code.<br>• Council owned and operated systems and purpose-built systems do not require accreditation; however, these systems are still required to meet the same standard to obtain the required permits.<br>• Purpose-built systems need to demonstrate how they meet the performance requirements of the Tasmania Plumbing Code (Tasmania Department of Justice and the Plumbing Advisory Committee). |
| Offsite wastewater management (e.g. centralised sewage treatment plant) | • Environment Protection Authority (EPA Board)<br>• Department of Primary Industries, Parks, Water and Environment (EPA Division)<br>• Local government | • *Environmental Management and Pollution Control Act 1994*<br>• State Policy on Water Quality Management 1997<br>• *Land Use Planning and Approvals Act 1993* | • The Tasmanian Government and local government regulate wastewater discharge to land or water under the *Environment Management and Pollution Control Act 1994* and the *Land Use Planning and Approvals Act 1993*.<br>• The Environment Management and Pollution Control Act provides for the establishment of the Board of Environment Protection Authority (EPA Board). The EPA Board is responsible for enforcing the provisions of the Act including assessment of Level 2 activities and publication of emission limit guidelines for point source pollution under the State Policy on Water Quality Management 1997.<br>• The Department of Primary Industries, Parks, Water and Environment (EPA Division) is required to support the EPA in the management and protection of Tasmania's environment through administration and enforcement of the Environment Management |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
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| | | | and Pollution Control Act. The EPA Division also provides environmental and policy advice and develops environment protection policies.<br>• Under this Act, sewage treatment systems with a design capacity to treat an average dry-weather flow of 100 kilolitres per day or more are defined as Schedule 2 Premises. Environmental conditions for discharge are set by the EPA.<br>• If there is a discharge to the environment, the scheme must develop a development proposal and environment management plan. The plan should address public health and environment issues and where the scheme includes a recycled water component, it is necessary to be reviewed by the Wastewater Re-Use Coordinating Group.<br>• Systems that are not captured under the Environment Management and Pollution Control Act as Schedule 2 Activities may still be defined as a Level 1 Activity under the *Land Use Planning and Approvals Act 1993* and require a permit from the local municipal council.<br>• Monitoring to ensure compliance to guidelines and/or permit conditions issued by local councils or the EPA Board is required by the State Policy on Water Quality Management 1997.<br>• Councils have a duty under the Environment Management and Pollution Control Act (s. 20A) to use their best endeavours to prevent or control pollution from activities not regulated by the Environment Protection Authority. Some of the enforcement provisions of the Act may be used by councils to discharge their duty and meet the Act's objective of preventing environmental harm and nuisance. |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
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| ***Recycled Water*** | | | |
| On-site water recycling (e.g. household greywater system or small treatment plant) | • Environment Protection Authority Victoria (EPA VIC)<br>• Local council | • *Environment Protection Act 1970* | • Under the *Environment Protection Act 1970*, on-site systems in Victoria are defined by size, being less than 5000 litres, and cover the treatment and dispersal of domestic wastewater (either sewage or greywater).<br>• The Environment Protection Act covers both the disposal and recycling of wastewater.<br>• Approval to install a system resides with local government.<br>• EPA VIC maintains a list of on-site systems that may be installed in Victoria through a 'certificate of approval' system.<br>• Blackwater recycling is not encouraged where a reticulated sewerage system is in place. |
| Off-site water recycling (e.g. centralised sewage treatment plant) | • EPA VIC<br>• Department of Health (for Class A schemes) | • Environmental Protection (Scheduled Premises and Exemptions) Regulation 2007 | • Wastewater treatment plants that discharge to the environment and have a design capacity of more than 5000 litres per day are required to be approved or licensed by EPA VIC under the Environmental Protection (Scheduled Premises and Exemptions) Regulation 2007.<br>• Some schemes that meet relevant EPA VIC guidelines may be eligible for an exemption from licensing.<br>• Large schemes (more than one megalitre per day) require approval from EPA VIC and Class A schemes (where recycled water is used for purposes with a high likelihood of direct contact) require approval from both EPA VIC and the Department of Health. |
| Stormwater harvesting and reuse—potable | • EPA VIC | | • The use and required quality of stormwater is not specifically regulated in Victoria (EPA Victoria 2009).<br>• Information provided by EPA VIC indicates that stormwater should not be used for drinking or food preparation. |
| Stormwater harvesting and reuse—non-potable | • EPA VIC | • Australian Guidelines for Stormwater Harvesting and Reuse | • There are no specific laws or regulations regarding quality standards stormwater must meet. However, individuals and organisations responsible for stormwater schemes have a duty of |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
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| | | | care to make sure their scheme will not place people or the environment at risk.<br>• The quality of stormwater and the associated management controls need to be proportional to the level of risk—the more likely it is that stormwater will place people or the environment at risk, the higher the water quality and more stringent the management controls need to be.<br>• There are regulations regarding the construction of stormwater schemes or the right to harvest stormwater.<br>• EPA VIC recommends that where two or more households or commercial, industrial and community premises have a stormwater scheme that the Australian Guidelines for Stormwater Harvesting and Reuse are followed (EPA Victoria 2009). |
| ***Drinking water*** | | | |
| Drinking water (metropolitan and non-metropolitan) | • Health Protection Branch of the Department of Health (Safe Drinking Water Regulatory Section) | • *Safe Drinking Water Act 2003*<br>• Safe Drinking Water Regulations 2005 | • The *Safe Drinking Water Act 2003* provides a state-wide regulatory framework that covers drinking water supplied by the state-owned water businesses. The Act requires water businesses to:<br>– develop and implement risk management plans<br>– comply with standards for drinking water<br>– publicly disclose relevant water quality information.<br>• Regular reporting (monthly and annually) of water quality results is required under the Act. Water businesses must notify the Secretary to the Department of Health where there is any known or suspected contamination of drinking water (s. 22) and if there are any breaches of water quality standards (s. 18). |
| ***Waterway health*** | | | |
| On-site wastewater management (e.g. septic tank) | | • *Environment Protection Act 1970* | • Under the *Environment Protection Act 1970*, on-site systems in Victoria are defined by size, being less than 5000 litres, and cover the treatment and dispersal of domestic wastewater (either sewage or greywater).<br>• The Environment Protection Act covers both the disposal and recycling of wastewater. |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
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| Offsite wastewater management (e.g. centralised sewage treatment plant) | • EPA VIC | • *Environment Protection Act 1970* | • The *Environment Protection Act 1970* was introduced to provide a legal framework for the protection of the environment and established EPA VIC.<br>• Each water business must have a licence with EPA VIC to cover the discharge of wastewater into the environment.<br>• Under its new 'corporate licence' program, each water business will have a single licence with EPA VIC to cover all of its wastewater facilities. Previously, a separate licence was required for each wastewater facility.<br>• The corporate licence sets out a number of requirements covering:<br>– a joint, public commitment by EPA VIC and the water business to increase sustainability of the water business<br>– performance requirements for the water business to meet<br>• Under the licence provisions, water businesses must regularly sample and monitor wastewater and alert EPA VIC after specified incidents or non-compliance.<br>• A corporate licence also includes a requirement to submit an annual performance statement to EPA VIC. |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
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| ***Recycled water*** | | | |
| On-site water recycling (e.g. household greywater system or small treatment plant) | • Water Unit, Department of Health<br>• Local government | • *Health Act 1911*<br>• Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974<br>• Code of Practice for the Reuse of Greywater in Western Australia | • The *Health Act 1911* regulates wastewater management and Part IV outlines sanitary provisions. The Act covers any waste management system that is not connected to a sewer.<br>• A wastewater system serving a single dwelling on a single plot or producing less than 540 litres per day requires local government approval and the system installed must be approved by the WA Department of Health, who maintains a list of approved systems.<br>• The requirements for approval are specified in the Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974.<br>• The use of greywater in sewered and unsewered areas is covered by the Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974 and detailed in the Code of Practice for the Reuse of Greywater in Western Australia.<br>• Applications for large on-site recycling systems in unsewered areas come directly to the WA Department of Health, and require approval from the Executive Director of Health if intended to serve a building that is not a single dwelling and produces more than 540 litres per day. |
| Off-site water recycling (e.g. centralised sewage treatment plant) | • Department of Environment and Conservation<br>• Water Unit, Department of Health | • *Environmental Protection Act 1986* | • The *Environmental Protection Act 1986* requires that wastewater treatment plants with an output greater than 100 cubic metres per day require a works approval for the infrastructure and an operating licence to discharge to the environment. The process should note that it is a recycled water scheme and whether it can meet the requirements.<br>• Applications are also provided to the Department of Health for comment.<br>• The licence specifies conditions for discharge. |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
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| Stormwater harvesting and reuse—potable and non-potable | • Department of Water<br>• Local government | • Stormwater Management Manual for Western Australia (Department of Water 2004–2007) | • The Stormwater Management Manual for Western Australia 2007 provides guidance on stormwater management (Department of Water and Swan River Trust 2007). One of the key stormwater management objectives is to maintain or improve surface water and groundwater quality.<br>• The guidelines are based on relevant methodologies and learnings from other national and state and territory stormwater management guidelines, including the National Water Quality Management Strategy: Australian Guidelines for Urban Stormwater Management.<br>• The stormwater guidelines require the development of stormwater management plans at the local government or catchment area level. |
| ***Drinking water*** | | | |
| Drinking water (metropolitan and non-metropolitan) | • Department of Health | • *Health Act 1911*<br>• State Planning Policy 2.7 – Public Drinking Water Source<br>• Australian Drinking Water Guidelines (1996)<br>• *Metropolitan Water Supply, Sewerage and Drainage Act 1909*<br>• *Country Areas Water Supply Act 1947* | • The Department of Health, under the *Health Act 1911*, is responsible for administering statutory processes to promote adequate sewage treatment and protection and maintenance of safe recreational and drinking water. Memorandums of understanding for drinking water are established between the Department of Health as the regulator of drinking water quality and the water service provider. The Department of Health audits the water service provider's water quality, data and reporting systems and provides for the development of a drinking water quality framework.<br>• The State Planning Policy 2.7 – Public Drinking Water Source (prepared under the *Town Planning and Development Act 1928* (s. 5aa)) seeks to protect and manage public drinking water source areas from incompatible land uses and pollution in order to maintain the quality of the drinking water. Land uses that are detrimental to the quality and quantity of the water supply will not be permitted unless it can be demonstrated that such impact can be managed. The policy seeks to ensure that priority is given to the protection of the highest quality drinking water through provisions in the Metropolitan Region Scheme and local government town planning schemes. |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
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| | | | • The Department of Health has adopted the Australian Drinking Water Guidelines (1996).<br>• In addition to the legislation under the Department of Health, the *Metropolitan Water Supply, Sewerage and Drainage Act 1909* and *Country Areas Water Supply Act 1947* provide powers necessary to legally define the boundary of the drinking water source. They also provide by-laws that allow the state to protect the water quality of these sources. These laws are administered by the Department of Water.<br>• The current review of water legislation will look to develop a single Act under which the protection of drinking water sources can be achieved. This will remove inconsistencies related to having two Acts (the *Metropolitan Water Supply, Sewerage and Drainage Act 1909* and *Country Areas Water Supply Act 1947*) for the protection of drinking water quality. |
| ***Waterway health*** | | | |
| On-site wastewater management (e.g. septic tank) | • Department of Health | • Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974 | • Sewage system installations are permitted only with local government or Department of Health approval (the Department of Health assesses larger development proposals). Persons wishing to install septic tank systems with leach drains/soakwells or an aerobic treatment unit need to lodge an Application to Construct or Install an Apparatus for the Treatment of Sewage with the relevant local government.<br>• It is an offence to install a wastewater system without an approval and it is also an offence to commission a system before a final inspection and approval to use from the local government.<br>• Applications to construct or install an apparatus for the treatment of sewage are required by the Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974.<br>• Onsite treatment and disposal of effluent systems will not be approved if a property can be reasonably connected to sewer. |

| *Area of regulation* | *Approval authority or regulator* | *Instruments* | *Compliance requirements* |
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| Offsite wastewater management (e.g. centralised sewage treatment plant) | • EPA Western Australia<br>• Department of Environment and Conservation | • *Environmental Protection Act 1986*<br>• Environmental Protection Regulations 1987<br>• *Swan and Canning Rivers Management Act 2006*<br>• Swan and Canning Rivers Management Regulations 2007 | • The *Environmental Protection Act 1986* provides for the formation of the EPA Western Australia. It also provides for the prevention, control and abatement of pollution and environmental harm and for the conservation, preservation, protection, enhancement and management of the environment.<br>• The Environmental Protection Regulations 1987 provides detail on the administration and enforcement of licences and licence conditions including monitoring requirements. Schedule 1 of the Regulations lists prescribed premises that must be registered and licensed under the *Environmental Protection Act 1986*.<br>• There is also legislation for the Swan and Canning rivers—*Swan and Canning Rivers Management Act 2006* and Swan and Canning Rivers Management Regulations 2007. The Act is the primary legislation for the protection of the Swan and Canning rivers, while the Regulations specify fines and penalties for unauthorised and unlawful activities and structures and for permit requirements for allowed activities on the river banks and the water.<br>• The Department of Environment and Conservation regulates wastewater discharges and promotes, protects and manages biodiversy.<br>• Environmental quality objectives are developed by the Department of Environment and Conservation. These are measurable indicators of physical, chemical or biological characteristics needed to be achieved to protect beneficial uses of a waterway. |

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