



# 2015 Water, Sewerage and Irrigation Performance Report

February 2016

**Economic Regulation Authority**

WESTERN AUSTRALIA

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## Key Points

- Properties connected to a water supply reached 1 million for the first time; connections in Perth grew by 2.7% (to 808,000) and regional town connections grew by 1.4% (to 213,000).
- In 2015, 46.4% of total drinking water was sourced from groundwater, followed by desalination at 30.3%.
- Desalination is now established as the second drinking water source for Perth.
- Annual residential water consumption fell across the State; Perth consumption fell by 3.9% (from 254kL to 244kL per property), and the regional town average consumption fell by 3.6% (from 308kL to 297kL per property).
- The use of recycled water fell across the state in 2015; recycled water supplied in Perth was down 6.7%, and in regional towns by 15.8%.
- Water mains breaks in Perth reached a six year peak of 15.0 per 100km of main.
- The average frequency of unplanned water supply interruptions were higher in Perth: up from 286 to 314 per 1,000 properties.
- Complaints about water remain close to, or at, record low levels; sewerage complaints reached a new record low in 2015.
- A drier than usual wet season contributed to Ord Irrigation Cooperative supplying 53% more water to their customers in 2015, reversing a long-term decline in supply volumes.

## Overview

The 2015 Water, Sewerage and Irrigation Performance Report is the latest in a series of annual reports<sup>1</sup> published by the Economic Regulation Authority (**ERA**) that examines the potable (drinking) and non-potable water, sewerage and irrigation supply schemes in the State.

The report covers the 32 drinking water schemes and 22 sewerage schemes that supply more than 1,000 connected properties. The report also examines the performance of the State's two largest irrigators. The ERA separately publishes on its website the performance of the smaller service providers in the form of a set of data tables.<sup>2</sup>

The purpose of this report is to bring transparency and accountability to the performance of the larger water, sewerage and irrigation service providers, with a particular focus on examining the level of service provided to customers over time.

<sup>1</sup> Each report covers the year ending 30 June.

<sup>2</sup> <http://www.erawa.com.au/licensing/water-licensing/licence-statistics>

# Water Supply

## Sources of Water

***Groundwater continues to be the dominant source of drinking water, but in Perth desalination is now the second source of drinking water***

Between 2014 and 2015, the state-wide total volume of water sourced was 394GL, an increase of 1% on the previous year: the total volume of urban water supplied in Perth decreased by 0.6% (to 258GL), and water supplied in regional towns increased by 2.1% (to 96GL).

In 2015, the proportion of Perth's water sourced from groundwater was 40.9% (down from 42.1% in 2014), closely followed by desalination 40.0% (up from 38.1% in 2014). The percentage of Perth's water sourced from surface water reached a six year low in 2015, at 15.9% of the total. The increasing use of desalinated water in Perth is a key element of the State Government's climate-independent water security strategy.

In regional towns, just over 90% of sourced water came from groundwater (63.5 %) and bulk water<sup>3</sup> (28.5%) in 2015. The remaining water was sourced from surface water<sup>4</sup> (3.3%) and recycled water (4.8%).

## Residential Water Consumption

***Average annual residential water consumption was lower***

The annual residential water consumption per property varies widely across the State, reflecting the variation in climate. Northern towns with higher average temperatures have higher consumption levels than towns in the cooler south-west of the State. Between 2014 and 2015, average annual water consumption per property in Perth fell, by 3.9% (from 254kL to 244kL), while the regional town average was down by 3.6% (from 308kL to 297kL).

## Water Network Expansion

***Water supply networks continued to grow***

### *Property Connections*

Between 2014 and 2015, the total number of properties connected to water mains grew by 2.4%, to reach 1.021 million properties. The number of connections in Perth and regional towns grew by 2.7% (to 808,000 properties) and 1.4% (to 213,000 properties), respectively.

### *Water Mains*

Between 2014 and 2015, the length of water mains in Perth grew by 2.2% (to 14,162km), and water mains in regional towns grew by 2.4% (to 5,719km).

<sup>3</sup> Bulk water is water that is received from another utility or entity outside the reporting utility's geographic area of responsibility.

<sup>4</sup> Surface water is water abstracted from sources such as dams or rivers.

## Water Main Breaks

### ***Water mains breaks in Perth reach a six year peak***

Compared to 2014, the level of mains breaks in Perth increased by 15.4%, to reach a six year peak of 15.0 breaks per 100 km of main in 2015. The level of mains breaks in 2015 was 15% above the average of the previous five years (13.0 per 100km of main).

## Water Supply Interruptions

### ***Average frequency of unplanned supply interruptions were higher***

The average frequency of unplanned supply interruptions was higher in Perth: between 2014 and 2015, the frequency of interruptions was up from 286 to 314 per 1,000 properties. The average frequency of interruptions in regional towns was down from 397.7 to 376.9 per 1,000 properties.<sup>5</sup>

Between 2014 and 2015, the average duration of an unplanned supply interruption was lower in Perth (down from 117 to 96 minutes), but the regional town average was higher (up from 88.4 to 120.6 minutes).

## Water Complaints

### ***Water service complaints and water quality complaints remain low***

In 2015, water quality complaints and water service complaints in Perth both remained at record low levels, at 0.1 and 0.3 complaints per 1,000 properties, respectively. The result in regional towns was mixed; the regional town average for water quality complaints remained at the record low level of 0.1 per 1,000 properties, while water service complaints rose to 0.2 complaints per 1,000 properties.

The three water utilities reporting on water complaints, Aqwest, Busselton Water and Water Corporation, attribute the historically low number of complaints they are reporting to changes in the methods used to separate customer enquiries from complaints.

## Sewerage Services

## Sewage Collected and Recycled

### ***Regional towns recycled over half of their sewage effluent in 2015***

Most of the State's towns recycle at least some proportion of their treated sewage effluent (wastewater). In 2015, the regional towns recycled, on average, 54% of

<sup>5</sup> It is not possible to compare water supply interruption frequency or the average duration of water supply interruptions with the years prior to 2014 because mains to meter interruptions were excluded from the calculation of interruption frequency and supply interruption duration.

sewage effluent. In Perth, Water Corporation recycled 7.0% of sewage effluent, a similar result to 2014.

### ***The total volume of recycled wastewater supplied is down in 2015***

Compared to 2014, the state-wide total volume of recycled water supplied fell by 11.6%, (down from 22GL in 2014 to 19.4GL in 2015), comprising a 15.8% decrease in water supplied in regional towns and a 6.7% decline in water supplied in Perth.

The largest user of recycled water was the commercial, municipal and industrial sector (49.8%), followed by the agricultural sector (25.9%) and onsite reuse (14%).

## **Sewerage Network Expansion**

### ***Customer growth leads to network expansion and increased sewer connections***

The total length of sewer mains and channels in Perth grew by 3.6% (up from 11,637 km in 2014 to 12,053km in 2015) and by 4.8% in regional towns (up from 3,467km in 2014 to 3,635km in 2015).

In 2015, the state-wide total number of connected sewerage properties grew by 2.5%. Perth recorded an increase of 2.6% (up from 713,000 in 2014 to 731,400 in 2015), and regional towns grew by 1.9% (from 156,000 in 2014 to 159,000 in 2015).<sup>6</sup>

## **Sewerage Complaints**

### ***Sewerage service complaints fall to a new record low***

The number of sewerage service complaints in Perth and the regional town average, have continued the long-term downward trend that started in 2012. Between 2009 and 2015, the level of sewerage service complaints in Perth has fallen from 6.2 to less than 0.1<sup>7</sup> per 1,000 properties, while the regional town average has fallen from 7.5 to 0.1 per 1,000 properties. The reasons behind the reduction in complaints are discussed under Water Complaints.

## **Irrigation Services**

This section of the report details the performance of the State's two largest irrigators: Harvey Water,<sup>8</sup> who operate three irrigation networks in areas around Harvey in the south west, and Ord Irrigation Cooperative, who supply customers in the area to the south of Kununurra.

### ***Water Supply***

### ***Mixed results for the State's two largest irrigators in 2015***

<sup>6</sup> For the towns covered by this report, there are less sewerage connected properties than there are water connected properties. The difference between the two is because not all properties are connected to sewer mains, instead the property is served by an on-site septic tank.

<sup>7</sup> The actual value is 0.045 per 1,000 connected properties.

<sup>8</sup> Harvey Water is the trading name of the South West Irrigation Management Cooperative (SWIMCO).

The volume of water supplied by Harvey Water fell from 56.3GL in 2014 to 52.4GL in 2015, a 6.9% reduction. Prior to 2014, the volume of water supplied by Harvey Water followed a downward trend because of the reduced water allocations and a contraction in the local dairy industry. The increase in water allocations in 2014 reversed the downward trend, but this has not carried forward into 2015.

Between 2014 and 2015, the volume of water supplied by Ord Irrigation increased by 53%, to reach a six year high of 146.5GL. The increase in supply volumes in 2015 reversed a five year downward trend that saw the annual volume of water supplied fall below 100GL for the first time in 2014.<sup>9</sup> Ord Irrigation has attributed the increase in 2015 to a drier than usual wet season, which required the supply of more irrigated water for agricultural purposes.<sup>10</sup>

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<sup>9</sup> Water supplied in 2014 was 95.8GL.

<sup>10</sup> Ord Irrigation Cooperative is located near Kununurra in the Kimberley region of Western Australia. Kununurra's wet season normally begins October each year and runs to around the following April.

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## Purpose of the Report

The purpose of this report is to bring transparency and accountability to the performance of the providers of water, sewerage and irrigation services in Western Australia.

This is the latest in a series of annual reports that examine the performance of water, sewerage and irrigation service providers in Western Australia that has been published by the ERA.

This report focuses on water service supply schemes (towns) with greater than 1,000 connected properties (see Parts A and B for details of these schemes). Data for water service schemes with less than 1,000 connected properties can be found on the ERA's website.<sup>11</sup>

The Economic Regulation Authority (**ERA**) is the independent economic regulator for Western Australia.

The ERA licenses providers of gas, electricity and water services and monitors compliance with licensing conditions and other related regulatory obligations. The ERA also assesses the terms and conditions, including prices, offered by owners of monopoly infrastructure to third parties in the gas, electricity and rail industries.

In addition, the ERA has oversight of the gas retail market scheme and monitors the behaviour of participants in the wholesale electricity market.

The objectives of this report are to:

- report on the performance of water, sewerage and irrigation supply schemes operated by Western Australian water service providers that are licensed by the ERA;
- highlight comparative performance outcomes for the different towns covered by the report; and
- examine service performance over time.

Throughout the report, the term 'all towns' refers to all of the towns that are captured by the indicator in question, including Perth. The term 'regional towns' means all of the towns and cities that are captured by the indicator in question, excluding Perth.

Reference to a year in the report should be read as the 12-month period ending 30 June in that year.

<sup>11</sup> <http://www.erawa.com.au/licensing/water-licensing/licence-statistics>

## Background

### Water Services Licences

There are four classes of water service that require a licence:

- water supply services (covers both potable and non-potable services)
- sewerage services
- irrigation services, and
- drainage services.

A licence may be granted for more than one class of service, e.g. a sewerage and water supply licence may be granted to a sewerage service provider to enable them to supply recycled effluent.

The licence specifies the area(s) of the State in which the service is to be provided. Where a licence covers more than one service it is possible for the operating area for each service to be different.

Prior to 17 November 2013, the *Water Services Licensing Act 1995* (**1995 Act**) was the legislation regulating the water services licensing scheme. From 18 November 2013, the *Water Services Act 2012* (**2012 Act**) repealed and replaced the licensing provisions in the 1995 Act.

Part 2 of the 2012 Act requires service providers to obtain a licence to provide a water service, and outlines the duties of licensees. The latter includes the obligation to provide services in accordance with the licence.

Part 2 also sets the requirement for regular independent audits of the licensee's compliance with the licence, and audits of the effectiveness of the system used to manage the assets covered by the licence.

Section 12(s) of the 2012 Act makes provision for licences to include conditions requiring licensees to provide information to the ERA relevant to the ERA's functions under the Act. Water supply, sewerage, irrigation and drainage licences include conditions requiring the licensee to provide to the ERA non-financial performance data on an annual basis.

The non-financial performance reporting data to be provided to the ERA by licensees is specified in the ERA's *Water, Sewerage and Irrigation Performance Reporting Handbook* (**Reporting Handbook**).

## Current Structure of Water Services Industry in WA

There are 34 licensed water service providers in the State:

- Aquasol Pty Ltd: W, S
- Bunbury Water Corporation (trading as **Aqwest**): W (potable)
- Busselton Water Corporation (trading as **Busselton Water**): W (potable)
- Hamersley Iron: W, S
- Moama Lifestyle Villages Pty Ltd: W (non-potable), S
- Peel Water: W, S
- Robe River Mining Company: W (potable), S
- Rottnest Island Authority (RIA): W, S, D
- Shire of Denmark: W (non-potable)
- Water Corporation: W, S, I, D
- 19 local government authorities: W (non-potable), S
- Gascoyne Water Cooperative (Gascoyne Water) W (non-potable), I
- South West Irrigation Management Cooperative (Harvey Water) W (non-potable), I
- Ord Irrigation Cooperative (Ord Irrigation) W (non-potable), I
- Preston Valley Irrigation Cooperative (Preston Valley): W (non-potable), I.
- WA Sewage: W (non-potable), S

Key:

W = Water supply services  
S = Sewerage services  
I = Irrigation services  
D = Drainage services

The four largest water services providers in the State are Aqwest (in Bunbury), Busselton Water, City of Kalgoorlie-Boulder and Water Corporation.

Water Corporation was established by the *Water Corporations Act 1995* and it is owned by the Western Australian Government. They are the State's largest water service provider, servicing over 1.2 million connected properties, and managing \$16.2 billion of water supply, sewerage, drainage and bulk water (for irrigation) assets.<sup>12</sup>

Aqwest and Busselton Water both became corporations in November 2013.<sup>13</sup> They service approximately 17,000 and 12,500 connected properties, and manage water supply assets of approximately \$88.6 million and \$65 million, respectively.

The City of Kalgoorlie-Boulder provides sewerage services to the town of Kalgoorlie-Boulder. The City services approximately 15,000 connected properties and manages approximately \$22.4 million in sewerage and water assets.

## Performance Reporting Obligations

### National Water Initiative Agreement

In April 2006, Western Australia became a signatory of the National Water Initiative Agreement (NWI Agreement), joining the Commonwealth and the other States and Territories.

Under the NWI Agreement, the signatories agreed to report independently, publicly and on an annual basis, benchmarking data on the pricing and service quality of urban and rural water delivery agencies. The signatories to the NWI Agreement have developed

<sup>12</sup> Water Corporation Annual Report 2014, accessed on 11 November 2015.

<sup>13</sup> Until November 2013, Aqwest and Busselton Water were government statutory authorities operating under the *Water Boards Act 1904* (1904 Act). Following amendments to the 1904 Act, both Aqwest and Busselton Water became corporations, although they continue to trade under the same names.

performance reporting frameworks for urban utilities (**Urban Framework**) and for rural water delivery agencies (**Rural Framework**).

The States and Territories are represented in the NWI by the agencies that are responsible for regulating water supply services in that jurisdiction. The ERA performs the roles of both the Data Coordinator and Audit Coordinator for Western Australia.

The original signatory representing the Commonwealth in the NWI was the National Water Commission (**NWC**). In September 2014, the Australian Government made a decision to introduce the *National Water Commission (Abolition) Bill 2014* which was passed in June 2015. The responsibility to administer the Urban Framework was transferred solely to the Bureau of Meteorology (**BOM**). Concurrently, the parties to the NWI Agreement decided to discontinue reporting against the Rural Framework because of the limited ability to compare the performance of the rural water service providers covered by the Framework.

The Urban Framework comprises a handbook with performance indicators and definitions, which are revised and published annually. Further information on the NWI Agreement and the Urban Framework can be found on the NWC's website.<sup>14</sup>

The Urban Framework captures all urban utilities that service 10,000 or more connected properties. In Western Australia there are four licensees that are captured by the Urban Framework: Aqwest (water only), Busselton Water (water only), City of Kalgoorlie-Boulder (sewerage only) and the Water Corporation (water and sewerage).<sup>15</sup>

The licences of the service providers that are captured by the NWI Urban Framework include a condition requiring these licensees to provide the ERA with annual performance data in accordance with the Framework.

## Water Performance Reporting Handbook

The Reporting Handbook that was current during the 2015 reporting period was published by the ERA in May 2015. The Reporting Handbook sets out standard performance reporting obligations for each type of supply service: potable water, non-potable water, sewerage and irrigation.<sup>16</sup>

In the case of service providers that are captured by the Urban Framework, the reporting requirements are aligned with the Framework. The ERA has also published MS Excel workbooks to collect data from the service providers.

<sup>14</sup> <http://nwc.gov.au/publications/topic/nprs>

<sup>15</sup> The Water Corporation services eight towns that are captured by the Urban Framework: Albany, Australind/Eaton, Bunbury (sewerage only), Busselton (sewerage only) Geraldton, Kalgoorlie-Boulder (water only), Mandurah and Perth.

<sup>16</sup> Drainage licences include service and performance standards in relation to drainage services, however, licensees are not required to include these in their annual licence performance report.

## **PART A: WATER PERFORMANCE INFORMATION**

## Covered Water Supply Schemes

Water supply schemes with greater than 1,000 connected properties in Western Australia are:

Albany Scheme	Denmark	Kalgoorlie-Boulder	Narrogin
Australind-Eaton	Derby	Karratha	Newman
Bridgetown-Hester	Dongara -Denison	Katanning	Northam
Broome	Dunsborough	Kununurra	Perth
Bunbury	Esperance	Mandurah Scheme	Pinjarra
Busselton	Geraldton	Manjimup	Port Hedland
Carnarvon	Harvey-Wokalup	Margaret River Scheme	South Hedland
Collie	Jurien	Merredin	York

With the exception of Bunbury and Busselton, which are supplied by Aqwest and Busselton Water respectively, the abovementioned town water supply schemes are supplied by the Water Corporation.

Water is supplied from a number of different sources, which comprise the following:

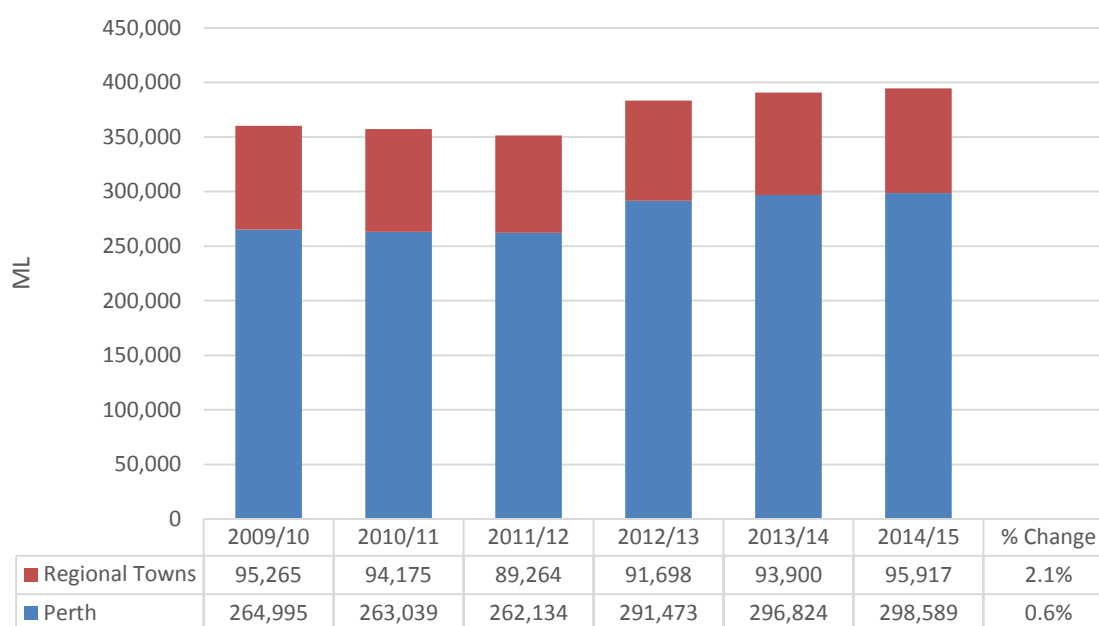
- **Groundwater** - potable and non-potable water abstracted from aquifers and other 'below ground' water sources. This excludes volumes sourced from groundwater supplies that have been artificially recharged using sources of water that have been counted elsewhere i.e., from rivers, desalination plants or sewage plants (recycling).
- **Surface water** - potable and non-potable water abstracted from surface water sources such as dams, rivers or irrigation channels.
- **Desalination** - potable and non-potable water sourced from desalination plants.
- **Bulk supplier** - potable and non-potable water purchased from another utility or entity outside a utility's geographic area of responsibility. The volume of water may include water which is subsequently exported (sold) to another utility.
- **Recycling** - treated effluent that is used by either the water utility itself, a business supplied by the water utility, or supplied through a third party pipe system for urban reuse.

## Sources of Water

Total sourced water includes water abstracted from water sources that include surface water, groundwater, desalination, recycled water and water received from a bulk supplier. The difference between sourced and supplied water is caused by the water loss due to water main breaks and leaks in the network, as well as metering inaccuracies.

**Figure 1** shows that, compared to 2014, total water sourced for all towns in 2015 increased by just 1.0% (from 390,724ML to 394,506ML), comprising a 0.6% rise in water sourced for Perth, and a 2.1% rise in water sourced for regional towns.

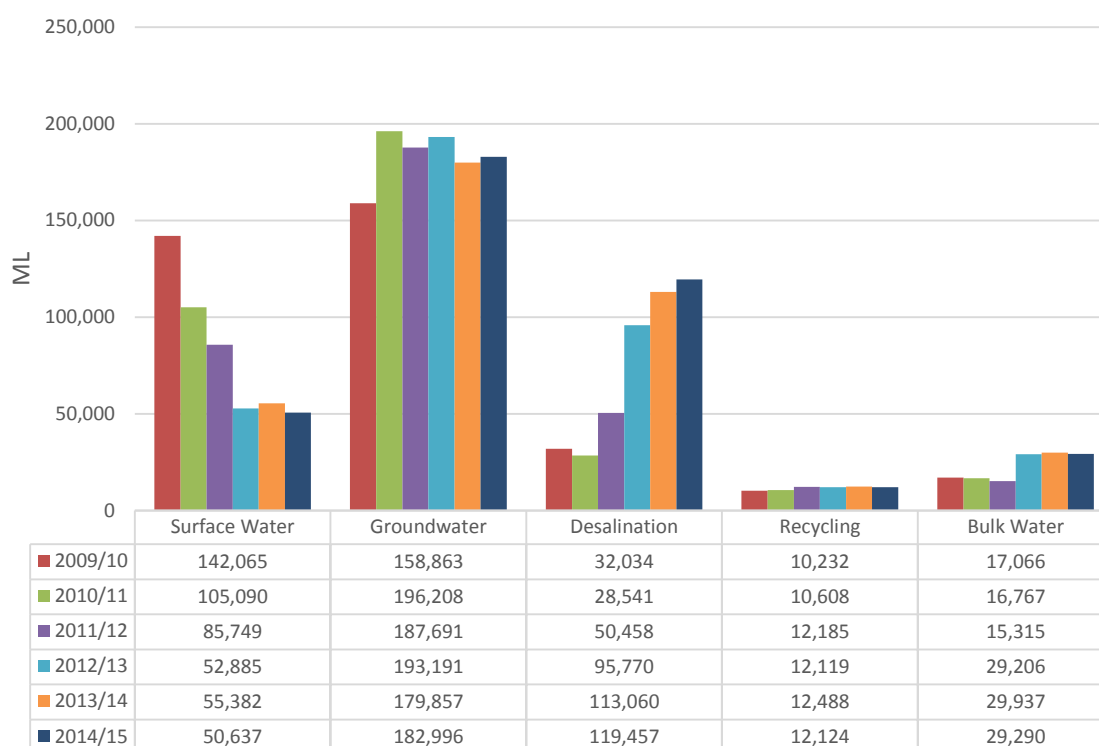
**Figure 1: Total volume of water sourced from all sources**



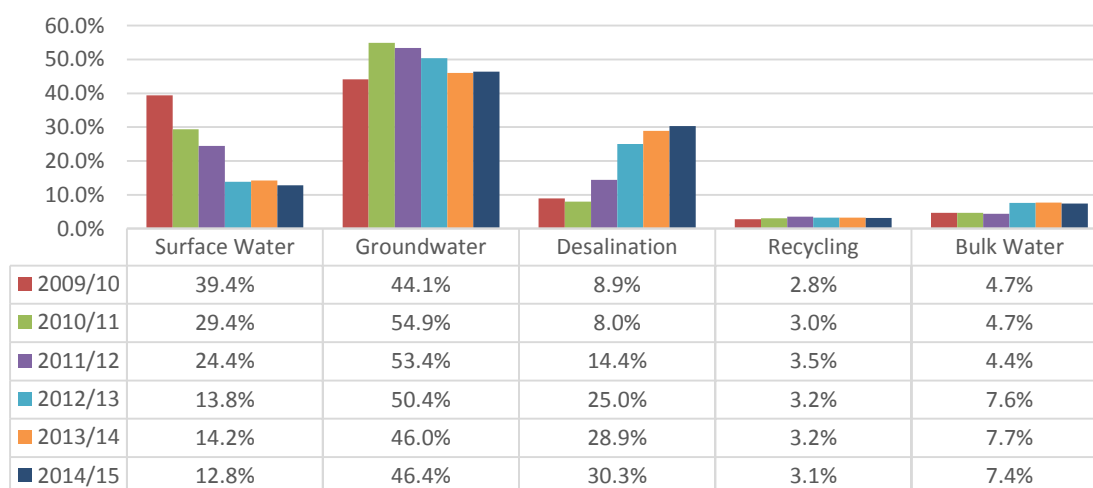
**Figure 2** and **Figure 3** detail the sources of water for all towns.

**Figure 2** shows that, between 2014 and 2015, the volume of water sourced from surface water decreased from 55.4GL to 50.6ML. Since 2010 the total volume of surface water (for all towns) has fallen by 91GL.

Water sourced from groundwater increased by 3.1GL between 2014 and 2015, while 2015 was the fourth consecutive year where water sourced from desalination increased markedly (up by 5.7% in 2015). The increased volume of water sourced from desalination served to offset the fall in the volume of water sourced from surface water and to meet increased demand.

**Figure 2: Sources of water by volume (all towns)**

**Figure 3** shows that, in 2015, desalinated water accounted for almost one third of the water sourced (30.3%), which is up from 28.9% in 2014. The aggregate capacity of Water Corporation's seawater desalination plants at Binningup and Kwinana is 145GL per annum, which is equivalent to 37% of total sourced water in 2015. The proportion of water sourced from surface water fell from 14.2% in 2014 to 12.8% in 2015, while the proportion of water sourced from groundwater, recycling and bulk water were relatively unchanged.

**Figure 3: Sources of water by percentage (all towns)**

**Figure 3** shows that groundwater continues to be the dominant source of drinking water; over the past six years, groundwater has supplied on average just over half of the total annual water sourced.<sup>17</sup> Desalination has overtaken surface water as the second largest

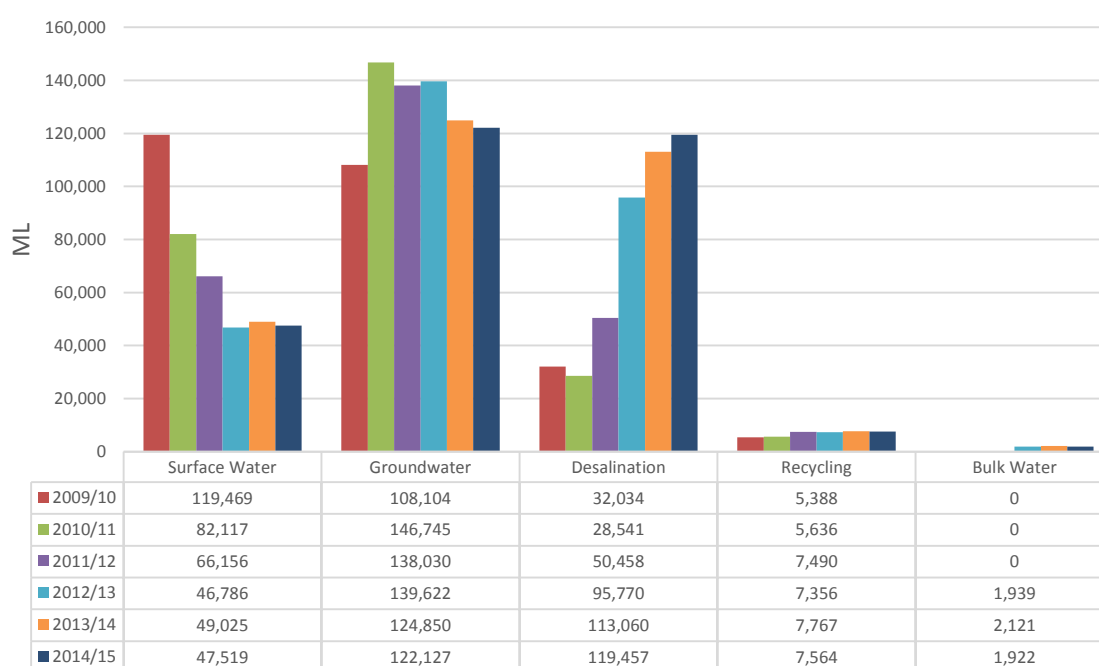
<sup>17</sup> The proportion of water sourced from groundwater was 51.5% in 2008/09.

source of the State's drinking water; a reflection of the State's drying climate. Water sourced from desalination is used to supply Perth's drinking water.<sup>18</sup>

**Figure 4** and **Figure 5** focus on the sources of drinking water for Perth. Groundwater continues to be the dominant source of water for Perth's drinking water supply. While in 2014 groundwater supplied 42.1% of Perth's drinking water, by 2015 this had fallen to 40.9% of the total. Water sourced from desalination is now established as the second largest source of Perth's drinking water, water sourced from desalination increased by 5.7% in 2015, and now accounts for 40% of the total.<sup>19</sup>

The shift away from surface water towards desalination as a source of drinking water is the result of the Government's water security strategy designed to tackle the effects of the State's drying climate.

**Figure 4: Sources of water by volume (Perth only)**



Recycling is another important climate independent source of water. **Figure 5** shows that the percentage of Perth's water sourced from recycling has fallen slightly, from 2.6% in 2014 to 2.5% in 2015.

The volume of water sourced from recycled water is expected to rise when the Water Corporation brings its new groundwater replenishment plant into service in 2016. Stage 1 of the project will be capable of recharging up to 14GL of water into underground aquifers, with the potential to double the output from now to 28GL in future years.<sup>20</sup> The State

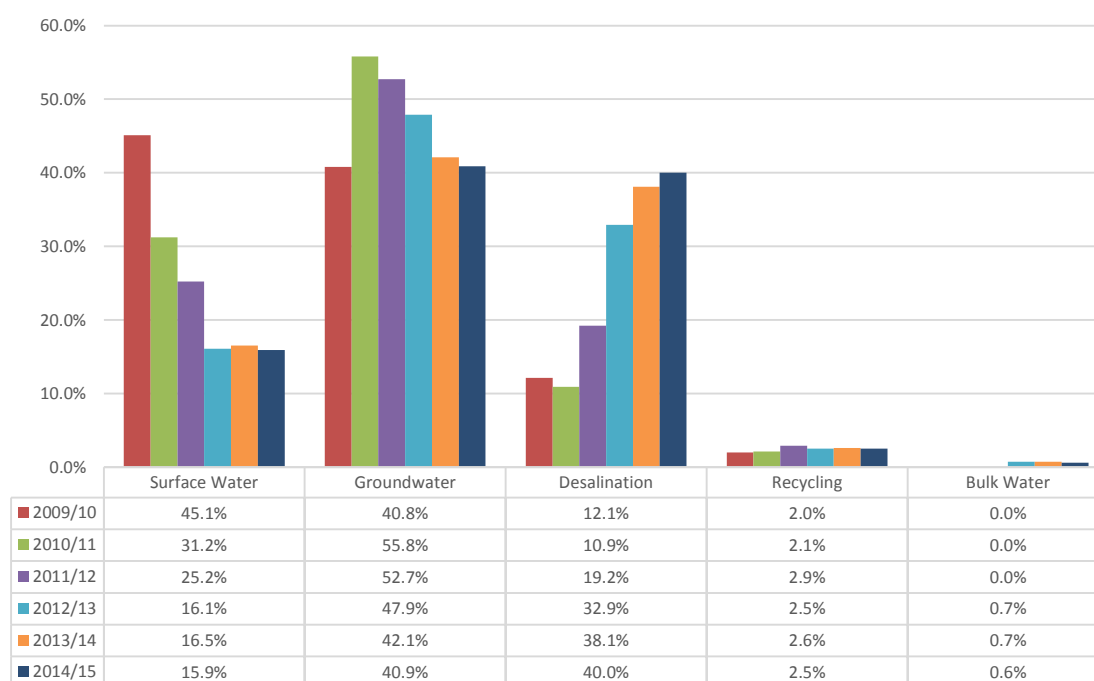
<sup>18</sup> The water from Water Corporation's two desalination plants is fed into the Integrated Water Supply Scheme, which also supplies water to Mandurah. But, as it is not possible to accurately estimate the proportion of desalinated water that is supplied to Mandurah, the total produced water is deemed to be supplied to Perth.

<sup>19</sup> Water Corporation informed the ERA in 2013 that the use of groundwater, desalinated and surface water has not changed drastically, but there has been a change how it is measured. If groundwater or desalinated water was not sent directly to customers, it was "banked", i.e. stored in the dams. When the water was used from the dams, it was reported as surface water, not groundwater or desalinated water. This led to an under reporting of the usage of groundwater and desalinated water and an over reporting of surface water. Water Corporation's new methodology identifies the different sources of water.

<sup>20</sup> Water Corporation website, Perth Groundwater Replenishment Plans Doubled, accessed on 15 December 2015.

Government has acknowledged the potential for recycled water to supply up to 20% of Perth's drinking water by 2060.<sup>21</sup>

**Figure 5: Sources of water by percentage (Perth only)**



**Figure 6** and **Figure 7** detail the sources of drinking water for regional towns. Groundwater is the dominant source of water in regional towns; in 2015, drinking water sourced from groundwater reached 63.5% of the total volume, which is an eight year high.<sup>22</sup>

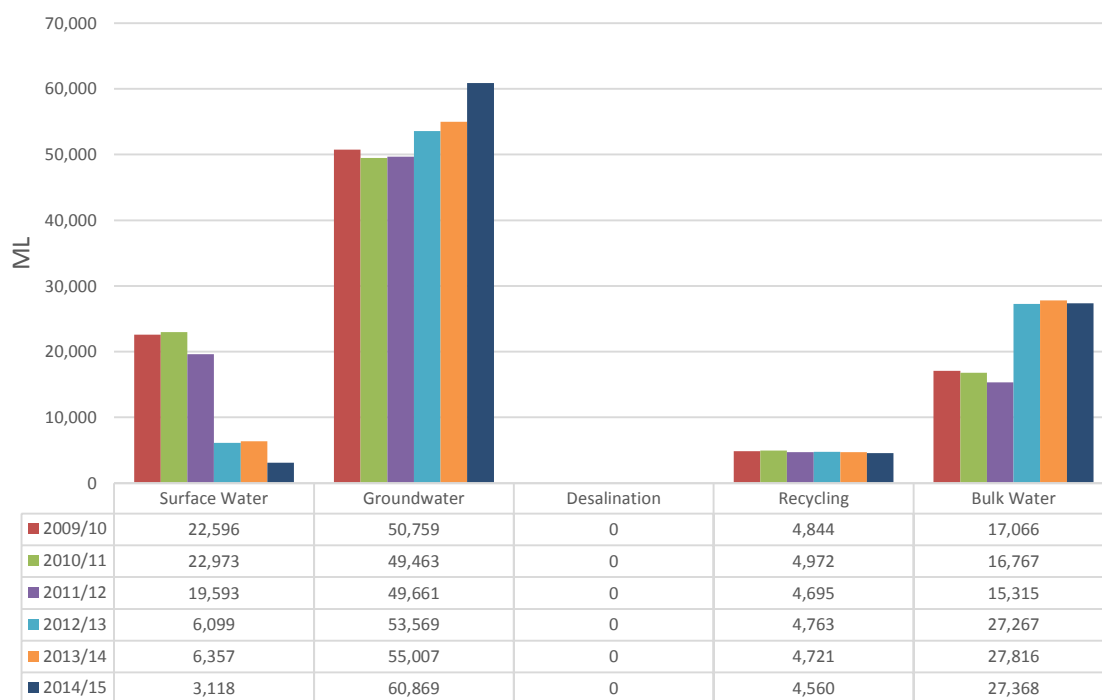
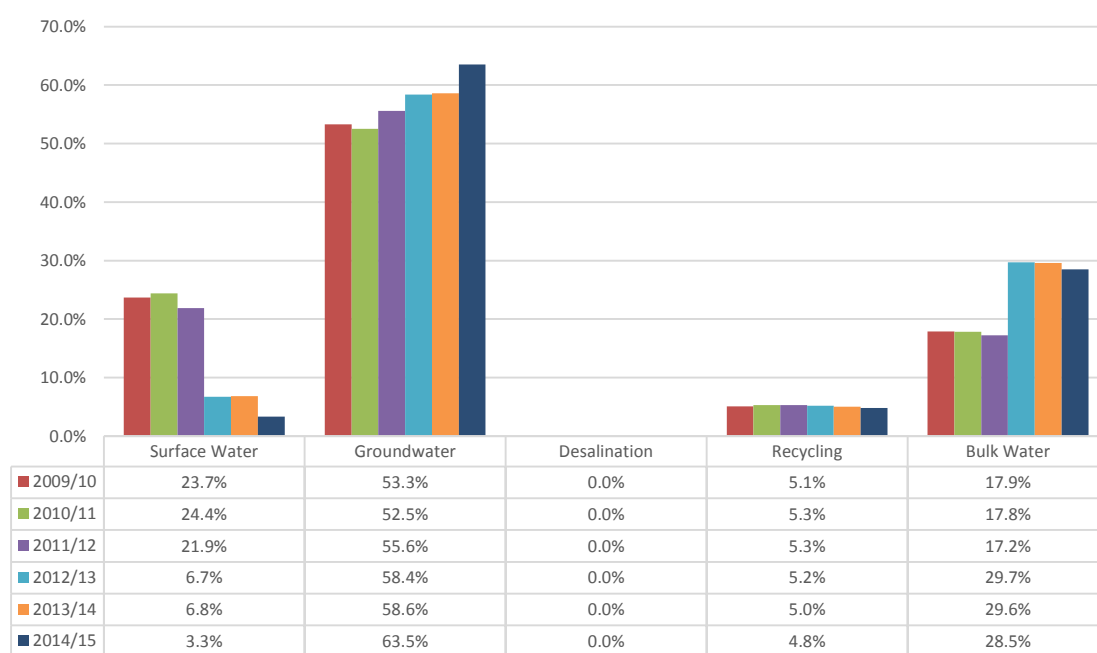
The drying climate has resulted in a shift away from surface water sources not only in Perth, but also in regional towns. For example, an increase in water sourced from groundwater in Karratha has resulted in significantly less water being taken from Harding Dam (down from 2,467ML in 2014 to 690ML in 2015).

In 2013, water sourced from bulk water suppliers overtook surface water as the second source of drinking water in regional towns for the first time, and this trend has continued into 2015. Between 2009 and 2015, the volume of sourced from surface water has fallen from 22GL to 3.1GL, while bulk water supplies have increased from 17GL to just over 27GL. The bulk water is supplied from Water Corporation sources located outside the town boundary.<sup>23</sup>

<sup>21</sup> Government of Western Australia website, Media Statement on 22 October 2014: *Works start on advanced water recycling plant*; accessed on 5 November 2014.

<sup>22</sup> The percentage of water sourced from groundwater was 54.2% in 2007/08 and 55.7% in 2008/09.

<sup>23</sup> Bulk water is water that is received from another utility or entity outside the reporting utility's geographic area of responsibility.

**Figure 6: Sources of water by volume (Regional Towns)****Figure 7: Sources of water by percentage (Regional Towns)**

## Uses of Water Supplied

### Total Urban Water Supplied

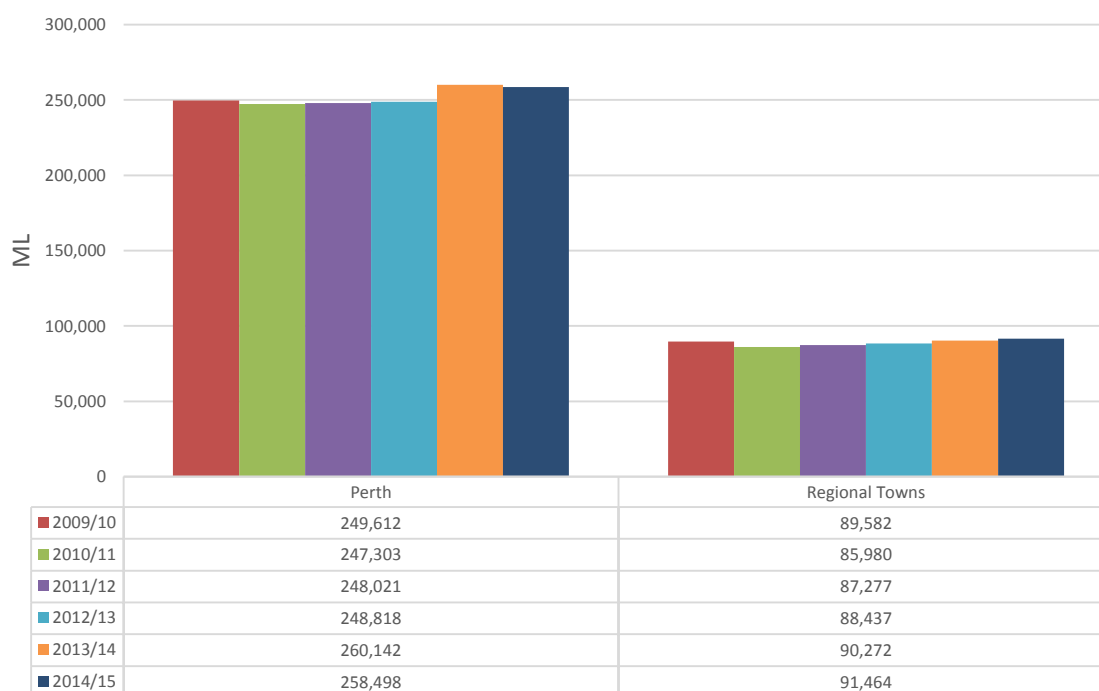
Total urban water supplied means the total metered volume of water (potable or non-potable), supplied to customers over the reporting period, plus estimated non-metered water supplied.

Total urban water includes residential, commercial, municipal and industrial water supplied and estimated water supplied for other purposes. The difference between sourced and supplied water is the real water losses caused by mains breaks and leaks, metering errors, and stored water.

**Figure 8** details the total urban water supplied in Perth and regional towns. Between 2014 and 2015, the volume of water supplied in Perth fell by 0.6%, but is still above the average of the last five years, and the volume of water supplied in regional towns rose by 1.3%.

Urban water supplied in Perth accounted for 74% of the state-wide total, a ratio that has been relatively constant over the past eight years. The proportion of water consumption in Perth is broadly consistent with the State's population distribution: approximately 79% of the State's population live in the greater Perth area.<sup>24</sup>

**Figure 8: Total urban water supplied**



### Average Annual Residential Water Supplied

**Table 1** details the average annual residential water supplied. In 2015, the average annual residential water supplied per property in Perth fell by 3.9%.

<sup>24</sup> Australian Bureau of Statistics website, publication 3218.0 Regional Population Growth, Australia 2013-14 (published 31 March 2015). Accessed 11 November 2015.

The average annual residential water supplied in regional towns continued its downward trend; consumption in 2015 fell 3.6%. The long term downward trend correlates with the introduction of permanent water savings measures across the State; the rate of decline in 2015 (3.6%) was much higher than in the two previous years.

**Table 1: Average annual water supplied per residential property (kL/property)**

	2010	2011	2012	2013	2014	2015
<b>Perth</b>	276	264	250	249	254	244
<b>Regional Town Average</b>	360	327	313	310	308	297

In 2015, Kununurra overtook Port Hedland as the town with the highest average annual residential water consumption (504kL), up by 5% compared to 2014. The average consumption in Port Hedland fell from 511kL in 2014, to 477kL in 2015.

Denmark continues to have the lowest average annual residential water consumption; the consumption per property in 2015 (144kL) was 10.6% lower than in 2014 (161kL).

The difference in the water consumption patterns for high and low residential consumption towns correlates with the climatic conditions across the State; towns in the north have higher annual average temperatures, and higher consumption levels, than towns in the cooler south-west.

## Asset Data

### Water Mains

**Table 2** examines the length of water mains in the State. There is loose correlation between population increase and growth in water mains networks, which is mostly driven by land development. Since 2010, the length of water mains in Perth has grown by an average of 1.7% per annum. The 2.2% increase in mains recorded in 2015 is significantly more than the 1.4% increase recorded in 2014, and above the long term trend growth of 1.7% per annum.

The length of water mains in regional towns grew by 2.4% in 2015. The largest increase in the mains network during 2015 occurred in Harvey/Wokalup (up by 19.5%), followed by Geraldton (up by 11.1%). Conversely, the length of the networks in Dongara Denison and Bridgetown/Hester fell, by 12.5% and 9% respectively, due to administrative adjustments.

**Table 2: Length of water mains (km)**

	2010	2011	2012	2013	2014	2015	% change
<b>Perth</b>	12,997	13,198	13,292	13,673	13,859	14,161	2.2%
<b>Regional Towns</b>	5,621	5,732	5,817	5,457	5,584	5,719	2.4%
<b>Total</b>	18,618	18,930	19,109	19,130	19,443	19,881	2.3%

### Properties Connected per km of Water Main

The purpose of this indicator is to report on the spatial density of properties served by water mains.

**Table 3** shows that the spatial density of properties served by water mains in Perth, and in regional towns has steadily increased since 2010.

In 2015, the spatial density of connected properties remained stable in Perth, and the average spatial density of connected properties in regional towns was also unchanged from last year. Looking at the town by town results in the regions, Dongara Denison and Bridgetown/Hester recorded the highest growth in spatial density, recording increases of 13.6% and 15.4%, respectively, while Harvey/Wokalup and Geraldton recorded falls of 15.8% and 9.4%, respectively.<sup>25</sup> The changes in spatial density in all four towns are the result of changes in the total length of water mains over the year, which is discussed under Water Mains above.

**Table 3: Properties served per km of water main**

	2010	2011	2012	2013	2014	2015
<b>Perth</b>	56	56	56	56	57	57
<b>Regional Town Average</b>	31	32	30	33	33	33

In 2015, Perth had the highest density of properties served (57 per km of main), which is consistent with the relatively high property densities in the metropolitan areas. Other towns with high property densities are Mandurah (52 per km of main), Newman (48 per km main) and Karratha (46 per km main).

Bridgetown/Hester had the lowest property density (15 per km of main), while the average of the remaining regional towns was 34 per km of main.

## Water Main Breaks

The level of water main breaks is influenced by a number of factors, including the type of mains infrastructure (above ground or below ground), the age of the mains, the standard of maintenance carried out by the service provider, and local conditions such as soil types and penetrating tree roots.

**Table 4** details the level of water main breaks. Compared to 2014, the level of mains breaks in Perth increased by 15.4%, to reach a six year peak of 15.0 per 100km of main in 2015. The level of mains breaks in 2015 was 15% above the average of the previous five years (13.0 per 100km of main).

The average level of mains breaks in regional towns fell by 3.2%, to 20.9 per 100km of main.

**Table 4: Water main breaks (per 100km of water main)**

	2010	2011	2012	2013	2014	2015
<b>Perth Total</b>	13.4	12.7	12.5	13.3	13.0	15.0
<b>Regional Town Average</b>	18.7	18.8	20.2	19.6	21.6	20.9

<sup>25</sup> Water Corporation has advised that the 2014 figure for the number of connected properties ('000's) for Geraldton was 18.5 and not 19.0 as previously reported. The 9.4% fall in special density for Geraldton is based on the 2014 figure of 18.5 connected properties ('000's). The ERA has retained the original 19.0 figure in Table 27 for consistency with the previous 2014 performance report.

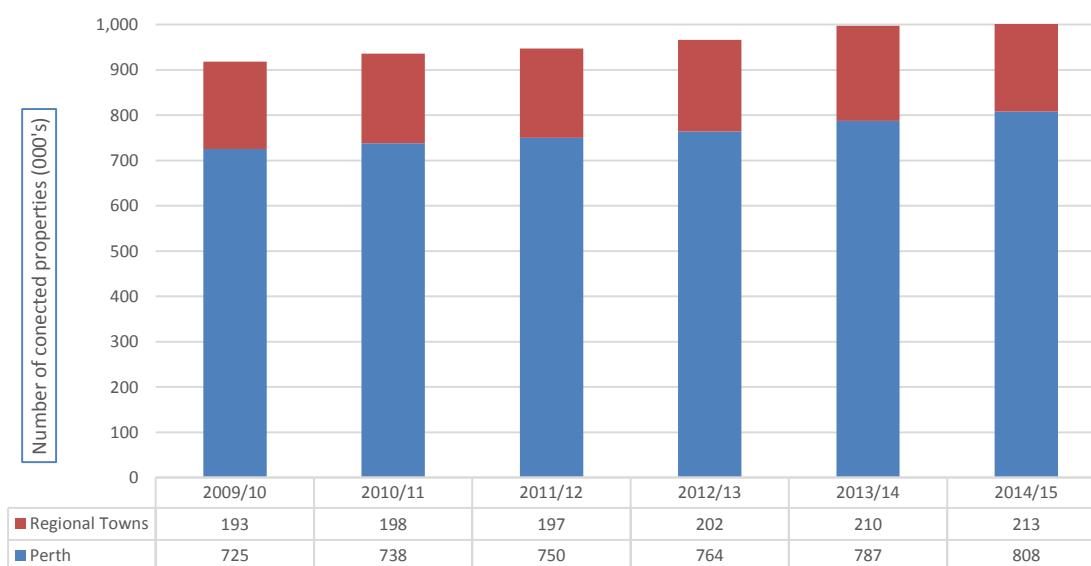
## Connected Properties – Water Supply

**Figure 9** details the number of connected properties over the six years to 2015.

Between 2014 and 2015, the total number of connected properties in the State grew by 2.4%, to reach 1.021 million properties. The number of connected properties in Perth and regional towns grew by 2.7% and 1.4%, respectively. Over the past six years, the average annual growth in the number of connected properties in Perth and in regional towns was 2.2% and 2.1% respectively.

In regional areas, the largest growth in connected properties occurred in South Hedland (10 %) and Dongara Denison (5.9%).

**Figure 9: Total connected properties - water supply (000's)**



## Customer Service

### Water Quality Complaints

**Table 5** details the level of water quality complaints for the six years to 2015.

Water quality complaints include any complaint regarding discolouration, taste, odour, stained washing, illness or cloudy water. Because the water supply schemes in the State vary significantly in size, this indicator is normalised to the number of connected properties expressed in thousands (water quality complaints per 1,000 connected properties) to enable comparison across supply schemes of differing sizes.

**Table 5: Water quality complaints (per 1,000 customers)**

	2010	2011	2012	2013	2014	2015
Perth	7.9	6.7	6.9	0.1	0.1	0.1
Regional Town Average	3.7	3.9	3.8	0.9	0.1	0.1

In 2015, the number of water quality complaints received from customers in Perth and regional towns was unchanged on the previous year, remaining at a six year low.

Compared to 2014, nearly all of the regional towns supplied by Water Corporation also recorded falls in the number of complaints in 2015. Concurrently, there were significant reductions in complaints recorded by the other two water service providers Aqwest and Busselton Water. Complaints recorded by Aqwest (per 1,000 connected properties) fell from 0.2 to 0.1, while those recorded by Busselton Water fell from 2.0 to 1.7.

It is notable that until 2012, Perth consistently recorded the highest level of water quality complaints nationwide in the major capital cities category of the Urban Framework, but by 2014, Perth recorded the lowest level of complaints in the category nationwide.<sup>26</sup> According to the Water Corporation, the downward trend in water quality complaints that commenced in 2013 is due to the change in the method of recording complaints.<sup>27</sup>

In 2015, regional towns recorded a record low average number of water quality complaints (0.1 per 1,000 properties), for the second consecutive year. Busselton recorded the highest number of water quality complaints (1.7 per 1000 properties), followed by Australind/Eaton and Northam (both at 0.3 complaints per 1,000 properties).

Over the past six years, Port Hedland, South Hedland and Newman have recorded the lowest level of complaints. The six year averages for these towns are 0.2, 0.3 and 0.3 complaints per 1,000 connected properties, respectively. Also, Esperance, Jurien and Derby have performed well with six year averages of 0.3, 0.3 and 0.3 per 1,000 connected properties, respectively.

## Water Service Complaints

Water service complaints include all complaints related to bursts, leaks, service interruptions, adequacy of service, water pressure and water reliability. The level of complaints is normalised to the number of connected properties, expressed in thousands (reported as number of complaints per 1,000 connected properties).

**Table 6** details the level of water service complaints for the six years to 2015. Since 2010, the number of complaints recorded for Perth and regional towns has shown a strong downward trend. In 2015, the water service complaints recorded for Perth remained unchanged at 0.3 per 1,000 properties. The level of complaints in regional towns doubled in 2015 to 0.2 per 1,000 properties. The reasons for the downward trend in the level of water service complaints are the same as those discussed under Water Quality Complaints above.

**Table 6: Water service complaints (per 1,000 customers)**

	2010	2011	2012	2013	2014	2015
<b>Perth</b>	5.8	2.7	0.9	0.3	0.3	0.3
<b>Regional Town Average</b>	4.9	2.4	1.3	0.8	0.1	0.2

<sup>26</sup> Perth recorded 0.1 complaints per 1,000 connections, compared to a median of 2.1 complaints for the 11 other service providers in the major utility category of the Urban Framework.

<sup>27</sup> Water Corporation provided the following explanation for the large reduction in water and sewerage complaints: "Historically the Corporation always reported a much higher number of complaints than other water utilities. [...] The Corporation was unique in that it automatically recorded all contacts/call on these subjects as a complaint, unless there was evidence to the contrary. [...] Previously [queries regarding malfunctions] were also automatically treated as complaints. When talking with these customers it is apparent that most people are not actually complaining but simply querying why it is happening. When given an explanation and an [estimated] completion time [...], most customers are satisfied."

## Average Duration of an Unplanned Water Supply Interruption

An unplanned water supply interruption occurs by definition where the customer has not received at least 24 hours notification of the interruption to supply. The average duration that a customer is without a drinking water supply is a partial indicator of service quality, the condition of the water network, and the standard of network management.

**Table 7** details the average duration of unplanned interruptions for the six years to 2015.

Between 2014 and 2015, the average duration of supply interruptions in Perth fell by nearly 17.9% in 2015, a six year low. The regional town average increased by almost 36.4%, to 120.6 minutes, in 2015, which was significantly higher than the six-year average of 93 minutes.

**Table 7: Average duration of an unplanned supply interruption (minutes)**

	2010	2011	2012	2013	2014	2015
<b>Perth</b>	125.4	114.0	118.0	129.7	117.0	96.0
<b>Regional Town Average</b>	78.0	85.4	99.0	84.0	88.4	120.6

In 2015, the highest average unplanned interruption durations in regional towns were recorded in York (318 minutes), followed by South Hedland (290 minutes) and Merredin (250 minutes). The shortest average unplanned interruption durations were recorded in Derby (22 minutes) and followed by Kalgoorlie-Boulder (39.6 minutes).

## Average Frequency of Unplanned Interruptions

The average frequency of unplanned interruptions measures the average number of times the water supply to a customer is interrupted without at least 24 hours' notice. This is a partial indicator of service quality, reliability and customer satisfaction. Again, this indicator is normalised to the number of connected properties, expressed in thousands (reported as number of interruptions per 1,000 connected properties).

**Table 8** shows that, in 2015, the average frequency of unplanned interruptions in Perth continued the upward trend of the previous five years, reaching a six year high of 314 per 1,000 connected properties. The average frequency of unplanned interruptions for regional towns fell 5.3% compared with the previous year but remained above the six year average of 236 interruptions. The much higher values recorded in 2014 and 2015 are due to the inclusion of interruptions on the mains to meter connections.<sup>28</sup>

**Table 8: Average frequency of unplanned supply interruptions (per 1,000 connected properties)**

	2010	2011	2012	2013	2014	2015
<b>Perth</b>	65.6	94.3	104.6	121.7	286.0	314.0
<b>Regional Town Average</b>	124.1	169.8	187.0	162.1	397.7	376.9

In 2015, Dongara Denison reported the highest frequency of unplanned interruptions (2,348 per 1000 properties), followed by Geraldton (1,097 per 1,000 properties) and Port Hedland

<sup>28</sup> This follows a change in the definition of the indicator in the *2012-13 National Performance Framework: urban performance reporting indicators and definitions handbook*. Prior to 2014, mains to meter interruptions were excluded from the calculation of interruption frequency.

(639 per 1,000 properties). The Water Corporation advised that the increased frequency of interruptions in Dongara Denison was the result of a non-standard valve installation which caused a large number of supply interruptions.

The lowest interruption frequencies were recorded in Margaret River (142 per 1,000 properties), followed by Manjimup (149 per 1,000 properties) and Mandurah (152 per 1,000 properties).

Comparing the 2014 and 2015 data in **Table 8** with that in **Table 7** shows that in Perth the average number of interruptions increased, but the average duration of each interruption was shorter. In regional towns the number of interruptions decreased, but the average duration of each interruption was longer.

## Health

### Water Quality Compliance

It is normal practice to divide the total operating area supplied by the water service provider into a number of zones. Zone definition is based on a range of criteria, such as an area served by one treatment plant, or an area with clear boundaries (town boundaries etc.).<sup>29</sup> Each water service provider defines their area based on the structure of their supply network.

**Table 9** details the number of zones, and the percentage of the population resident in those zones, where the water supply complied with the microbiological and chemical health standards during 2015. All of the 61 zones across the State have achieved 100% compliance with the standards since reporting began in this format in 2009.

**Table 9: Zones and percentage population where microbiological compliance was achieved in 2015**

	Number of zones where microbiological compliance was achieved	Percentage of population where microbiological compliance was achieved
Perth	24	100
Regional Towns	37	100
All Towns	61	100

<sup>29</sup> A discussion on the criteria used to define a zone can be found on page 89 of the *2013-14 National Performance Framework: urban performance reporting indicators and definitions handbook*,

## **PART B: SEWERAGE PERFORMANCE INFORMATION**

## Covered Sewerage Schemes

The report captures sewerage supply schemes with more than 1,000 connected properties, which includes the following 22 towns:

<b>Albany</b>	<b>Collie</b>	<b>Kalgoorlie-Boulder</b>	<b>Manjimup</b>	<b>Perth</b>
<b>Australind-Eaton</b>	<b>Dunsborough</b>	<b>Karratha</b>	<b>Merredin</b>	<b>South Hedland</b>
<b>Broome</b>	<b>Esperance</b>	<b>Katanning</b>	<b>Narrogin</b>	
<b>Bunbury</b>	<b>Geraldton</b>	<b>Kununurra</b>	<b>Newman</b>	
<b>Busselton</b>	<b>Jurien</b>	<b>Mandurah</b>	<b>Northam</b>	

All of the sewerage schemes are operated by the Water Corporation, with the exception of Kalgoorlie-Boulder, which is operated by the City of Kalgoorlie-Boulder.

For a number of sewerage indicators, data is not available for Newman and occasionally other towns.<sup>30</sup> Where this is the case, average values for the indicators have been calculated by excluding those towns.

## Sewage Collected per Property

Sewage collected is defined as the total volume of sewage collected by the utility, measured as treatment plant inflow, plus sewage treated by another business on behalf of the water utility, e.g. a wholesaler.

Between 2014 and 2015, the state-wide total volume of sewage collected fell from 161.8GL to 161.3GL (a decrease of 0.3%), which is consistent with the reduction in water supplied reported under Uses of Water Supplied.<sup>31</sup> The total volume of sewage collected in Perth fell 0.2% (down from 135.4GL to 135.0GL) while the total volume of sewage collected in regional towns fell 0.7% (down from 26.4GL to 26.2GL).

**Table 10** details the annual volume of sewage collected per property for the six years to 2015. Compared to 2014, the annual sewage collected per property in Perth and regional towns fell by 2.6% and 5.9%, respectively, the result of a reduction in volume of sewage collected and an increase in the number of connected properties.

**Table 10: Sewage collected per property (kL)**

	2010	2011	2012	2013	2014	2015
<b>Perth</b>	189	182	189	187	190	185
<b>Regional Town Average</b>	185	176	193	185	188	177

In the regional towns, the volume of sewage collected per property correlates well with the volume of residential water supplied. The towns in the warmer northern areas of the State consume more water and produce higher volumes of sewage, while the reverse applies in towns in the cooler southern areas of the State. Compared to 2014, the largest increases in the total collected sewage volumes were recorded in Merredin (7.4%) and Australind /

<sup>30</sup> The Newman sewerage reticulation network is operated by Water Corporation, but the sewage treatment plant is operated by the Shire of East Pilbara.

<sup>31</sup> There is a correlation between the amount of water supplied and the proportion of that water than is subsequently collected as sewage.

Eaton and Bunbury / Dalyellup, both up 4%, while the largest falls were in Collie (-18.4%), Dunsborough (-17.1%) and Kununurra (-16.3%).

## Recycled Water (% of Effluent Recycled)

This indicator measures the percentage of treated sewage (effluent) that is used to produce recycled water. Recycled water can be used, for example, to irrigate the town's parks and ovals, or for agricultural, industrial or commercial uses.

**Table 11** details the percentage of effluent that was used to produce recycled water for the six years to 2015. Compared to 2014, the percentage of recycled effluent in Perth was unchanged, while regional towns recorded a fall of 0.9%.

**Table 11: Recycled water - percentage of effluent recycled**

	2010	2011	2012	2013	2014	2015
<b>Perth</b>	6.1	7.4	8.0	7.9	7.0	7.0
<b>Regional Town Average</b>	48.6	48.7	48.4	54.1	54.5	54.0

The underlying data shows that five of the six towns that recycled 100% of their effluent in 2014 did so in 2015: Albany, Australind/Eaton, Broome, Dunsborough and Kununurra; the sixth town, Merredin, recycled 95.5% of effluent in 2015.

Kalgoorlie-Boulder recorded the largest increase in the percentage of effluent recycled in 2015, (up from 56.0% to 97.0%). In contrast, Collie and Jurien have not recycled any effluent since reporting began in 2009, while Bunbury, Mandurah and Perth continue to recycle less than 10% of their effluent.

## Asset Data

### Length of Sewerage Mains and Channels (km)

Sewer mains include all trunk, pressure and reticulation mains.

**Table 12** details the length of the sewer main and channel network for the six years to 2015. During 2015, the total length of sewer mains and channels in Perth increased by a further 3.6%, while in regional towns the total length of sewer mains increased by 4.8%. The increase in mains in both Perth and regional towns continues the growth trend of the past six years.<sup>32</sup> Since 2010, the average annual growth in the length of sewer mains in both Perth and regional towns has been just over 1.0%.

**Table 12: Length of sewer mains and channels (km)**

	2010	2011	2012	2013	2014	2015	% change
<b>Perth</b>	11,007	11,198	11,271	11,443	11,637	12,053	3.6%
<b>Regional Towns</b>	3,204	3,265	3,359	3,336	3,467	3,635	3.9%
<b>Total</b>	14,211	14,463	14,630	14,779	15,104	15,688	4.8%

<sup>32</sup> The decrease in the length of mains in regional towns in 2013 was attributed to the reclassification of sewer mains, and a review of town boundaries for the 21 supply schemes operated by Water Corporation.

## Properties served per km of Sewer Main

The purpose of this indicator is to report on the spatial density of properties served by sewerage mains.

**Table 13** details the properties served per km of sewer main for the six years to 2015.

During 2015, the average number of properties served per km of sewer main in regional towns fell, and was unchanged in Perth. Some of the individual regional towns have seen small changes in spatial density because of the reduction in the number of connected properties, due to reclassification of properties and town boundary adjustments.

**Table 13: Properties served per km of sewer main<sup>33</sup>**

	2010	2011	2012	2013	2014	2015	% change
<b>Perth</b>	60	60	61	61	61	61	-
<b>Regional Town Average</b>	44	45	41	43	43	41	-4.7%

Of the regional towns, Newman, South Hedland, and Broome recorded the highest density with 52 properties, 50 properties and 48 properties per km of sewerage main, respectively. Conversely, Jurien, Manjimup and Northam recorded the lowest spatial densities, with 22 properties, 34 properties and 34 properties per km of sewer main.

## Sewer Main Breaks and Chokes

The purpose of this indicator is to report on the number of sewer main breaks and chokes in the sewerage system. A choke is defined as a confirmed partial or total blockage that may or may not result in a spill from the sewer system to the external environment. Breaks and chokes is a partial indicator of customer service and the condition of the sewerage network. **Table 14** shows sewer main breaks and chokes during the five years to 2015.

**Table 14: Sewer main breaks and chokes (per 100km of main)**

	2011	2012	2013	2014	2015	% change
<b>Perth</b>	19.3	18.6	16.1	17.0	17.6	3.5%
<b>Regional Town Average</b>	27.4	24.9	24.6	24.2	23.6	-2.5%

Between 2014 and 2015, the level of breaks and chokes in Perth rose slightly, but remained below the five-year average (17.7 per 100km of main), while the level of breaks and chokes in regional towns fell, also remaining below the five-year average (24.9 per 100km of main).

In 2015, Narrogin, Katanning and Northam recorded the highest levels of breaks and chokes with 81, 62 and 46 per 100km of main, respectively. In contrast, Broome, Jurien, Mandurah, Manjimup and Dunsborough all achieved a breaks and chokes performance of below 10.0 per 100km of sewer main.

<sup>33</sup> The apparent growth in regional town property connections was caused by a rounding error in 2010 and 2011.

## Customers

### Total Connected Properties – Sewerage

**Figure 10** details the number of sewerage connected properties for the six years to 2015.

During 2015, the number of connected properties in Perth rose by 2.5%, and in regional towns connected properties increased by 1.9%. Over the six years to 2015, the average annual growth in connected properties in Perth was 2.1%, and in regional towns growth was just over 1.0% per annum.

**Figure 10: Total connected properties - sewerage (000's)**



In 2015, six of the 22 regional towns had over 10,000 connected properties: Albany, Busselton, Bunbury/Dalyellup, Geraldton, Kalgoorlie-Boulder and Mandurah.<sup>34</sup> The next largest regional towns are Australind/Eaton (with approximately 9,000 connections), Broome (with approximately 6,700 connections) and Karratha (with approximately 7,900 connections). The smallest sewerage schemes (<2,000 connections) are: Jurien (700 connections), Katanning (1,600 connections), Kununurra (1,900 connections), Manjimup (1,700 connections), Merredin (1,400 connections) and Narrogin (1,900 connections).

### Sewerage Service Complaints

**Table 15** details the level of sewerage service complaints, expressed as a normalised figure per 1,000 properties, for 2010-2015. The purpose of this indicator is to report customer satisfaction with sewerage services, and provide a partial indicator of service quality and reliability.

Sewerage service complaints include all complaints concerning sewer blockages and spills, trade waste services, sewerage system reliability, sewage odours and all other sewerage issues.

<sup>34</sup> Towns with over 10,000 connected properties are covered by the NWI Urban Framework.

**Table 15: Sewerage service complaints (per 1,000 properties)**

	2010	2011	2012	2013	2014	2015
Perth	2.1	1.4	0.4	0.2	0.1	0.0
Regional Town Average	2.7	2.4	1.2	0.6	0.3	0.2

The level of sewerage service complaints in Perth and in the regional towns have continued to trend downwards. In 2015, the level of complaints in Perth has fallen, to reach a record low of 0.045 per 1,000 properties, while in regional towns the average level of complaints has also reached a record low of 0.2 per 1,000 properties.

In 2015, all except five regional towns - Albany (0.2 per 1,000 properties), Esperance (0.2 per 1,000 properties), Geraldton (0.8 per 1,000 properties), Kalgoorlie-Boulder (3.0 per 1,000 properties) and Northam (0.3 per 1,000 properties) - recorded less than 0.1 sewerage service complaints per 1,000 properties.

All except one of the 22 sewerage schemes are operated by Water Corporation. The reduction in the number of water service complaints received by the Water Corporation is discussed earlier in this report under Water Quality Complaints.

## Environment

### *Percent of Sewage Treated Volume Compliant*

Following the review and amendment of the Reporting Handbook in 2014, this indicator has been discontinued.

### *Number of Sewage Treatment Plants Compliant at All Times*

Following the review and amendment of the Reporting Handbook in 2014, this indicator has been discontinued.

### *Comparative Sewage Treatment Levels*

The purpose of these indicators is to report on the degree to which sewage is treated. This is an important cost driver for a water utility, both in terms of both capital costs and operating costs: higher level treatment processes are more expensive than lower level processes.<sup>35</sup>

**Table 16** provides a breakdown of the all town average of percentage of sewage that was treated to a primary, secondary or tertiary level in the five years to 2015. In Perth, 95% of the sewage is treated to tertiary level and the remaining 5% to primary level.

Eight out of the 21 regional towns treat 100% of their sewage to a tertiary, recyclable, level: Albany, Australind/Eaton, Bunbury/Dalyellup, Busselton, Collie, Dunsborough, Mandurah and Manjimup. The remaining 13 towns treat 100% of their sewage to secondary level.

<sup>35</sup> Primary treatment removes suspended matter by settling it at the bottom of the tank; secondary micro-organism treatment removes up to 85% of dissolved and suspended biological matter; and tertiary treatment disinfects and also removes, or reduces the level of, nutrients. More information on 2013 – 14 *National Performance Framework: Urban performance reporting indicators and definitions handbook* at [nwc.gov.au](http://nwc.gov.au).

**Table 16: Percentage of sewage treated by treatment level (all towns)**

	2011	2012	2013	2014	2015
<b>Primary Treatment</b>	4.2%	4.2%	4.3%	4.2%	4.5%
<b>Secondary Treatment</b>	7.3%	7.4%	7.3%	7.1%	6.9%
<b>Tertiary Treatment</b>	88.5%	88.4%	88.5%	87.8%	88.6%

### ***Sewer Overflows Reported to the Environmental Regulator***

This indicator measures the level of sewer overflows that may adversely impact on water quality, human health and ecosystem stability (if they occur in sensitive areas). The number of overflows indicates the condition of, and standard of operation of, the sewerage network.

**Table 17** details the number of sewer overflows (per 100km of sewer main) that have been reported to the environmental regulator over the past six years. The data varies quite widely each year, which suggests that the root cause of the overflows is probably weather events (such as storms or flooding) rather than sewer infrastructure maintenance issues.

**Table 17: Sewer overflows reported to the environmental regulator (per 100km of sewer main)**

	2010	2011	2012	2013	2014	2015
<b>Perth Total</b>	1.1	0.2	0.1	0.2	0.2	0.1
<b>Regional Town Average</b>	0.5	1.2	0.5	0.8	0.2	1.4

There were six regional towns where the number of reported sewer overflows were greater than the regional town average of 1.4 per 100km of sewer main: Australind/Eaton (2.5), Collie (2.2), Katanning (9.5), Narrogin 6.6), Newman (3.9) and Northam (2.4). Water Corporation commented that sewer overflows were mainly attributed to blockages and high rainfall events.



## **PART C: COMBINED WATER AND SEWERAGE PERFORMANCE INFORMATION**

## Performance Data Format

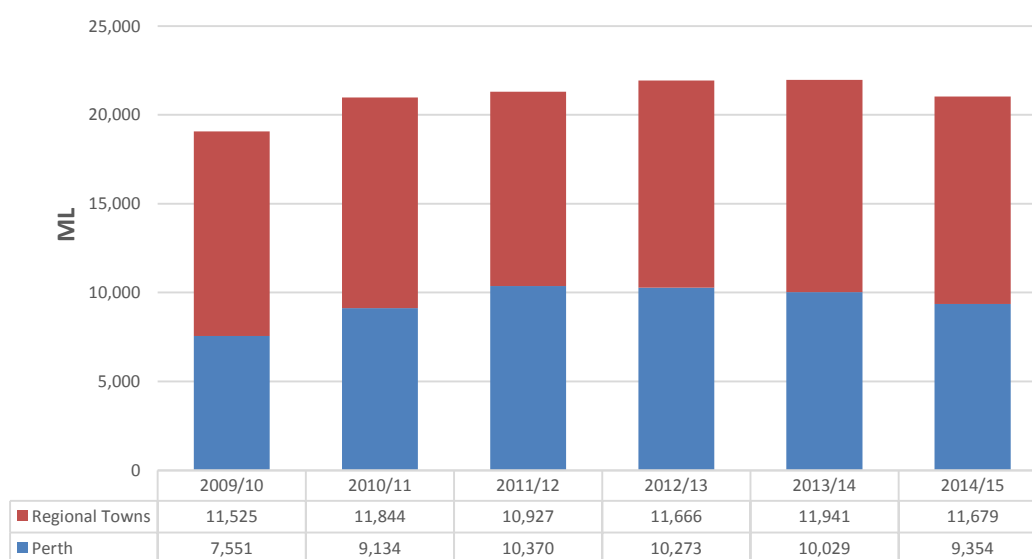
This part of the report presents the performance data of the combined water and sewerage service providers.<sup>36</sup> The performance data for all the towns/schemes in this section has been provided in a format consistent with the National Water Commission's Urban Framework for water delivery and sewerage providers.

## Total Recycled Water Supplied

Total recycled water supplied is the sum of all treated effluent that is used by either the water utility itself, or supplied to another business, or supplied for urban reuse. The volume of recycled water supplied is an indirect measure of the volume of potable or non-potable water saved, had recycled water not been available.

**Figure 11** shows the volume of recycled water supplied in Perth and in regional towns between 2010 and 2015. In 2015, the total volume of recycled water supplied across the State fell by 4.3%, from 22GL in 2014 to 21GL in 2015. The fall in the volume supplied was the net result of a 2.2% decrease in water supplied in regional towns and a 6.7% decline in water supplied in Perth.

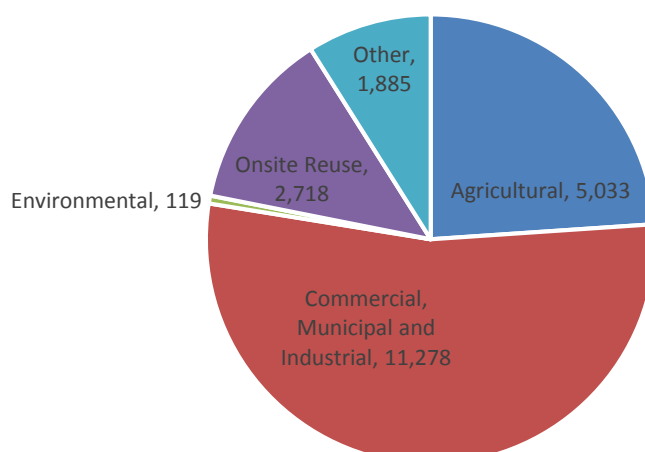
**Figure 11: Total recycled water supplied (ML)**



**Figure 12** provides a breakdown of the uses of recycled water in 2015. The largest user of recycled water was the commercial, municipal and industrial sector (53.6%) followed by agricultural users (23.9%) and onsite reuse<sup>37</sup> (12.9%).

<sup>36</sup> The data presented here is for 35 water and sewerage schemes that supply recycled water in the State; in three towns (Bunbury/Dalyellup, Busselton and Kalgoorlie-Boulder) the water and sewerage services are provided by separate utilities.

<sup>37</sup> Onsite reuse is where the water is used for processes within a sewage treatment plant, such as cleaning.

**Figure 12: Uses of recycled water in 2015**

## Total Water and Sewerage Complaints

This indicator reports on customer satisfaction with water and sewerage services and on service quality and reliability. The level of complaints is normalised to the number of connected properties, expressed in thousands. The data presented here is for 19 towns that have their water and sewerage service provided by the same utility.

**Table 18** presents the combined water and sewerage complaints for the six years to 2015.

Between 2014 and 2015, the number of complaints in Perth fell by 20% (down from 1.0 to 0.8 per 1,000 properties), and the regional town average fell by 22% (from 0.9 to 0.7 per 1,000 connected properties) to reach a six year low.

**Table 18: Total water and sewerage complaints (per 1,000 connected properties)**

	2010	2011	2012	2013	2014	2015
<b>Perth</b>	16.8	12.1	9.5	0.6	1.0	0.8
<b>Regional Town Average</b>	11.9	8.1	6.3	1.0	0.9	0.7

For the second consecutive year, Northam recorded the highest level of complaints (1.4 complaints per 1,000 connected properties), followed by Narrogin and Geraldton (1.3 complaints per 1,000 connected properties), Collie (1.1 complaints per 1,000 connected properties) and South Hedland (1.1 complaints per 1,000 connected properties). The remaining 14 towns received less than 1.0 complaints per 1,000 properties.

All 19 towns with the water and sewerage services provided by the same utility are supplied by Water Corporation. The reasons for the reduction in the number of water service complaints received by the Water Corporation since 2012 is discussed earlier in this report under Water Quality Complaints.

## Billing and Account Complaints – Water and Sewerage

The purpose of this indicator is to report on the level of billing and account complaints received for the utility's water supply and sewerage services.<sup>38</sup> A billing and account complaint includes all complaints relating to account payment, financial loss or overcharging, billing errors and affordability.

Complaints regarding government pricing policy, tariff structures or when a correctly calculated bill is queried are excluded. The level of complaints is normalised to the number of connected properties, expressed in thousands.

**Table 19** presents the number of billing and account complaints received in Perth and the 31 regional towns between 2010 and 2015.<sup>39</sup> Compared to 2014, the number of billing and account complaints in Perth and in regional towns were both lower in 2015. In Perth the number of complaints fell to a record low of 0.03 per 1,000 connected properties, while the regional town average fell to 0.4 per 1,000 connected properties, the second lowest on record.

York had the highest number of billing and account complaints (1.8 complaints per 1,000 properties), followed by Narrogin (1.3 complaints per 1,000 properties). Of the remaining 33 supply schemes, 11 recorded zero billing and account complaints.

**Table 19: Billing and account complaints - water and sewerage (per 1,000 connected properties)**

	2010	2011	2012	2013	2014	2015
<b>Perth</b>	1.2	1.4	1.4	0.2	1.0	0.0 <sup>40</sup>
<b>Regional Town Average</b>	1.3	1.4	1.0	0.2	0.6	0.4

## Connect Time to a Call Centre Operator

The purpose of this indicator is to report on the proportion of calls that are answered by an operator within 30 seconds, where the customer has selected an option to speak with an operator.<sup>41</sup> The Water Corporation is the only water service provider that operates a state-wide customer call centre, covering both water and sewerage enquiries.

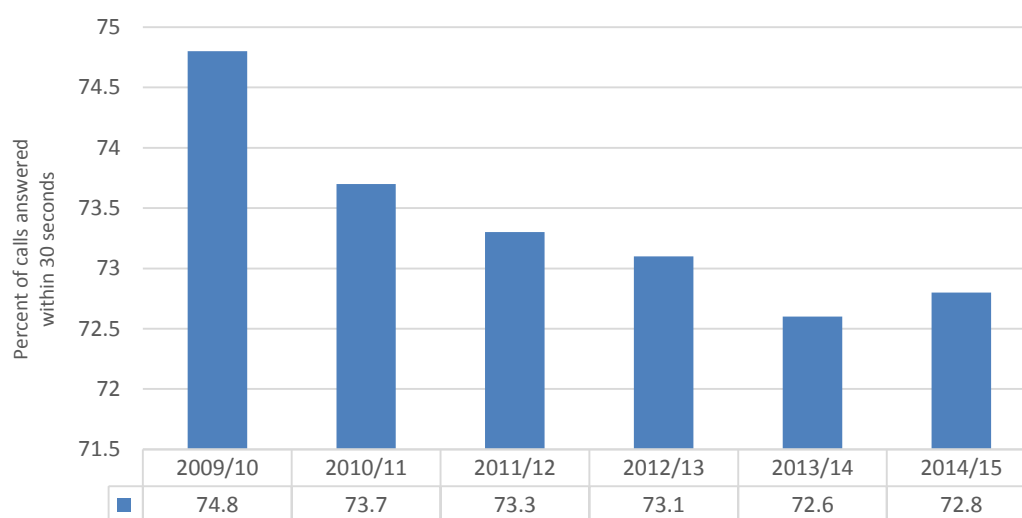
**Figure 13** details the proportion of customer calls to the Water Corporation call centre that were answered within 30 seconds over the six years to 2015. In 2015, 72.8% of telephone calls to a Water Corporation operator were answered within 30 seconds. The 2015 result by Water Corporation reverses the previous downwards trend, begun in 2010. Despite the improvement, the 2015 performance remained below the six year average of 73.4%.

<sup>38</sup> The data presented here is for a total of 35 water and sewerage schemes. In some towns the water and sewerage services are provided by separate utilities.

<sup>39</sup> Three of the towns have separate water and sewerage service providers: Bunbury/Dalyellup, Busselton and Kalgoorlie-Boulder. Accordingly, there reported data covers 35 separate water and sewerage supply schemes.

<sup>40</sup> The actual value is 0.03 per 1,000 connected properties.

<sup>41</sup> Utilities that operate a call centre capable of automatically recording operator responsiveness must report on this indicator. Utilities that have other telephone systems to handle customer calls may report this indicator on a voluntary basis.

**Figure 13: Percentage of Water Corporation calls answered within 30 seconds**



## **PART D: IRRIGATION PERFORMANCE INFORMATION**

## Irrigator performance data included in this report

This report continues the ERA's coverage of the performance of Western Australian irrigators. The two irrigators covered by this report are:

- Ord Irrigation Cooperative Ltd (Ord Irrigation); and
- South West Irrigation Management Cooperative (Harvey Water).

There are another two irrigators licensed by the ERA (Gascoyne Water Cooperative (**GWC**) and Preston Valley Irrigation Cooperative (**PVIC**)), but they are excluded from the report based on their smaller customer base. Instead, GWC and PVIC provide to the ERA a limited subset of the performance information that Ord Irrigation and Harvey Water are required to provide. This makes it difficult to meaningfully compare the performance of the two pairs of irrigators.

The data for Ord Irrigation and Harvey Water is derived from the annual performance reports provided to the ERA, which are based on the, now defunct, Rural Framework (refer to the discussion in the section entitled "Performance Reporting Obligations").

## Volume of Water Supplied

**Table 20** details the total volume of water supplied for irrigation purposes between 2010 and 2015.

The volume of water supplied by Harvey Water during 2015 was 6.9% lower than in 2014. Prior to 2014, the volume of water supplied was on a downward trend because of the dry weather conditions, which resulted in reductions in Harvey Water's water allocations, and a contraction in the local dairy industry. Increased water allocations in 2014 reversed the downward trend, but the gains of 2014 have not been continued into 2015.

Between 2014 and 2015, the volume of water supplied by Ord Irrigation increased by 53%, to reach a six year high. The increase in supply volumes in 2015 reversed a five year downward trend that saw the annual volume of water supplied by Ord Irrigation fall below 100GL for the first time in 2014. Ord Irrigation has attributed the increase in 2015 to a drier than usual wet season in early 2015, which required the supply of more irrigated water for agricultural purposes.<sup>42</sup>

**Table 20: volume of water supplied for irrigation (ML)**

	2010	2011	2012	2013	2014	2015	% change
<b>Harvey Water</b>	69,038	59,876	46,096	41,807	56,310	52,397	-6.9%
<b>Ord Irrigation Cooperative</b>	114,049	117,369	118,816	100,637	95,772	146,541	53%
<b>Total</b>	183,087	177,245	164,912	142,444	152,082	198,938	30.8%

<sup>42</sup> Ord Irrigation is located near Kununurra in the Kimberley region of Western Australia. Kununurra's wet season normally begins October each year and runs to around the following April.

## Customer delivery points

**Table 21** presents the number of customer service (water delivery) points on the two supply networks for the six years to 2015. During 2015, the number of customer service points on the Harvey Water network rose by 1.5%, while those on the Ord Irrigation network remained relatively unchanged.

**Table 21: Number of customer service points on irrigation networks**

	2010	2011	2012	2013	2014	2015	% change
<b>Harvey Water</b>	1,698	1,744	1,760	1,751	1,759	1,786	1.5%
<b>Ord Irrigation Cooperative</b>	286	283	270	271	269	268	-0.4%
<b>Total</b>	1,984	2,027	2,030	2,022	2,038	2,054	1.3%

## Carrier Length (Gravity Irrigation)

**Table 22** details the length of the pipes and channels in the gravity irrigation networks operated by Harvey Water and Ord Irrigation.

The Ord Irrigation network is entirely made up from unlined channel, whereas the Harvey Water network has a mix of lined channels, unlined channels and pipe. The network channel length on both the Harvey Water and Ord Irrigation networks has remained almost unchanged since 2012.

**Table 22: Carrier length - gravity irrigation networks in 2014 (km)**

	Unlined Channel	Lined Channel	Pipe	Total Carrier Length
<b>Harvey Water</b>	171	85	495	<b>771</b>
<b>Ord Irrigation Cooperative</b>	125	0	0	<b>125</b>
<b>Total</b>	296	85	495	<b>876</b>

## Complaints

**Table 23** details the complaints received by Ord Irrigation and Harvey Water during the six years to 2015. Over the past six years, the number of complaints received by both irrigators has been quite small. All of the complaints that have been received relate to customer service issues rather than billing and account issues.

In 2015, Ord Irrigation received one complaint, while, for the fifth consecutive year, Harvey Water did not receive any complaints.

**Table 23: Customer service delivery complaints**

	2010	2011	2012	2013	2014	2015
<b>Harvey Water</b>	3	0	0	0	0	0
<b>Ord Irrigation Cooperative</b>	4	2	0	3	2	1



## **APPENDIX 1: ADDITIONAL WATER PERFORMANCE INFORMATION**

Table 24: Total Urban Water Supplied (ML)

	2010	2011	2012	2013	2014	2015
<b>Albany Scheme</b>	4,128	3,701	3,702	3,609	3,953	4,445
<b>Australind / Eaton</b>	3,757	3,490	3,981	4,283	4,544	4,716
<b>Bunbury (AQWEST)</b>	5,812	5,686	5,491	5,528	5,799	5,830
<b>Busselton Water</b>	3,790	3,750	3,800	3,840	4,160	4,275
<b>Geraldton</b>	8,180	8,097	7,826	9,014	9,122	9,061
<b>Kalgoorlie-Boulder</b>	8,843	8,553	8,167	8,312	7,774	7,190
<b>Mandurah Scheme</b>	11,824	11,723	11,311	11,730	12,523	12,550
<b>Perth</b>	249,612	247,303	248,021	248,818	260,142	258,498
<b>Bridgetown / Hester</b>	438	356	504	437	467	487
<b>Broome</b>	5,543	5,525	5,737	5,836	6,021	5,788
<b>Carnarvon</b>	1,497	1,342	1,431	1,421	1,459	1,415
<b>Collie</b>	1,258	2,072	1,099	1,073	1,146	1,108
<b>Denmark</b>	361	354	498	465	531	443
<b>Derby</b>	985	907	1,342	1,208	1,286	1,335
<b>Dongara Denison</b>	627	636	903	849	833	906
<b>Dunsborough / Yallingup</b>	1,343	1,296	1,447	1,552	1,554	1,663
<b>Esperance</b>	1,869	1,590	1,794	1,708	1,806	1,744
<b>Harvey / Wokalup</b>	544	479	568	546	686	584
<b>Jurien</b>	288	259	376	374	396	387
<b>Karratha</b>	5,476	5,266	5,162	5,530	4,934	5,661
<b>Katanning</b>	1,085	1,056	1,473	793	753	752
<b>Kununurra</b>	1,243	1,159	1,406	1,337	1,306	1,332
<b>Manjimup</b>	804	698	797	669	715	713
<b>Margaret River Scheme</b>	997	1,139	1,207	1,351	1,311	1,432
<b>Merredin</b>	661	627	625	746	567	565
<b>Narrogin</b>	817	830	746	778	800	727
<b>Newman</b>	2,034	1,791	1,832	2,301	2,117	2,156
<b>Northam</b>	1,255	1,233	1,211	1,315	1,474	1,285
<b>Pinjarra</b>	2,695	2,389	2,035	1,012	1,215	1,105
<b>Port Hedland</b>	2,200	2,144	2,251	2,286	2,319	6,716
<b>South Hedland</b>	8,703	7,310	8,092	8,071	8,179	4,617
<b>York</b>	525	522	463	463	523	475
<b>Total</b>	<b>339,194</b>	<b>333,283</b>	<b>335,298</b>	<b>337,255</b>	<b>350,414</b>	<b>349,962</b>
<b>Total (excluding Perth)</b>	<b>89,582</b>	<b>85,980</b>	<b>87,277</b>	<b>88,437</b>	<b>90,272</b>	<b>91,464</b>

**Table 25: Average Annual Residential Water Supplied (kL/property)**

	2010	2011	2012	2013	2014	2015
<b>Albany Scheme</b>	209	190	188	179	188	188
<b>Australind / Eaton</b>	392	347	334	338	337	328
<b>Bunbury (AQWEST)</b>	270	266	255	254	267	264
<b>Busselton Water</b>	297	285	280	272	287	284
<b>Geraldton</b>	369	357	343	327	321	305
<b>Kalgoorlie-Boulder</b>	360	348	310	335	306	320
<b>Mandurah Scheme</b>	269	252	239	239	241	237
<b>Perth</b>	276	264	250	249	254	244
<b>Bridgetown / Hester</b>	225	191	230	183	194	194
<b>Broome</b>	547	512	499	504	448	446
<b>Carnarvon</b>	427	356	387	369	365	358
<b>Collie</b>	295	265	241	227	262	244
<b>Denmark</b>	156	146	145	147	161	144
<b>Derby</b>	515	466	485	448	432	422
<b>Dongara Denison Dunsborough / Yallingup</b>	326 315	323 297	310 282	266 272	266 292	258 290
<b>Esperance</b>	282	236	231	228	239	236
<b>Harvey / Wokalup</b>	346	300	287	272	290	276
<b>Jurien</b>	206	181	180	177	180	183
<b>Karratha</b>	533	502	460	473	444	462
<b>Katanning</b>	280	270	252	245	263	238
<b>Kununurra</b>	626	532	531	493	480	504
<b>Manjimup</b>	246	214	200	189	193	192
<b>Margaret River Scheme</b>	240	227	233	209	229	222
<b>Merredin</b>	330	302	280	275	271	258
<b>Narrogin</b>	287	276	226	247	254	234
<b>Newman</b>	606	516	501	565	506	437
<b>Northam</b>	310	290	243	273	281	247
<b>Pinjarra</b>	316	284	285	280	298	286
<b>Port Hedland</b>	639	588	523	509	511	477
<b>South Hedland</b>	591	496	489	538	474	413
<b>York</b>	337	319	252	270	260	247
<b>Average</b>	<b>357</b>	<b>325</b>	<b>311</b>	<b>308</b>	<b>306</b>	<b>295</b>
<b>Average (excluding Perth)</b>	<b>360</b>	<b>327</b>	<b>313</b>	<b>310</b>	<b>308</b>	<b>297</b>

Table 26: Water main breaks (per 100km of water main)

	2010	2011	2012	2013	2014	2015
<b><u>NWC Towns</u></b>						
Albany Scheme	11.5	12.0	8.1	13.8	12.0	11.3
Australind / Eaton	5.0	5.6	7.1	5.2	5.0	4.6
Bunbury (AQWEST)	10.7	10.3	10.2	12.0	10.0	12.0
Busselton Water	6.4	5.0	3.3	6.6	8.0	8.2
Geraldton	43.1	28.9	20.0	27.7	23.0	26.8
Kalgoorlie-Boulder	22.8	19.9	16.7	13.1	17.0	20.8
Mandurah Scheme	6.3	5.2	6.8	6.3	4.0	4.2
Perth	13.4	12.7	12.5	13.3	13.0	15.0
<b><u>Minor Towns</u></b>						
Bridgetown / Hester	22.2	28.0	27.7	17.6	21	15
Broome	11.9	21.8	24.9	8.2	6	9
Carnarvon	8.3	11.9	14.8	23.2	17	32
Collie	32.7	24.6	28.7	30.8	35	20
Denmark	11.6	13.3	16.1	7.5	14	28
Derby	22.7	18.9	25.9	7.4	22	23
Dongara Denison Dunsborough / Yallingup	58.9	27.6	33.9	13.8	26	38
Esperance	12.3	18.8	23.7	15.6	25	11
Harvey / Wokalup	14.2	9.7	15.3	11.0	5	8
Jurien	9.8	4.9	10.2	4.1	16	16
Karratha	24.8	28.9	25.9	20.5	18	33
Katanning	13.4	21.2	17.8	27.8	24	20
Kununurra	17.1	27.9	27.0	11.1	30	16
Manjimup	14.7	15.9	22.5	24.2	21	16
Margaret River Scheme	3.5	7.0	6.9	9.2	8	11
Merredin	15.2	20.8	31.2	42.3	58	59
Narrogin	19.1	22.3	25.4	37.5	37	40
Newman	10.2	10.1	39.6	42.6	23	21
Northam	24.4	20.5	23.1	37.8	54	28
Pinjarra	8.8	14.1	7.0	8.3	16	13
Port Hedland	59.2	70.1	65.2	69.2	52	50
South Hedland	17.1	11.6	15.7	13.8	18	17
York	28.9	32.7	14.9	30.1	26	27
Average	<b>18.5</b>	<b>18.6</b>	<b>20.0</b>	<b>19.4</b>	<b>21.3</b>	<b>20.7</b>
Average (excluding Perth)	<b>18.7</b>	<b>18.8</b>	<b>20.2</b>	<b>19.6</b>	<b>21.6</b>	<b>20.9</b>

Table 27: Total Connected Properties (000's)

	2010	2011	2012	2013	2014	2015
<b><u>NWC Towns</u></b>						
<b>Albany Scheme</b>	14.9	15.1	14.9	15.3	16.0	15.6
<b>Australind / Eaton</b>	9.7	10.0	10.3	10.6	11.0	11.3
<b>Bunbury (AQWEST)</b>	16.0	16.0	16.0	16.6	17.0	16.91
<b>Busselton Water</b>	10.8	11.1	11.4	11.6	12.0	12.5
<b>Geraldton</b>	16.6	17.0	17.2	18.1	19.0	18.8
<b>Kalgoorlie-Boulder</b>	13.9	14.0	14.1	14.2	14.0	14.5
<b>Mandurah Scheme</b>	40.2	41.5	42.2	43.0	45.0	46.1
<b>Perth</b>	725.0	738.0	750.0	763.5	787.0	808.0
<b><u>Minor Towns</u></b>						
<b>Bridgetown / Hester</b>	1.5	1.5	1.6	1.6	1.6	1.7
<b>Broome</b>	6.6	6.8	6.9	7.1	7.5	7.6
<b>Carnarvon</b>	2.6	2.6	2.6	2.6	2.6	2.6
<b>Collie</b>	3.6	3.7	3.7	3.7	3.7	3.7
<b>Denmark</b>	2.0	2.1	2.1	2.1	2.3	2.4
<b>Derby</b>	1.5	1.6	1.7	1.8	1.9	1.9
<b>Dongara Denison Dunsborough / Yallingup</b>	1.6	1.7	1.7	1.7	1.7	1.8
<b>Esperance</b>	4.2	4.3	4.4	4.7	5.0	5.1
<b>Harvey / Wokalup</b>	5.3	5.3	5.4	5.4	5.5	5.5
<b>Jurien</b>	1.4	1.5	1.5	1.5	1.5	1.5
<b>Karratha</b>	1.5	1.5	1.4	1.5	1.5	1.5
<b>Katanning</b>	8.5	8.6	7.5	7.8	8.5	8.6
<b>Kununurra</b>	1.9	1.9	1.9	1.9	1.9	1.9
<b>Kununurra</b>	1.8	1.9	2.0	2.1	2.1	2.1
<b>Manjimup</b>	2.4	2.4	2.4	2.4	2.4	2.4
<b>Margaret River Scheme</b>	2.4	2.4	2.4	2.4	2.4	2.4
<b>Merredin</b>	4.1	4.3	4.3	4.4	4.6	4.8
<b>Narrogin</b>	1.7	1.7	1.6	1.6	1.6	1.6
<b>Newman</b>	2.1	2.2	2.2	2.2	2.3	2.3
<b>Northam</b>	2.1	2.2	2.2	2.2	2.3	2.3
<b>Pinjarra</b>	3.5	4.2	2.4	2.5	2.9	2.9
<b>Port Hedland</b>	3.3	3.4	3.4	3.5	3.5	3.6
<b>South Hedland</b>	1.9	2.0	2.0	2.1	2.2	2.2
<b>York</b>	2.1	2.2	2.2	2.4	2.4	2.5
<b>Total</b>	4.5	4.7	4.4	4.5	5.0	5.5
<b>Total (excluding Perth)</b>	1.5	1.6	1.6	1.6	1.6	1.6
<b>Total</b>	918.2	936.4	947.0	965.6	996.7	1021.0
<b>Total (excluding Perth)</b>	193.2	198.4	197.0	202.1	209.7	213.0

Table 28: Water Service Complaints (per 1,000 customers)

	2010	2011	2012	2013	2014	2015
<b><u>NWC Towns</u></b>						
Albany Scheme	1.9	2.1	0.8	0.2	0.2	0.2
Australind / Eaton	8.6	2.2	1.3	0.2	0.2	0.1
Bunbury (AQWEST)	5.2	4.3	7.3	5.5	0.2	0.2
Busselton Water	0.2	0.8	0.4	0.2	0.2	0.0
Geraldton	12.0	3.6	1.6	1.3	0.6	0.5
Kalgoorlie-Boulder	4.0	2.1	0.4	0.1	0.0	0.2
Mandurah Scheme	1.6	1.3	0.5	0.0	0.0	0.0
<b><u>Minor towns</u></b>						
Perth	5.8	2.7	0.9	0.3	0.3	0.0
Bridgetown / Hester	5.2	1.3	0.6	1.3	0.0	0.0
Broome	4.1	1.9	0.9	0.3	0.8	0.1
Carnarvon	1.2	1.9	1.9	0.0	0.0	0.0
Collie	25.8	2.7	1.9	3.0	0.3	0.3
Denmark	1.0	1.4	1.4	0.0	0.0	1.3
Derby	2.6	0.6	0.0	0.0	0.0	0.0
Dongara Denison Dunsborough / Yallingup	12.2	3.6	0.6	0.0	0.0	1.1
Esperance	1.4	2.3	0.5	0.2	0.0	0.0
Harvey / Wokalup	3.6	3.4	6.3	0.6	0.2	0.2
Jurien	4.2	6.9	0.7	1.4	0.0	0.0
Karratha	1.4	2.0	0.0	0.0	0.0	0.0
Katanning	1.8	1.7	0.8	0.1	0.0	0.0
Kununurra	1.6	2.6	0.5	0.0	0.0	0.0
Manjimup	2.2	1.1	2.5	0.0	0.0	0.0
Margaret River Scheme	2.1	0.4	0.4	0.0	0.0	0.0
Merredin	1.7	0.7	0.2	0.2	0.0	0.8
Narrogin	7.9	4.2	2.4	1.2	0.0	0.6
Newman	2.3	3.6	0.4	0.0	0.0	0.0
Northam	5.7	1.7	0.8	0.4	0.7	0.0
Pinjarra	2.4	1.5	1.5	0.0	0.3	0.3
Port Hedland	10.1	1.0	2.0	0.0	0.0	0.0
South Hedland	6.2	4.1	0.5	4.6	0.0	0.4
York	6.2	1.7	2.5	0.0	0.0	1.1
Average	6.8	5.0	0.0	3.8	0.0	0.0
Average (excluding Perth)	5.0	2.4	1.3	0.8	0.1	0.2
	4.9	2.4	1.3	0.8	0.1	0.2

Table 29: Average Duration of Unplanned Water Supply Interruption (minutes)

	2010	2011	2012	2013	2014	2015
<b><u>NWC Towns</u></b>						
<b>Albany Scheme</b>	80.5	121.0	145.0	123.8	123.0	120.8
<b>Australind / Eaton</b>			86.0	75.7	78.0	72.2
<b>Bunbury (AQWEST)</b>	38.0	50.0	61.8	56.7	48.0	43.0
<b>Busselton Water</b>	41.3	41.6	79.5	2.8	3.0	197.5
<b>Geraldton</b>	66.9	102.0	193.0	139.7	110.0	103.4
<b>Kalgoorlie-Boulder</b>	50.0	28.0	36.0	33.9	56.0	39.6
<b>Mandurah Scheme</b>	57.4	34.0	79.0	64.3	68.0	61.2
<b>Perth</b>	125.4	114.0	118.0	129.7	117.0	96.0
<b><u>Minor towns</u></b>						
<b>Bridgetown / Hester</b>	138.9	120.0	154.0	66.0	142	150
<b>Broome</b>	79.7	74.0	143.0	35.0	117	40
<b>Carnarvon</b>	30.1	96.0	41.0	49.0	45	38
<b>Collie</b>	180.8	127.0	177.0	148.0	95	78
<b>Denmark</b>	132.7	98.0	159.0	95.0	90	244
<b>Derby</b>	27.4	38.0	42.0	31.0	34	22
<b>Dongara Denison Dunsborough / Yallingup</b>	70.3	105.0	62.0	85.0	69	187
<b>Esperance</b>	78.6	73.0	83.0	88.0	48	64
<b>Harvey / Wokalup</b>	93.4	65.0	83.0	90.0	149	83
<b>Jurien</b>	221.1	118.0	128.0	78.0	164	132
<b>Karratha</b>	31.3	74.0	54.0	97.0	42	55
<b>Katanning</b>	86.6	108.0	41.0	60.0	54	52
<b>Kununurra</b>	146.8	261.0	219.0	160.0	114	150
<b>Manjimup</b>	17.8	47.0	34.0	36.0	62	41
<b>Margaret River Scheme</b>	30.2	55.0	60.0	75.0	59	57
<b>Merredin</b>	29.3	42.0	71.0	101.0	125	82
<b>Narrogin</b>	138.9	58.0	83.0	86.0	97	250
<b>Newman</b>	83.2	182.0	170.0	125.0	98	189
<b>Northam</b>	69.4	96.0	98.0	106.0	152	115
<b>Pinjarra</b>	93.0	108.0	81.0	143.0	136	151
<b>Port Hedland</b>	83.2	62.0	73.0	47.0	56	84
<b>South Hedland</b>	74.8	106.0	100.0	117.0	87	230
<b>York</b>	57.2	51.0	66.0	74.0	84	290
<b>Average</b>	90.2	107.0	168.0	162.0	137	318
<b>Average (excluding Perth)</b>	79.5	86.3	99.6	86.9	89.3	119.9
	78.0	85.4	99.0	85.5	88.4	120.6

Table 30: Average Frequency of Unplanned Interruptions

	2010	2011	2012	2013	2014	2015
<b><u>NWC Towns</u></b>						
Albany Scheme	108.2	136.2	161.8	136.3	292.0	253.2
Australind / Eaton	39.0	47.0	64.8	40.4	246.0	268.3
Bunbury (AQWEST)	134.4	144.9	168.4	163.9	210.0	204.0
Busselton Water	2.8	1.1	1.0	127.5	175.0	165.0
Geraldton	172.5	262.7	289.7	604.3	829.0	1,097.4
Kalgoorlie-Boulder	63.7	54.8	65.6	21.9	357.0	398.0
Mandurah Scheme	51.5	47.8	62.6	35.9	123.0	152.0
Perth	65.6	94.3	104.6	121.7	286.0	314.0
<b><u>Minor Towns</u></b>						
Bridgetown / Hester	128.0	192.0	211.0	54.8	498.1	346
Broome	121.0	406.0	457.0	123.2	616.9	452
Carnarvon	18.0	100.0	68.0	35.9	131.3	154
Collie	309.0	231.0	249.0	281.7	332.7	334
Denmark	195.0	130.0	440.0	297.1	351.3	518
Derby	66.0	62.0	191.0	90.6	287.4	179
Dongara Denison Dunsborough / Yallingup	186.0	423.0	197.0	294.1	1,290.8	2,348
Esperance	115.0	162.0	198.0	189.2	401.2	204
Harvey / Wokalup	344.0	259.0	198.0	146.2	335.2	332
Jurien	99.0	189.0	275.0	85.9	221.9	158
Karratha	1.0	208.0	83.0	58.2	286.9	158
Katanning	182.0	172.0	624.0	239.9	283.0	272
Kununurra	234.0	136.0	207.0	252.1	335.1	427
Manjimup	93.0	206.0	56.0	55.8	287.1	376
Margaret River Scheme	29.0	64.0	60.0	132.9	199.7	149
Merredin	4.0	45.0	30.0	32.3	96.0	142
Narrogin	152.0	263.0	203.0	131.9	277.9	373
Newman	64.0	111.0	136.0	179.5	288.4	175
Northam	355.0	299.0	403.0	248.5	1,734.8	485
Pinjarra	27.0	83.0	45.0	44.7	232.8	180
Port Hedland	80.0	142.0	94.0	69.4	150.7	279
South Hedland	325.0	546.0	311.0	585.0	960.7	639
York	81.0	63.0	143.0	125.8	337.2	193
Average	67.0	78.0	105.0	139.0	160.2	274
Average (excluding Perth)	122.3	167.5	184.5	160.8	394.2	375.0
	124.1	169.8	187.0	162.1	397.7	376.9

Table 31: Sewage Collected Per Property (kL per annum)

	2010	2011	2012	2013	2014	2015
<b><u>NWC Towns</u></b>						
Albany	195	185	188	180	182	170
Australind / Eaton	162	160	159	163	160	159
Bunbury / Dalyellup	182	175	178	173	181	185
Busselton	182	175	178	149	148	146
Geraldton	171	153	157	153	152	149
Kalgoorlie/Boulder	192	180	179	177	166	156
Mandurah	144	136	144	141	145	144
Perth	189	182	189	187	190	185
<b><u>Minor Towns</u></b>						
Broome	207	200	251	244	197	186
Collie	221	169	194	175	201	164
Dunsborough	154	144	142	140	146	121
Esperance	178	177	202	191	192	168
Jurien	73	73	73	89	101	96
Karratha	177	201	261	229	211	211
Katanning	175	142	148	166	169	171
Kununurra	297	318	324	286	306	256
Manjimup	221	184	237	183	211	210
Merredin	126	131	176	152	139	149
Narrogin	211	156	205	204	204	194
Newman					not applic	not applic
Northam	187	156	130	157	191	187
South Hedland	250	312	338	350	352	314
Average	<b>185</b>	<b>177</b>	<b>193</b>	<b>185</b>	<b>188</b>	<b>177</b>
Average (excluding Perth)	<b>185</b>	<b>176</b>	<b>193</b>	<b>185</b>	<b>188</b>	<b>177</b>

**Table 32: Recycled Water (% of Effluent Recycled)**

	2010	2011	2012	2013	2014	2015
<b><u>NWC Towns</u></b>						
<b>Albany</b>	96.0	100.0	100.0	100.0	100.0	100.0
<b>Australind / Eaton</b>	100.0	100.0	100.0	100.0	100.0	100.0
<b>Bunbury / Dalyellup</b>	5.0	5.0	3.9	3.8	5.0	3.2
<b>Busselton</b>	15.0	20.0	18.0	16.6	15.0	14.0
<b>Geraldton</b>	14.0	14.7	13.6	13.8	13.0	12.7
<b>Kalgoorlie/Boulder</b>	75.4	100.0	100.0	72.4	56.0	97.0
<b>Mandurah</b>	1.7	1.5	2.4	2.1	2.0	2.4
<b>Perth</b>	6.1	7.4	8.0	7.9	7.0	7.0
<b><u>Minor Towns</u></b>						
<b>Broome</b>	15.0	20.0	18.0	102.0	100.0	100.0
<b>Collie</b>	0.0	0.0	0.0	0.0	0.0	0.0
<b>Dunsborough</b>	63.0	78.0	100.0	100.0	100.0	100.0
<b>Esperance</b>	31.0	30.0	25.0	16.0	15.0	12.1
<b>Jurien</b>	0.0	0.0	0.0	0.0	0.0	0.0
<b>Karratha</b>	92.0	66.0	51.0	50.0	49.1	51.4
<b>Katanning</b>	100.0	100.0	100.0	69.0	56.4	83.0
<b>Kununurra</b>	0.0	0.0	0.0	100.0	100.0	100.0
<b>Manjimup</b>	100.0	84.0	79.0	84.1	92.9	85.4
<b>Merredin</b>	100.0	100.0	100.0	100.0	100.0	95.5
<b>Narrogin</b>	27.0	45.0	25.0	26.0	29.2	22.4
<b>Newman</b>					not applic	not applic
<b>Northam</b>	43.0	45.0	39.0	32.0	65.9	44.6
<b>South Hedland</b>	94.0	65.0	94.0	94.0	90.9	56.1
<b>Average</b>	<b>46.6</b>	<b>46.7</b>	<b>46.5</b>	<b>51.9</b>	<b>52.3</b>	<b>51.8</b>
<b>Average (excluding Perth)</b>	<b>48.6</b>	<b>48.7</b>	<b>48.4</b>	<b>54.1</b>	<b>54.5</b>	<b>54.0</b>

Table 33: Sewer Main Breaks and Chokes (per 100km of sewer main)

	2010	2011	2012	2013	2014	2015
<b><u>NWC Towns</u></b>						
Albany	26.7	18.2	25.6	30.7	19.0	23.0
Australind / Eaton	6.5	5.0	6.1	6.5	6.0	10.4
Bunbury / Dalyellup	13.2	11.6	12.2	14.6	12.0	12.4
Busseton	2.4	8.4	5.4	8.4	3.0	4.0
Geraldton	10.8	6.7	8.8	14.3	7.0	10.7
Kalgoorlie/Boulder	76.0	73.1	63.7	24.4	30.0	18.0
Mandurah	11.8	11.1	8.1	9.4	8.0	7.5
Perth	22.2	19.3	18.6	16.1	17.0	17.5
<b><u>Minor Towns</u></b>						
Broome	0.9	7.6	3.0	1.6	4.0	1
Collie	29.8	28.3	33.7	21.3	19.0	26
Dunsborough	3.3	11.0	6.2	12.6	9.0	4
Esperance	7.3	5.8	2.7	8.4	12.0	17
Jurien					3.0	6
Karratha	18.9	17.8	20.1	29.5	16.0	16
Katanning	52.3	82.8	52.4	54.8	62.0	62
Kununurra	26.9	40.8	20.5	7.4	23.0	27
Manjimup	2.0	8.1	14.0	18.0	18.0	8
Merredin	35.1	29.7	32.4	32.4	25.0	39
Narrogin	81.7	61.7	57.8	62.2	82.0	81
Newman	40.7	25.3	37.5	48.8	40.0	25
Northam	49.6	68.4	48.8	46.4	64.0	46
South Hedland	15.0	25.7	39.5	39.5	22.0	28
Average	24.2	27.0	24.6	24.2	23.9	23.3
Average (excluding Perth)	24.3	27.4	24.9	24.6	24.2	23.6

Table 34: Total Connected Properties – Sewerage (000's)

	2010	2011	2012	2013	2014	2015
<b><u>NWC Towns</u></b>						
<b>Albany</b>	11.0	11.3	11.1	11.4	12.0	11.7
<b>Australind / Eaton</b>	7.0	8.0	8.0	8.3	9.0	8.9
<b>Bunbury / Dalyellup</b>	15.3	15.8	16.2	16.6	17.0	16.8
<b>Busseton</b>	9.0	10.0	10.0	10.6	10.9	11.3
<b>Geraldton</b>	10.0	10.3	10.5	11.2	12.0	11.9
<b>Kalgoorlie/Boulder</b>	13.7	14.7	15.0	14.0	15.1	15.0
<b>Mandurah</b>	31.6	33.4	33.8	34.7	36.0	37.5
<b>Perth</b>	659.0	675.9	685.4	698.1	713.0	731.4
<b><u>Minor Towns</u></b>						
<b>Broome</b>	6.0	6.2	6.0	6.2	6.5	6.7
<b>Collie</b>	3.0	3.0	3.2	3.2	3.2	3.3
<b>Dunsborough</b>	3.0	3.2	3.2	3.5	3.7	3.8
<b>Esperance</b>	4.0	3.7	3.7	3.8	3.9	4.0
<b>Jurien</b>	1.0	0.6	0.6	0.7	0.7	0.7
<b>Karratha</b>	8.0	8.2	8.6	7.2	7.8	7.9
<b>Katanning</b>	2.0	1.6	1.6	1.6	1.6	1.6
<b>Kununurra</b>	2.0	1.7	1.8	1.8	1.9	1.9
<b>Manjimup</b>	2.0	1.7	1.7	1.7	1.7	1.7
<b>Merredin</b>	1.0	1.4	1.3	1.4	1.4	1.4
<b>Narrogin</b>	2.0	1.9	1.9	1.9	1.9	1.9
<b>Newman</b>	3.0	4.0	2.3	2.4	2.5	2.7
<b>Northam</b>	3.0	2.8	2.8	2.8	2.9	2.9
<b>South Hedland</b>	4.0	4.1	3.8	4.0	4.2	4.8
<b>Total</b>	<b>801</b>	<b>824</b>	<b>833</b>	<b>847</b>	<b>869</b>	<b>890</b>
<b>Total (excluding Perth)</b>	<b>142</b>	<b>148</b>	<b>148</b>	<b>149</b>	<b>156</b>	<b>159</b>

Table 35: Sewerage Service Complaints (per 1,000 customers)

	2010	2011	2012	2013	2014	2015
<b><u>NWC Towns</u></b>						
Albany	2.7	1.1	0.8	0.3	0.1	0.2
Australind / Eaton	1.7	4.1	2.4	0.1	0.1	0.0
Bunbury / Dalyellup	1.4	0.4	1.6	0.2	0.1	0.1
Busseton	1.7	1.0	0.4	0.3	0.1	0.2
Geraldton	0.0	1.3	0.7	0.2	0.7	0.8
Kalgoorlie/Boulder	26.4	24.6	12.3	4.1	4.2	3.0
Mandurah	1.4	0.8	0.3	0.1	0.0	0.0
Perth	2.1	1.4	0.4	0.2	0.1	0.0
<b><u>Minor Towns</u></b>						
Broome	1.2	0.2	0.0	0.0	0.0	0.0
Collie	1.4	0.7	0.0	0.0	0.0	0.0
Dunsborough	0.0	2.2	1.2	0.0	0.0	0.0
Esperance	0.5	0.5	0.0	0.0	0.0	0.2
Jurien	0.0	0.0	0.0	0.0	0.0	0.0
Karratha	1.3	1.3	0.4	0.0	0.0	0.0
Katanning	1.9	1.3	1.3	0.6	0.0	0.0
Kununurra	3.8	1.8	1.1	1.1	0.0	0.0
Manjimup	1.9	0.6	1.2	1.2	0.0	0.0
Merredin	0.7	2.9	0.7	3.0	0.0	0.0
Narrogin	0.5	1.6	0.5	0.5	0.0	0.0
Newman	0.9	1.0	0.0	0.0	0.0	0.0
Northam	4.4	1.4	0.4	0.0	0.3	0.3
South Hedland	3.6	1.2	0.0	0.0	0.0	0.0
Average	<b>2.7</b>	<b>2.3</b>	<b>1.2</b>	<b>0.5</b>	<b>0.3</b>	<b>0.2</b>
Average (excluding Perth)	<b>2.7</b>	<b>2.4</b>	<b>1.2</b>	<b>0.6</b>	<b>0.3</b>	<b>0.2</b>

Table 36: Total Recycled Water Supplied (ML)

	2010	2011	2012	2013	2014	2015
<b><u>NWC Towns</u></b>						
Albany (W/S)	2063	1993	1929	2051	2114	2009
Australind / Eaton (W/S)	1144	1209	1257	1350	1378	1433
Bunbury (W)	0	0	0	0	0	0
Bunbury / Dalyellup (S)	140	138	111	110	148	102
Busselton (W)	0	0	0	0	0	0
Busselton (S)	236	291	265	261	245	230
Geraldton (W/S)	240	233	223	235	237	221
Kalgoorlie/Boulder (W)	0	0	0	0	0	0
Kalgoorlie/Boulder (S)	1988	2289	1817	1793	1410	1607
Mandurah (W/S)	78	70	119	104	119	131
Perth (W/S)	7551	9134	10370	10273	10029	9354
<b><u>Minor Towns</u></b>						
Bridgetown/Hester (W)	48	20	35	35	43	33
Broome (W/S)	1009	1094	737	869	949	963
Carnarvon (W)	230	283	257	231	236	229
Collie (W/S)	0	0	0	0	0	0
Denmark (W)	0	0	0	0	0	0
Derby (W)	292	300	273	270	248	291
Dongara / Denison (W)	0	0	125	148	143	139
Dunsborough (W/S)	293	356	461	495	515	462
Esperance (W/S)	155	149	132	84	72	67
Harvey/Wokalup (W)	0	0	0	0	0	0
Jurien (W/S)	0	0	0	0	0	0
Karratha (W/S)	1160	999	789	842	599	603
Katanning (W/S)	277	226	232	178	150	205
Kununurra (W/S)	0	0	0	546	528	459
Manjimup (W/S)	353	256	313	259	337	339
Margaret River scheme (W)	399	397	421	429	932	821
Merredin (W/S)	109	102	116	102	91	105
Narrogin (W/S)	109	135	96	101	114	83
Newman (W/S)	0	0	0	0	0	not applic
Northam (W/S)	127	146	126	120	226	157
Pingarra (W)	249	198	273	268	319	343
Port Hedland (W)	175	268	176	176	176	62
South Hedland (W/S)	632	670	616	587	582	564
York (W)	19	22	28	22	30	22
<b>Total</b>	<b>19,076</b>	<b>20,978</b>	<b>21,297</b>	<b>21,939</b>	<b>21,970</b>	<b>21,034</b>
<b>Total (excluding Perth)</b>	<b>11,525</b>	<b>11,844</b>	<b>10,927</b>	<b>11,666</b>	<b>11,941</b>	<b>11,680</b>

