

# DRINKING WATER QUALITY IN SCOTLAND 2013 SUMMARY

ANNUAL REPORT BY THE DRINKING WATER QUALITY REGULATOR FOR SCOTLAND



SAFEGUARDING YOUR DRINKING WATER QUALITY



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The Drinking Water Quality Regulator for Scotland (DWQR) regulates the quality of water supplied by Scottish Water and has a role to ensure that local authorities are meeting their responsibilities to regulate the quality of private water supplies. The role of DWQR was created by the Water Industry (Scotland) Act 2002 (“the Act”), which gives the Regulator various powers to enter premises as part of an investigation, to obtain information and to take enforcement action. This report fulfils the requirement under the Act that the DWQR publishes a report on the exercise of the Regulator’s functions during the previous year. This report relates to the calendar year 2013.

The quality standards that drinking water supplies must meet are set out in regulations and the function of DWQR is to ensure that these regulations are complied with. In Scotland the regulations relating to the quality of water supplied by Scottish Water are the Water Supply (Water Quality) (Scotland) Regulations 2001. Private water supplies have equivalent regulations – the Private Water Supply (Scotland) Regulations 2006 – which are enforced by local authorities. Quality standards in both regulations are derived from the European Drinking Water Directive 98/83/EC.

In Scotland the water supplier, Scottish Water, takes and analyses its own samples to demonstrate that the water supplied complies with regulatory requirements. This is consistent with water industry practice in the rest of the UK. The DWQR checks that this has been done correctly and monitors the results. DWQR also inspects a range of Scottish Water activities that could affect quality and investigates any water quality incidents that are reported.

Drinking water in Scotland comes from a number of sources. All supplies need to be treated before they are of satisfactory quality to be drunk by consumers. The extent and type of treatment required depends on the nature of the supply, its quality and any potential risks to quality that are present. All water in Scotland supplied by Scottish Water is disinfected. This usually involves adding a tightly controlled amount of chlorine to the water in order to make it safe. Summary facts about the public water supply in Scotland are shown below:



**197 Loch and Reservoir Sources**



**177 River Sources**



**84 Spring and Borehole Sources**



**47,000km Water Mains**



**252 Water Treatment Works**



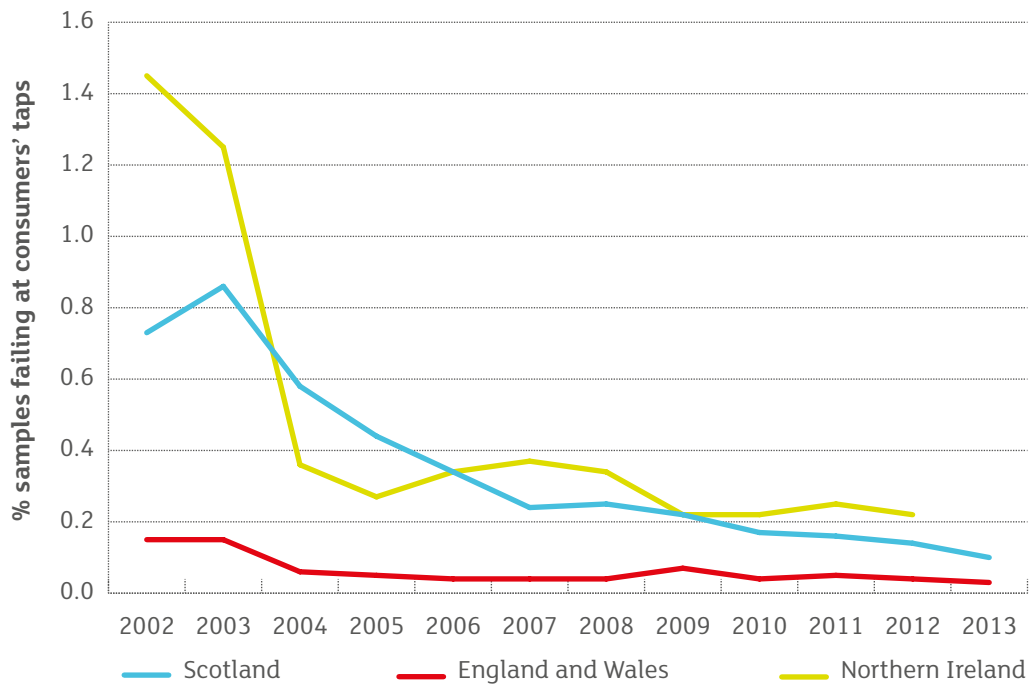
**1,001 Storage Points**

### COMPLIANCE WITH THE STANDARDS – HOW GOOD WAS DRINKING WATER IN 2013?

Scottish Water carried out 330,156 regulatory tests for which there is a numerical standard on Scotland's drinking water in 2013 and many more for operational purposes. Some of these tests were on samples taken from water as it leaves treatment works and storage points. The largest number of samples was collected from randomly selected consumers' taps across the country, and this is where compliance is generally measured as it is the point at which users consume the water.

In 2012, 154,755 tests were carried out on samples collected from consumers taps and 99.89% of these complied with the standards, demonstrating the continued improvement in drinking water quality. The chart shows that compliance in Scotland has improved considerably in the 11 years since Scottish Water was formed. It also shows that there remains more to do before water quality in Scotland consistently achieves the same standard as that in England and Wales.

#### Relative compliance at consumers' taps in the UK



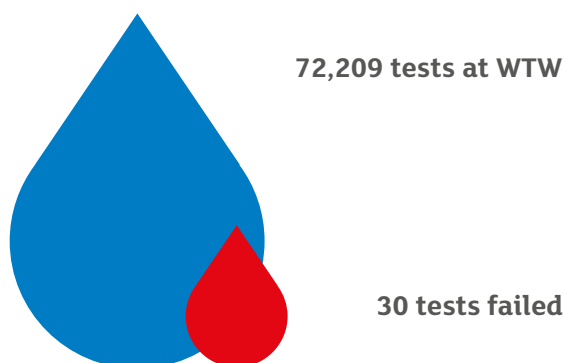
## WATER QUALITY AT TREATMENT WORKS

The 252 water treatment works (WTW) around Scotland vary considerably in size, but all are sampled regularly. In 2013, 72,209 tests were carried out on samples collected at treatment works. The main compliance parameters are microbiological – coliforms and *E. coli* – and these provide an important check that disinfection has been effective. In 2013, only 17 samples contained coliforms and 1 contained *E. coli*. This represents a significant improvement on past years with detections of both parameters around half those in 2012, and represents the best ever microbiological compliance.

*Cryptosporidium* is a microscopic organism that can cause illness and can be present in untreated water contaminated by faecal material. The treatment process should be able to remove it. Scottish Ministers require Scottish Water to sample supplies and test for *Cryptosporidium* in all supplies at a frequency that depends on risk. Out of 8,300 samples from 252 treatment works in 2013, 118 contained *Cryptosporidium* oocysts. The number of treatment works from which at least one positive sample was taken was 43. Both of these figures are a considerable improvement on 2012, although there is plenty of scope for additional progress.

Water treatment works performed well in 2013, reflecting delivery of investment, improved sampling arrangements and significant efforts by operational staff. DWQR inspections of works have generally shown treatment works to be adequately equipped and well managed. Among site specific issues identified, some common themes emerged, including a need to more comprehensively assess and respond to important risks to water quality, including the need for additional water quality monitoring where a risk has been identified.

Work to fully understand the operation of key parts of the treatment process and the science behind these at some sites is beginning to bear fruit. It is vital Scottish Water continues this work and challenges long-standing assumptions and operational practices where appropriate. Nowhere is this more apparent than with *Cryptosporidium* and the need to investigate detections and assess plant performance against well-documented industry best practice to ensure the necessary resilience is built into all treatment processes.



## WATER QUALITY IN DISTRIBUTION SYSTEMS

The distribution system comprises the network of pipes delivering water to homes and businesses as well as any storage points such as water towers and service reservoirs. Scottish Water has over a thousand storage points and more than 47,000km of water mains and it must ensure that the condition of these does not cause water quality to deteriorate.

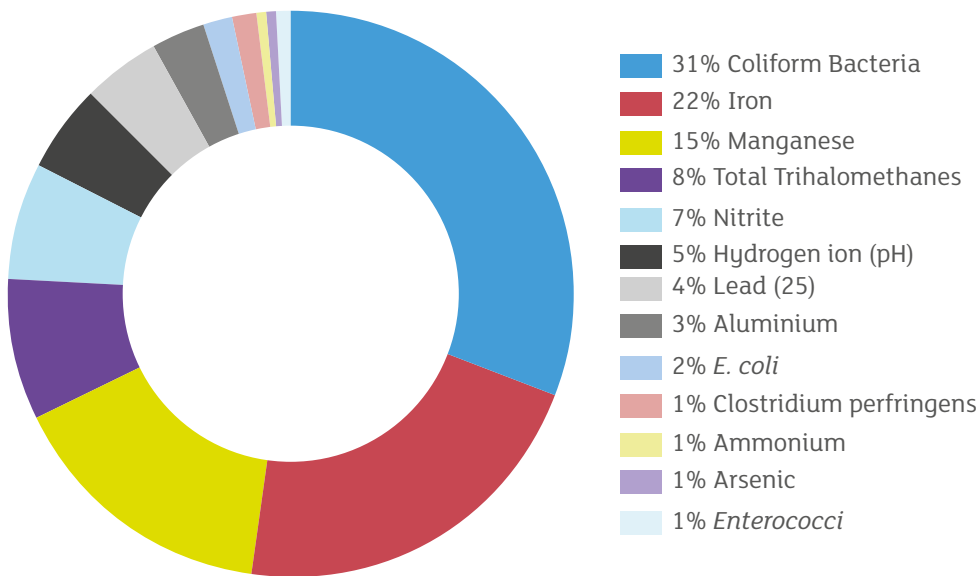
Scottish Water must sample each storage point weekly and test for *E. coli* and coliform bacteria. According to the Regulations, 5% of samples from a storage point may contain coliforms before it is considered to have failed to meet the standard, however, DWQR expects all detections to be investigated. In 2013, 3 samples contained *E. coli* and no storage points failed to meet the regulatory requirement that 95% of samples shall not contain coliforms. This is the first time that this has been achieved. Scottish Water's investigation of failures at storage points has improved over the year and is helping to bring about improvements to the assets and to working practices, although there remains much to do.

Although they are measured at consumer's taps, iron and manganese compliance provides an indication of the condition of the distribution system and any sediment within it. Both substances can cause discoloration that can greatly inconvenience consumers and lead to complaints. In 2013, compliance for iron and manganese remained fairly static compared to previous years. Rawburn supply zone in the Scottish Borders had the poorest iron compliance, while five of the 25 manganese failures occurred in Muirdykes zone where there is a known problem that is the subject of an Undertaking from Scottish Water.

### WATER QUALITY AT CONSUMERS' TAPS

Most samples to assess regulatory compliance are taken from consumer taps, and testing takes place for 51 parameters that have numerical standards. Sampling frequencies are determined by the size of the population in the water supply zone. The vast majority of samples that were taken complied fully with regulatory requirements. For microbiology, three samples contained *E. coli*, one more than in 2012. The poorest compliance was for total trihalomethanes (99.14%), iron (99.32%), lead (99.54%) and manganese (99.51%), with all of these except iron an improvement on last year. Trihalomethane (THM) compliance was greatly improved on that of 2012, with extensive work by Scottish Water to reduce the number of failures due to this disinfection by-product producing results. This work must continue to bring THM compliance in Scotland into line with that in the rest of the UK.

### Failures at consumers' taps by parameter



The percentages show the proportion of total failures



## EVENTS AND INCIDENTS

Very occasionally things go wrong, and Scottish Water is required to tell DWQR about all events that could adversely affect water quality or cause concern to consumers. In 2013, 419 such events were notified to DWQR, a significant reduction on previous years. DWQR considers each event and classifies them. The more serious ones are declared incidents and may require a full report from Scottish Water. DWQR investigates incidents and produces a written assessment, making recommendations where appropriate. Incident assessments are published on the DWQR website. In 2013, 24 events were classified as incidents, representing a sharp drop on 2012. Once again, the number of incidents that were caused by a failure of the disinfection process is too high. Scottish Water has committed to producing disinfection strategies at all of its treatment works. These should consider the effectiveness and resilience of the current disinfection process at each site and identify any risks that need to be addressed via the drinking water safety planning process.

Three significant incidents occurred in 2013:

- Tomnavoulin WTW, Moray  
*Cryptosporidium* was detected in the supply, which has had a history of problems of this nature. It is evident that the measures put in place previously to address problems in 2012 at the works have not been completely effective. Scottish Water has replaced membranes, installed additional monitoring and is continuing to investigate the situation. DWQR has visited the site and has been engaged in ongoing dialogue with Scottish Water concerning the resilience offered by the plant and is continuing to seek a prompt, lasting, solution to ensure that consumers in Tomnavoulin have a safe and reliable supply of drinking water.
- Bradan WTW, Ayrshire  
 Bradan water treatment works suffered a failure of the disinfection process for nearly three hours. Further investigation established that an isolation valve from the standby chlorine drum was in a closed position and the drum appeared empty when it was in fact full. Emergency chlorine dosing to the clear water tank was used until the issue was rectified and prevented any impact on the quality of water supplied to consumers. DWQR visited the site to speak to staff and better understand the circumstances around the incident. Scottish Water has implemented various measures to prevent a recurrence.
- Storr Forest WTW, Skye  
*Cryptosporidium* was detected in large quantities in a sample taken from this basic supply. Further detections continued at lower concentrations through the Autumn until clear samples were eventually obtained in November. Scottish Water took advice from NHS Highland throughout the incident. Storr Forest is vulnerable to changes in raw water quality as there is no filtration process and there has been a history of intermittent *Cryptosporidium* previously in the supply.

DWQR considers that, although some actions to improve source protection have been taken, the current treatment at the site is inadequate for the risks present and the new membrane plant planned for the supply should be constructed as quickly as possible, with temporary filtration equipment installed at the site to reduce the risk.

### AUDIT AND INSPECTION

Audit and Inspection is a key part of DWQR's role and DWQR undertakes a number of inspections across Scotland every year, auditing against regulatory requirements and industry best practice. This enables DWQR to monitor Scottish Water's performance and hear about issues first hand from operational staff as well as comparing practices in different parts of Scotland. Where deficiencies are noted, DWQR makes recommendations, the resolution of which is tracked. Elements of best practice are also noted. In 2013, DWQR undertook the following inspections:

- 7 water treatment works
- 10 treated water storage points
- Scottish Water's complaints procedure
- Scottish Water's procurement processes

The treatment work's inspections demonstrated that treatment processes were generally being run effectively by highly competent staff. A number of issues were identified. The more commonly occurring themes included the online monitoring of water quality, SCADA systems, and identification of risk.

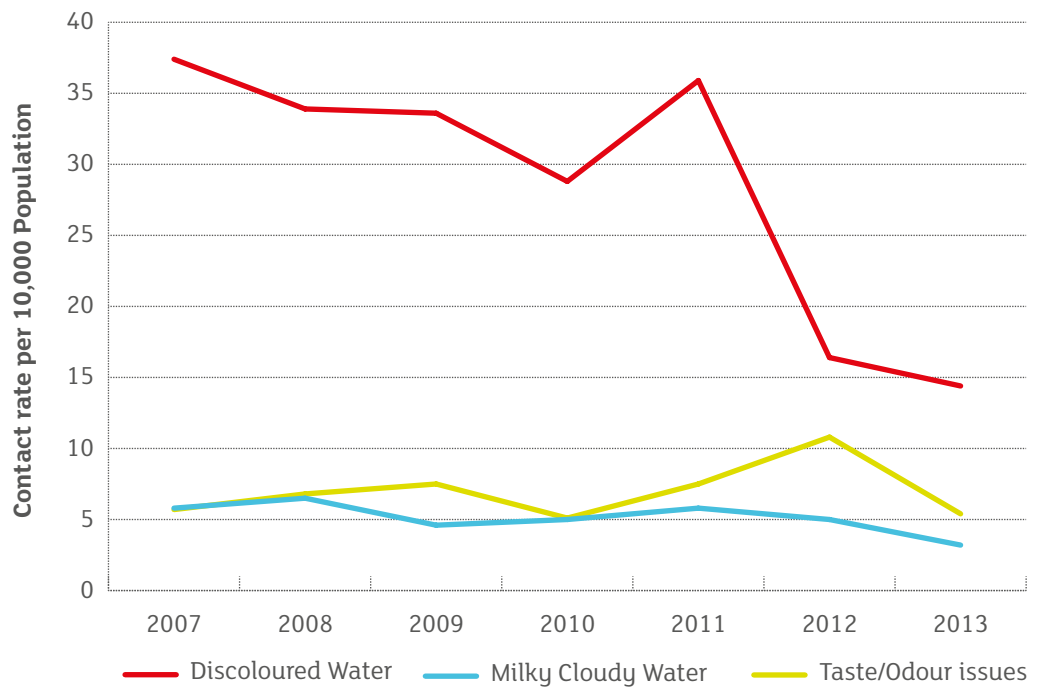
Inspection of storage points around the country highlighted a number of site-specific issues that have been addressed by Scottish Water. The procurement of chemicals and services affecting water quality was audited, with robust processes found to be in place.

52 recommendations were made by DWQR during inspections of WTW.

## CONSUMER CONTACTS

Scottish Water had 12,212 consumer contacts relating to water quality equating to a contact rate of 24.4 per 10,000 population. This is a reduction in overall call volumes of 32.3%, when compared to the number of calls during 2012. This is a considerable and welcome trend, which it is to be hoped can be continued. There is a reduction in the numbers in all categories of call but the largest segment continues to be consumers experiencing discoloured water, although this too shows a downward trend. Over 40% of all taste and odour complaints are about chlorine, the level of complaints is 2.2 per 10,000, which is the lowest seen in the past seven years.

### Trend in key contact categories

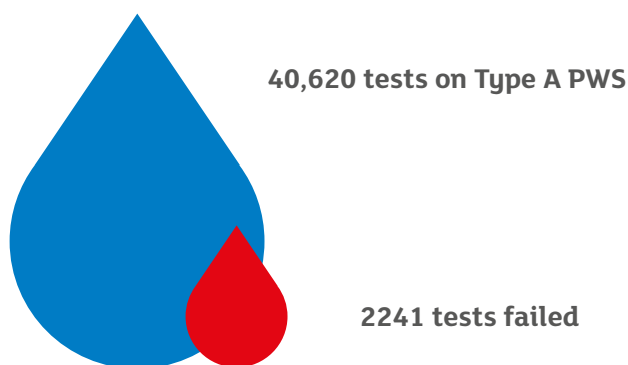


## PRIVATE WATER SUPPLIES

Private water supplies (PWS) are drinking water supplies which are not the responsibility of Scottish Water but of their owners and users. The Private Water Supplies (Scotland) Regulations 2006 (“the 2006 Regulations”) are enforced by local authorities, and the DWQR supervises this enforcement.

The sources of PWS are many and varied, and a large number of householders and businesses depend on them for their drinking water supplies. In 2013, there were 19,916 registered PWS in Scotland which were reported to the DWQR, 2,434 Type A and 17,482 Type B. Type A supplies are those which supply 50 or more people or 10m<sup>3</sup> of water or more, and any PWS which is used in a commercial or public activity. The Type B classification relates to smaller, domestic supplies. Around 3% of Scotland’s population relies on PWS for their drinking water, but a significant number of others, for example visitors and tourists, will also consume these supplies.

Environmental Health teams from local authorities annually review risk assessments and sample larger ‘Type A’ PWS. In 2013, 95.6% of Type A PWS had either a completed or reviewed risk assessment, with 17 local authorities reporting that they had reviewed risk assessments for all of their Type A supplies. A total of 40,620 tests were carried out on samples taken from Type A PWS, with 94.5% of tests complying with the standards. The smaller Type B supplies, which are sampled on a less frequent basis, had 14,521 tests undertaken, of which 88.8% met the required standard.



*E. coli*, which can cause illness, were detected in 13.6% of Type A private water supply samples taken across Scotland. The number of *E. coli* failures occurring on private supplies appears fairly static. It is apparent that many of these failing supplies are reported as having a disinfection process – these results suggest that this is less than effective. DWQR has commissioned research into the effectiveness of ultra violet (UV) disinfection processes on small water supplies of the type found in Scotland.

In 2013, eight notices were served on failing supplies across the whole of Scotland. DWQR finds this disappointing due to the percentage of tests failing and more specifically, the percentage of tests failing for *E. coli*. There are 149 supplies that have failed for *E. coli* for three years or more, with 16 supplies failing for five years. It is vital that such supplies are tackled and, although responsibility for private supplies rests with owners and users, local authorities are urged to provide appropriate advice and make full use of the enforcement powers available to them.

Other parameters which recorded significant numbers of failures on private water supplies in 2013 included colour, iron, manganese and hydrogen ion (pH).

The Scottish Government provides non-means tested grants of up to £800 per property to improve PWS. These are available from local authorities to all who own or use a PWS. In 2013-2014, £845,449 in grants was awarded for PWS improvements. According to the data provided by local authorities this funding improved 291 supplies to 564 properties.

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