

# Indicators and trends

## Monitoring climate change adaptation

Scotland's centre of expertise connecting climate change research and policy

Indicator name			Version
BW8 Domestic water usage			26/06/18
Indicator type:	Risk/opportunity	Impact	Action
			X
SCCAP Theme	SCCAP Objective	CCRA risk/opportunity	
Buildings and infrastructure networks	B2: Provide the knowledge, skills and tools to manage climate change impacts on buildings and infrastructure  N2: Support a healthy and diverse natural environment with the capacity to adapt	BD15 Increased societal water demand  WA5 Public water supply-demand deficits  WA4 Changes in household water demand	

### At a glance

- This indicator covers domestic water usage from mains supplies.
- Climate change is expected to reduce summer rainfall in parts of Scotland, and this may increase the pressure on water resources for some areas
- Population growth is expected to increase water demand in the household sector
- Scottish Water is implementing water efficiency measures designed to mitigate this increase

Latest Figure	Trend
<u>2017/2018:</u> Total water volume used by households: 904 megalitres (MI) per day.  Per capita consumption: 153 litres per person per day.	<u>2008/9 to 2017/18:</u> No clear trend in total household water use.  Per capita water consumption has remained fairly stable.

### Why is this indicator important?

Although Scotland is a relatively water rich country, there are not unlimited resources available for treatment and supply. The combined effect of climate change and the growing worldwide population may increase the pressure on available global water resources (Scottish Water, 2012). Possible climate impacts include changes in the quality and availability of water resources, increased variability in rainfall patterns, and restrictions on discharging wastewater back to the environment (Scottish Water, 2013).

Ensuring that the available resources are used in a sustainable way is critical to Scotland's future prosperity (Scottish Water, 2012). Reducing water demand is important in order to reduce the risk of loss of supply to customers and meet future demand requirements. By monitoring both household and non-household (BW9) water usage it is possible to assess changes in societal water demand. This indicator specifically examines household water usage, and provides a measure of the effectiveness of the strategies employed to increase efficiency of water used by households.

#### Related indicators:

**BW6** Water leakage and losses

**BW7** Customers and zones vulnerable to supply deficit

**BW9** Non-domestic water usage

**NB27** Summer low flow events in Scottish rivers

### What is happening now?

Over the last few years Scottish Water has undertaken a campaign to educate its household customers about measures they can take to preserve water resources. This has been achieved through customer information communications, on-line promotions, and partnerships with local authorities. They are also assessing the relative costs, effectiveness, and sustainability of different measures that may reduce household water consumption, in order to inform policy in Scotland (Scottish Water, 2012). Activities include a water efficiency trial to understand how household customers use water and what motivates them to engage in water efficient behaviours. Data collection for the trial has been ongoing since 2015/16, with early findings indicating that a combination of physical interventions to properties and customer education can potentially achieve modest reductions in water use. Learning gained from the trial has enabled the development of a plan to issue water efficiency advice packs to 49,000 households in areas susceptible to supply shortages (Scottish Water, 2017a).

Scottish Water is a member of Water Industry Research (UKWIR), and works to promote and adopt that body's best practice guidance, together with best practices in agreement with the Water Industry Commission for Scotland (WICS) appointed Leakage Reporter (Walton, 2018).

### What has happened in the past?

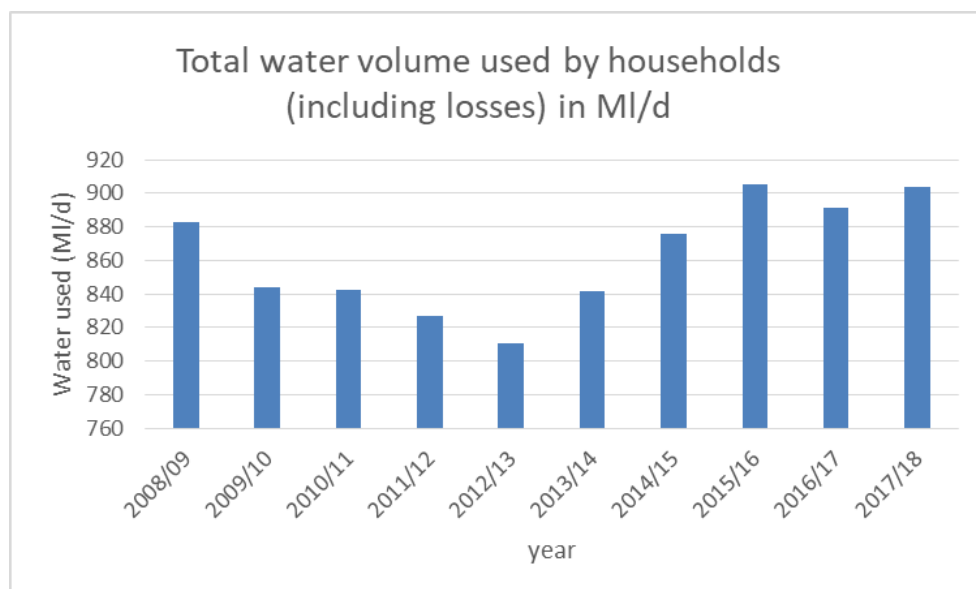
Water consumption statistics are calculated each year between the 1<sup>st</sup> April and the 31<sup>st</sup> March. Table 1 shows the yearly figure for household water consumption from the 2008/9 period to 2017/18. As only a very small number of households in Scotland have water meters, consumption is monitored on an area basis. Thus the first column in Table 1 ('Water Volume used by un-metered households') covers nearly all households and is calculated using data reported from Scottish Water's Continuous Area Per Household Consumption (PHC) Monitor.

The second column ('Water Volume used by metered households') reflects the consumption recorded by the very few households that have water meters (circa 400-500), plus an element for meter under registration. The third column shows the total volume across un-metered and metered households.

Figure 1 illustrates the trend in household water consumption over time. The total volume of water used by domestic customers reduced each year between 2008/9 and 2012/13 to 92% of the 2008/9 figure, and then increased, peaking in 2015/16 at 103% of the 2008/9 figure.

**Table 1** Volume of household water delivered (including supply pipe losses) in megalitres per day.

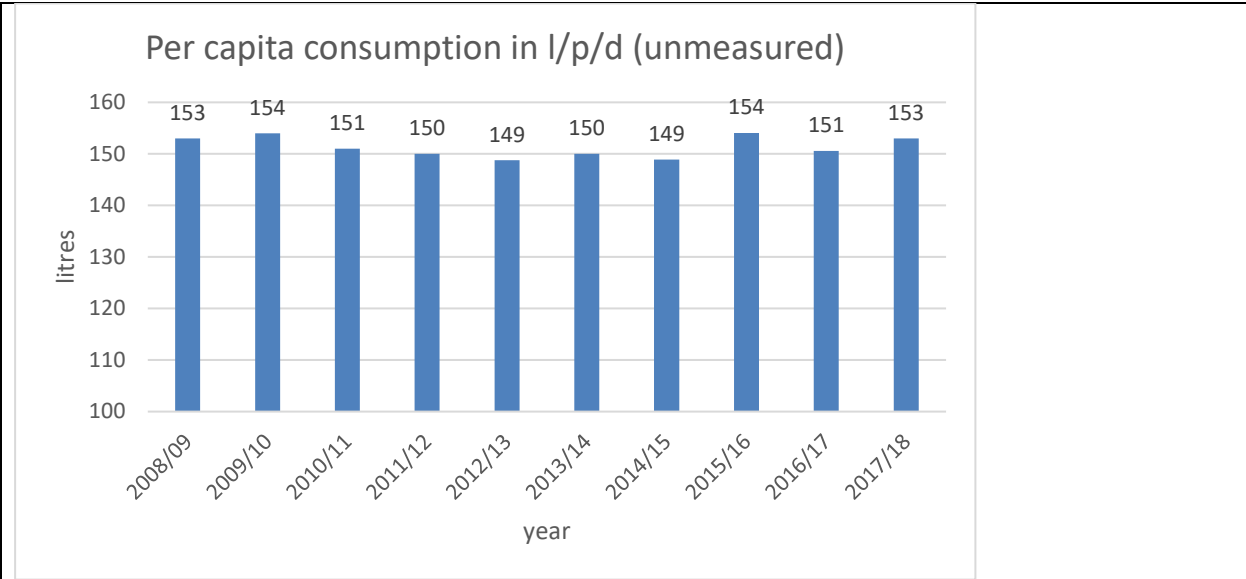
Year	Water Volume used by un-metered households (including losses) in MI/d	Water Volume used by metered households (including losses),MI/d	Total household volume of water (including losses), MI/d
2008/09	882.26	0.25	882.51
2009/10	843.84	0.23	844.07
2010/11	841.89	0.28	842.17
2011/12	826.40	0.24	826.64
2012/13	810.20	0.19	810.39
2013/14	841.41	0.23	841.64
2014/15	875.8	0.22	876.02
2015/16	905.19	0.25	905.44
2016/17	891.14	0.25	891.39
2017/18	903.81	0.24	904.05



**Figure 1** Total volume of household water delivered (including supply pipe losses) per day.

Note: Vertical axis is not scaled to zero

The trend in per capita water consumption, which has remained relatively stable, is shown in Figure 2. It decreased slightly from 2009/10 to 2012/13, and there was a slight increase in 2015/16.



**Figure 2** Unmeasured per capita water consumption in litres per person per day

Note: Due to the very small number of metered domestic properties (around 400-500, with 2.5m unmeasured), per capita consumption data presented is based on unmeasured households only. Vertical axis is not scaled to zero.

**What is projected to happen in the future?**

By 2035 the Scottish population is expected to grow by 10%, primarily due to the net inward migration from Europe, placing additional demands on the water supply. In addition, the number of households is expected to grow by 21%, although the average household occupancy rate will reduce from 2.18 to 1.93. In addition, climate change may result in alterations to the availability or quality of water sources (Scottish Water, 2013), which could impact on future water supplies.

**Patterns of change**

If Scotland’s population grows in some of the eastern areas of Scotland where rainfall is expected to decrease, the extra demand on water resources may cause some environmental pressures. However, Scottish Water is implementing water efficiency measures, which may help to reduce the increase in demand.

**Interpretation of indicator trends**

Between the 2012/2013 and 2013/2014 reporting periods, there was an increase in the volume of water delivered to un-metered households, which could be attributed to an increase in the estimated rate of supply pipe losses per property (Scottish Water, 2014). There was also an increase in Per Capita Consumption (PCC) of around 1.2 l/person/day (See Figure 1). The measured household volume of water delivered also increased by 0.04 Ml/d compared to the previous year.

The slight increase in per capita consumption from 2015/16 reflects Scottish Water’s investment into state of the art flow meters, pressure monitoring devices and data loggers that enable more frequent collection of flow and pressure data, helping more accurate quantification of domestic water consumed (Walton, 2018). This suggests that the apparent slight increase in consumption in the last 3 years may result from more accurate measurement rather than an actual change.

The number of metered properties is fairly small (just 440 in 2017/18), and is not constant, therefore figures relating to this group may be misleading. The volume of metered water delivered decreased by 0.06Ml/d between 2008/9 and 2012/13 period, which may simply be related to a reduction in the number of measured households.

Reported per capita consumption over the period may also be influenced by changes in the socio-demographic data used to stratify the customer property base, changes in property vacancy levels reported by Local Authorities, changes in the reported numbers of properties connected to the network and variations in the weather year to year (Walton, 2018).

Customer demand may vary from year to year due to weather conditions. For example, household consumption reduced in 2016/17, compared to the previous year. Scottish Water attributed this in part to the cool summer with above average rainfall reducing demand (Scottish Water, 2017b). The weather can also have a significant effect on levels of leakage (ibid).

## Limitations

Data covers households supplied from the water mains only, and does not cover households that use private water supplies.

Domestic water usage will be affected by lifestyle – for example it is likely to be less for people who go out to work, or who spend substantial time away from home, and more for those who spend the majority of their time at home.

Scottish Water is continually utilising new technologies to improve the accuracy of monitoring of domestic water consumption (Walton, 2018).

## References

Scottish Water (2017a) *Scottish Water Annual Return 2016/17 Overview*. Scottish Water. Available online at: [https://www.watercommission.co.uk/UserFiles/Documents/Overview\\_1.pdf](https://www.watercommission.co.uk/UserFiles/Documents/Overview_1.pdf)

Scottish Water (2017b). *Scottish Water WIC Annual Return: Commentary June 2017*. Available online at: [https://www.watercommission.co.uk/UserFiles/Documents/Commentary\\_2.pdf](https://www.watercommission.co.uk/UserFiles/Documents/Commentary_2.pdf)

Scottish Water (2014). *Scottish Water Annual Return Commentary 2013-2014*. Scottish Water. Available online at: <http://www.watercommission.co.uk/UserFiles/Documents/20140613%20-%20AR14%20Commentary.pdf>

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Walton (2018). Walton, M. (Scottish Water). Personal communication, 23 May 2018.

Water Industry Commission for Scotland (2018). *Scottish Water's Annual Return*. Available online at: [https://www.watercommission.co.uk/view\\_Regulatory\\_data.aspx](https://www.watercommission.co.uk/view_Regulatory_data.aspx)

### Further information

### Acknowledgements

Miranda Jacques-Turner, Martin Walton and Peter Douglas (Scottish Water) provided additional data and contextual information.

Author of 2016 indicator version: Lynne Jack and Ailsa Strathie (Heriot-Watt University), using data provided by Scottish Water; contribution from Katherine Beckmann (Heriot-Watt University/CXC).

## Appendix One: Indicator metadata and methodology

**Table 1: Indicator metadata**

	Metadata
<b>Title of the indicator</b>	BW8 Domestic water usage
<b>Indicator contact:</b> Organisation or individual/s responsible for the indicator	ClimateXChange
<b>Indicator data source</b>	Data publicly available from the Water Industry Commission for Scotland. Additional data supplied by Scottish Water.
<b>Data link:</b> URL for retrieving the indicator primary indicator data.	<a href="https://www.watercommission.co.uk/view_Regulatory_data.aspx">https://www.watercommission.co.uk/view_Regulatory_data.aspx</a>

**Table 2: Indicator data**

	Indicator data
<b>Temporal coverage:</b> Start and end dates, identifying any significant data gaps.	April 2008 – March 2018
<b>Frequency of updates:</b> Planned or potential updates	Data is updated annually. A year runs from 1 <sup>st</sup> April to 31 <sup>st</sup> March.
<b>Spatial coverage:</b> Maximum area for which data is available	Scotland
<b>Uncertainties:</b> Uncertainty issues arising from e.g. data collection, aggregation of data, data gaps	
<b>Spatial resolution:</b> Scale/unit for which data is collected	Megalitres delivered per day (including losses)
<b>Categorical resolution:</b> Potential for disaggregation of data into categories	Per capita / per household / un-metered and metered households.
<b>Data accessibility:</b> Restrictions on usage, relevant terms & conditions	Publicly Available Data. Per capita consumption data not publicly available; obtained direct from Scottish Water.

**Table 3 Contributing data sources**

<b>Contributing data sources</b>
Data sets used to create the indicator data, the organisation responsible for them and any URLs which provide access to the data.
<a href="https://www.watercommission.co.uk/view_Regulatory_data.aspx">https://www.watercommission.co.uk/view_Regulatory_data.aspx</a>

**Table 4 Indicator methodology**

<b>Indicator methodology</b>
The methodology used to create the indicator data
The indicator is derived from data supplied to the Water Industry Commission for Scotland in Scottish Water's Annual Return tables ( <a href="#">Water Industry Commission for Scotland, 2018</a> ). The unmeasured household volume is calculated using data reported from Scottish Water's Continuous Area Per Household Consumption (PHC) Monitor (Scottish Water, 2017b). The measured household consumption reflects actual consumption as recorded at metered Supply Points plus an element for meter under registration (Scottish Water, 2014). These figures were summed to produce the total yearly figure reported. The unmeasured per capita consumption data was provided directly by Scottish Water.