

DRINKING WATER QUALITY IN SCOTLAND 2015

PRIVATE WATER SUPPLIES



CONTENTS

EXECUTIVE SUMMARY	2
1 TYPES OF PRIVATE WATER SUPPLIES IN SCOTLAND	4
2 SAMPLING AND RISK ASSESSMENT	7
3 THE QUALITY OF PRIVATE WATER SUPPLIES	11
4 PRIVATE WATER SUPPLY GRANT	18
5 DWQR ACTIVITY AND RESEARCH	20
ANNEXES	23

Annex A - The Regulatory Framework

Annex B – Index of Information Letters issued during 2015

Executive Summary

The Drinking Water Quality Regulator for Scotland (DWQR) has a role in ensuring that local authorities are meeting their responsibilities to regulate the quality of private water supplies. DWQR also regulates the quality of water supplied by Scottish Water. The role of DWQR was created by the Water Industry (Scotland) Act 2002 ("the Act"), which gives the Regulator powers to obtain information. 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 2015 and is for private water supplies, a similar report on the quality of water supplied by Scottish Water was published in August.

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 2015 local authorities reported to DWQR that there were 20,436 registered PWS in Scotland, 2,405 Type A and 18,031 Type B. Type A supplies are those which supply 50 or more people or 10m³ 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 3.4% 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 2015, 96% of Type A PWS had either a completed or reviewed risk assessment, with 19 local authorities reporting that they had reviewed risk assessments for all of their Type A supplies. A total of 42,361 tests were carried out on samples taken from Type A PWS, with nearly 95% of tests complying with the standards. The smaller Type B supplies fall out-with the prescribed monitoring regime but some are sampled at the request of users, grant applications or as part of public health investigations. Of those sampled, 18,356 tests were undertaken, of which 90% met the required standard.

E. coli, which has the potential to cause illness and provides an indication that faecal contamination of the supply has occurred, was detected in 12.3% of Type A private water supply samples taken across Scotland. This is an improvement on that of the previous year when 14.7% of Type A supplies sampled contained *E. coli*. The presence of *E. coli* indicates that the supplies or properties served by them, are either not receiving the appropriate amount of treatment before use, or that the existing treatment is not being satisfactorily managed and maintained. Given the potential risks to public health, all failures are thoroughly investigated by the local authority. Where there is a need for immediate action to safeguard their health in the short term, users are advised to boil water for human consumption or to use an alternative supply, including bottled water. Users will also be

informed of any required improvement works and the timescales in which these works must be carried out and enforcement work is initiated with the owners/users, where necessary, to improve the supply.

In 2015, 26 Improvement Notices were served on thirteen failing supplies across the whole of Scotland. This has increased from that of the previous two years. A total of 80 Type A supplies failed for *E. coli* for the past three years or more, a vast improvement on 2014 where 138 supplies failed for this time period. It is vital that such supplies are tackled and, although responsibility for private supplies rests with owners and users, local authorities are urged to continue to provide appropriate advice and DWQR expects them to make full use of the enforcement powers available to tackle such supplies.

Other parameters which recorded significant numbers of failures on private water supplies in 2015 included coliforms, colour, iron, manganese, lead and hydrogen ion (pH). Although the quality of private supplies is a complex area and improvements are not always easy to achieve or maintain, DWQR believes owners and users must take greater responsibility for the quality of their private supplies, especially where the parameters failing are of significance for health, such as *E. coli*. It is essential that owners and users recognise their responsibilities and the risk of consuming poor quality untreated water, and that they work with local authorities to obtain support to improve their private water supplies.

The data presented in this report does not indicate that there have been significant improvements in the quality of private water supplies, but it is important to recognise that there is considerable work being undertaken by local authorities and also through initiatives such as the Private Water Supplies Improvement Strategy and the VTEC/*E. coli* O157 Action Plan. These initiatives aim to secure lasting improvements not only to the quality of private water supplies but also to reduce the risk to health.

The Scottish Government does provide financial support for owners and users of PWS to support improvements through the provision of a non-means tested grant of up to £800 per property. These are available from local authorities to all who own or use a PWS. In 2015-2016, £811,668 was awarded for PWS improvements. According to the data provided by local authorities this funding improved 480 supplies.

1 Types of Private Water Supplies in Scotland

Private water supplies (PWS) are drinking water supplies which are not provided by Scottish Water as part of their core function and are the responsibility of the owners and users of the supplies.

In 2015, the data provided to the Drinking Water Quality Regulator for Scotland (DWQR) by local authorities stated that there are 20,436 private supplies in Scotland. This data shows that around 182,791 people (3.4% of Scotland's population) live or work in premises that rely daily on a private water supply. This figure, however, does not take into account the large numbers of the public who may use premises with a private water supply in the course of leisure activities, or visitors to Scotland each year who use these private water supplies.

In Scotland PWS fall into one of two categories either A or B. Type A PWS are those which supply 50 or more people, provide 10 or more cubic metres a day, or regardless of the number of people served or the volume supplied, are supplying a premises that is part of a commercial or public activity. These Type A supplies serve a variety of holiday lets, B&Bs, hotels, caravan parks/campsites, community halls and a range of other facilities. Type B PWS are all other domestic PWS, many of which serve single properties. **Figure 1** illustrates the data reported to DWQR for 2015 for the two different categories of supply.

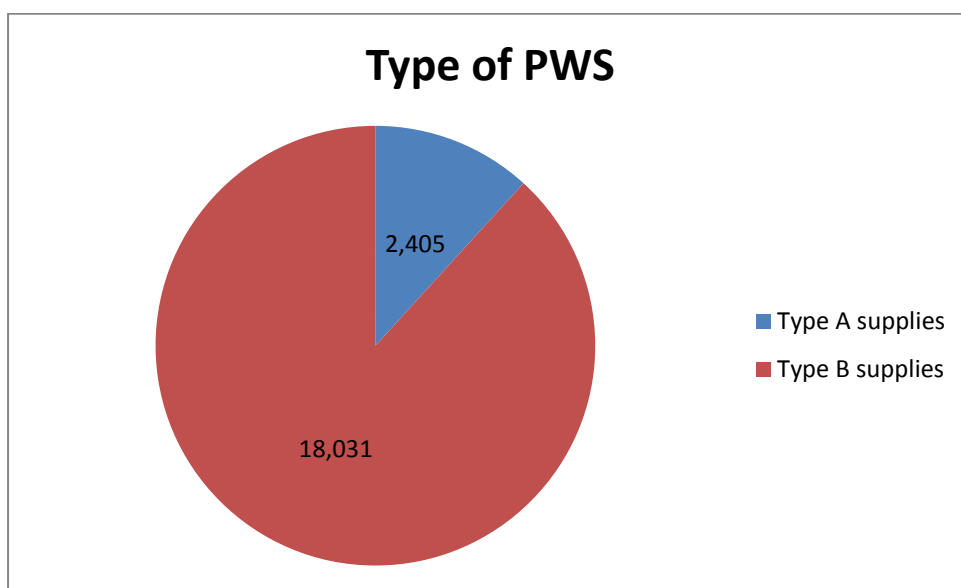


Figure 1 Private Water Supplies by Type

Private supplies vary greatly in their nature, ranging from springs and boreholes serving individual properties to larger groundwater or surface water supplies. The majority of private water supplies are found in rural areas; though some can be found in towns and cities, even in areas where there is a public supply of water. **Table 1** provides a summary of private water supplies in each local authority area, and the population reliant upon them. Whilst on average 3.4% of the population in Scotland use a private water supply, this can vary

significantly between local authority areas, for example, a very small proportion of the population in Aberdeen City (0.01%) are reliant on a PWS compared to 26% in Argyll and Bute.

Table 1 Summary of Private Water Supplies by Local Authority Area

Local Authority	Number of Type A supplies	Number of Type B supplies	% of Population served by PWS
Aberdeen City	2	44	0.1
Aberdeenshire	220	7,508	11.2
Angus	44	406	4.1
Argyll & Bute	469	1,481	26.3
City of Edinburgh	1	16	0.0
Clackmannanshire	4	22	0.6
Comhairle nan Eilean Siar	13	38	1.7
Dumfries and Galloway	171	1,246	14.7
Dundee City	0	1	0.0
East Ayrshire	2	191	0.7
East Dunbartonshire	1	18	0.2
East Lothian	6	35	0.6
East Renfrewshire	3	131	1.4
Falkirk	2	8	0.0
Fife	31	300	1.1
Glasgow City	0	0	0.0
Highland	711	1,717	13.9
Inverclyde	7	54	1.7
Midlothian	5	61	0.5
Moray	103	710	4.3
North Ayrshire	20	256	2.1
North Lanarkshire	0	15	0.0
Orkney	28	206	9.0
Perth and Kinross	283	1,283	19.8
Renfrewshire	4	7	0.1
Scottish Borders	149	1,287	12.3
Shetland	2	60	0.8
South Ayrshire	22	210	1.0
South Lanarkshire	24	284	0.1
Stirling	62	376	6.5
West Dunbartonshire	6	14	0.2
West Lothian	10	46	0.3
SCOTLAND	2,405	18,031	3.4

The pie chart shown in **Figure 2** gives more detail for those local authority areas with the greatest proportion of PWS.

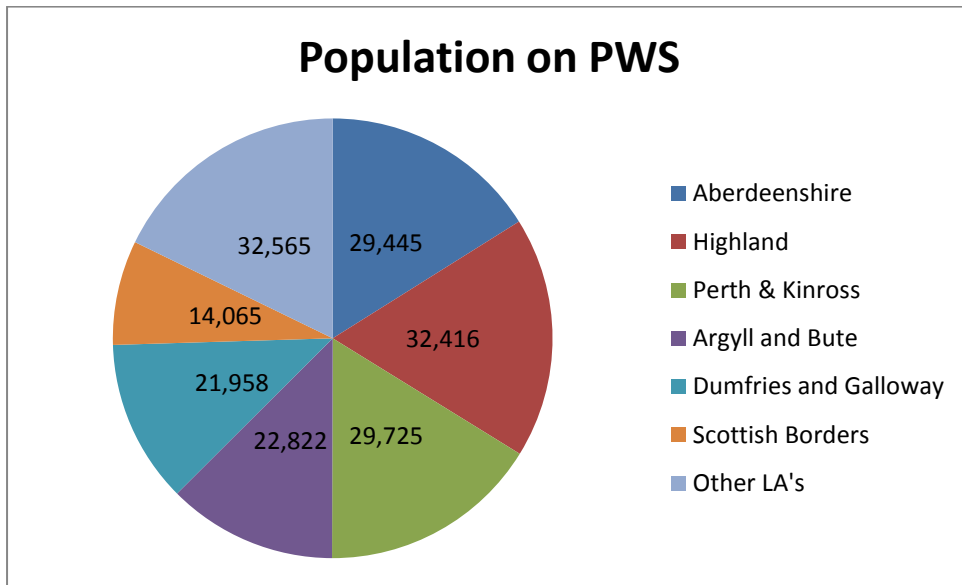


Figure 2 Distribution of population on Private Supplies across Scotland

2 Risk Assessment and Sampling

Risk Assessment

The Private Water Supplies (Scotland) Regulations 2006 (“the 2006 Regulations”) place a duty on local authorities to risk assess all Type A supplies and to review these risk assessments annually. Additionally, local authorities must provide advice and assistance on risk assessments to those responsible for Type B supplies on request. These risk assessments should determine whether the supply poses a potential risk to health and, if so, the action required to safeguard health in the short term and improve the supply in the longer term.

Table 2 below shows that in 2015 96% of Type A supplies had a completed or reviewed risk assessment. This is a slight increase on last year where 94% had a completed or reviewed risk assessment.

Generally, all local authorities performed well in completing their risk assessments; with 19 reporting that they had completed 100% of required risk assessments or reviews. A further eight authorities achieved compliance with the risk assessment requirements for in excess of 90% of their supplies. Two local authorities – Edinburgh (which has only one supply) and the, Scottish Borders completed less than 90%.

DWQR considers the risk assessment process to be a vital part of the management of private water supplies. Although analysis of water samples is a useful tool, this only provides an indication of the water quality at the time a sample is collected. A comprehensive and regularly updated risk assessment is a means of examining all the challenges to a supply and provides the opportunity to discuss specific issues and improvements with users of supplies. It is also the first step towards the creation of a drinking water safety plan to comprehensively manage those risks.

Table 2 Risk assessment of Type A supplies

Local Authority	Number of Type A supplies	Type A Risk Assessment or Review	RA Compliance
Aberdeen City	2	2	100
Aberdeenshire	220	220	100
Angus	44	41	93.2
Argyll and Bute	469	445	94.9
Clackmannanshire	4	4	100
Dumfries and Galloway	171	168	98.3
Dundee City	0	-	-
East Ayrshire	15	15	100
East Dunbartonshire	1	1	100
East Lothian	6	6	100
East Renfrewshire	3	3	100
Edinburgh City of	1	0	0
Eilean Siar	13	13	100
Falkirk	2	2	100
Fife	36	36	100
Glasgow City	0	-	-
Highland	711	710	99.9
Inverclyde	8	8	100
Midlothian	5	5	100
Moray	103	97	94.2
North Ayrshire	20	20	100
North Lanarkshire	0	-	-
Orkney Islands	29	29	100
Perth & Kinross	283	278	98.2
Renfrewshire	4	4	100
Scottish Borders	149	107	71.8
Shetland Islands	2	2	100
South Ayrshire	22	22	100
South Lanarkshire	26	23	88.5
Stirling	70	58	82.9
West Dunbartonshire	6	6	100
West Lothian	10	10	100
SCOTLAND	2,405	2,314	96.2

Sampling



Local authorities are required by the 2006 Regulations to sample each Type A supply in their area at least once a year. Type B supplies must be sampled by local authorities within 28 days of being requested by the owner or user of the supply and are not subject to routine annual monitoring.

Sample collection

Table 3 shows the number of Type A supplies that were tested for at least one parameter during the year, broken down by local authority. In 2015, across Scotland 94% of supplies were sampled: a slight improvement on 2014. Twenty four local authorities met the requirements for more than 90% of their Type A supplies, and of these, thirteen local authorities achieved 100% compliance. Of the local authorities with large numbers of supplies Aberdeenshire, Highland, Stirling and Argyll and Bute were able to sample 95% or more of their Type A supplies.

In 2015 a total of 60,717 tests were carried out on PWS; 42,361 from Type A supplies and 18,356 from Type B supplies.

Sample rates for colour, taste and odour remain low. Coloured water is very common in Scottish surface waters and many private water supplies have no treatment that will remove it. Colour is an important parameter because it provides an indication of the organic content of the water, which can have a detrimental effect on the efficacy of UV disinfection, and must be sampled at the required frequency. Taste and odour has a lower sampling compliance because analysis is not undertaken where the microbiological quality of the sample is unsatisfactory due to the potential health risks to the health and safety to staff in the laboratory.

Table 3 Type A supply sampling compliance

Local Authority	Number of Type A supplies	Supplies Sampled	2015 Sampling Compliance	2014 Sampling compliance
Aberdeen City	2	2	100	100
Aberdeenshire	220	218	99	96
Angus	44	41	93	91
Argyll and Bute	469	450	96	81
Clackmannanshire	4	4	100	100
Dumfries and Galloway	171	157	92	94
Dundee City	-	-	-	-
East Ayrshire	2	2	100	87
East Dunbartonshire	1	1	100	100
East Lothian	6	6	100	100
East Renfrewshire	3	3	100	33
Edinburgh City of	1	1	100	100
Eilean Siar	13	9	69	38
Falkirk*	2	1	100	100
Fife	31	31	100	97
Glasgow City	-	-	-	-
Highland	711	684	96	96
Inverclyde	7	7	100	100
Midlothian	5	5	100	100
Moray	103	99	96	98
North Ayrshire	20	19	95	89
North Lanarkshire	-	-	-	-
Orkney Islands	28	20	71	97
Perth & Kinross	283	258	91	98
Renfrewshire	4	4	100	100
Scottish Borders	149	114	77	89
Shetland Islands	2	0	0	100
South Ayrshire	22	22	100	88
South Lanarkshire	24	23	96	100
Stirling	62	61	98	88
West Dunbartonshire	6	5	83	100
West Lothian	10	10	100	100
SCOTLAND	2,405	2,254	94	92

* New supply. The LA has six months in which to sample the supply.

3 The Quality of Private Water Supplies

Many private water supplies suffer from inadequate treatment and poor or variable raw water quality. Consequently, compliance with the standards for drinking water quality is often much lower than for Scottish Water’s public supplies.

Type A Private Water Supplies

Table 4 shows some of the key parameters that Type A supplies are monitored for and how supplies are complying with the relevant standards.

Table 4 Type A Private Water Supply Compliance for Key Parameters

Parameter	No. Type A Samples	No. Type A Samples Failed	Type A % Samples Failed	Type A % Compliance
All Parameters	42,361	2,185	5.15	94.8
Coliform Bacteria	2114	444	21	79.0
E. coli	2116	261	12.33	87.7
Colour	1804	292	16.19	83.8
Turbidity	1865	45	2.41	97.6
Hydrogen ion (pH)	1881	332	17.65	82.4
Aluminium	978	24	2.45	97.6
Iron	1068	121	11.33	88.7
Manganese	921	78	8.47	91.5
Lead (10)	1155	92	7.97	92.0

Overall, Type A compliance increased slightly, from 94.0% last year to this year’s 94.8%. **Figure 3** shows percentage compliance for Type A supplies over the past 6 years.

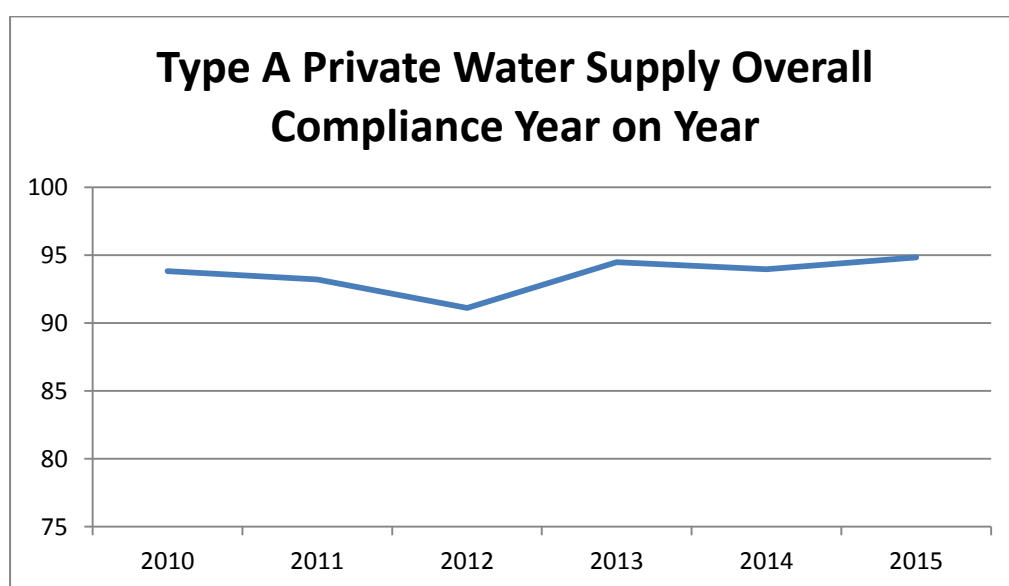


Figure 3 Type A Private Water Supply Overall Compliance Year on Year

In 2015, 16% of Type A samples did not meet the standard for colour. Water containing colour above the regulatory standard will have a visible tint and, more importantly, be difficult to disinfect effectively. Coloured water is usually the result of water sources derived from areas with peaty soils, of which there are many in Scotland.



PWS collecting tank

Metals

Many Type A private water supplies in Scotland do not comply with the standards for a number of metals. Iron (11.3% of samples failing), manganese (8.5% of samples failing) and aluminium (2.5% of samples failing) all occur naturally, and many private water supplies have no treatment process capable of removing them. In many cases, simple filtration is all that is required, although in some cases a pre-oxidation stage is also needed. Iron can also be derived from corroding iron pipework and fittings within the private water supply itself.

The effect of these metals is mostly aesthetic, although they can clog filters and coat ultra-violet disinfection lamps, rendering them ineffective and potentially exposing the users to unseen microbiological hazards.

Compliance for lead and other metals found in plumbing systems such as copper is poor. These metals can dissolve into water where the water is corrosive. 8.0% of samples from Type A supplies failed the standard for lead. Lead is a very important parameter and the standard is set for health based reasons because exposure to lead can have serious implications, particularly for young children. Compliance for copper has significantly improved in 2015, with 6.4% of samples taken from Type A supplies in 2015 not meeting the standard, compared with a 30% failure rate in 2014 with a similar sampling rate.

Many Scottish waters are naturally soft and corrosive to metals without further treatment and conditioning. This is an essential but often neglected part of the treatment process, and many private water supplies do not have any adequate conditioning stage. This is also reflected in the compliance figure for hydrogen ion (pH) which shows that 17.7% of samples were outside the permitted range for this parameter.

In order to prevent dissolution of plumbing metals, soft waters need to have their alkalinity increased, which, in simple terms, means the pH and the concentration of dissolved minerals needs to be increased so that the water no longer has a tendency to corrode metals. This can be achieved simply and at low cost through the use of a filter containing a suitably alkaline medium such as limestone chips, although its success is dependent on the specific supply and raw water quality.

This issue can additionally be controlled through careful design of the plumbing system and use of the appropriate, approved, materials. Knowledge and control of the materials used in the distribution of private water supplies is often poor, and a thorough water safety plan for a supply should aim to document all materials used in the system and assess any potential impact they might have on water quality.

Microbiology



PWS Filtration and UV Disinfection Treatment

In 2015, almost three quarters of samples taken from private water supplies across Scotland did not contain any coliforms, a similar figure to last year. This leaves 959 samples that contained at least one coliform.

Although mostly non-pathogenic in themselves, the presence of coliforms can indicate that the water has become contaminated or that any disinfection process on the supply is not operating correctly. The percentage of water supplies failing for *E. coli* is also similar to 2014, with 14.7% of samples containing *E. coli*. This is potentially of more concern as *E. coli* can cause illness in humans.

Another faecal indicator organism, *Enterococci*, was present in almost 8% of Type A water supplies. This is unacceptable, given that Type A supplies are those most likely to be consumed by members of the public visiting a commercial enterprise or staying in tourist accommodation. In public health terms, it is standard practice by local authorities to inform users on unsatisfactory supplies where *E. coli* is isolated as a precaution and to implement appropriate controls to minimise any risk to health. These measures could include a notice to boil water for human consumption or use of an alternative supply. As part of these investigations, consideration is given to additional monitoring and sampling; discussion on the availability of grant; and potential enforcement action to secure improvements.

Table 5 shows compliance for *E. coli* by local authority. It is difficult to compare compliance results between local authorities due to the wide disparity in the numbers of supplies between local authorities and the number of different factors which may influence sample results.

Table 5 Sample Compliance for *E. coli* – Type A Supplies

Local Authority	Number of Type A tests	Number of Type A fails	Compliance (%)
Aberdeen City	2	0	100
Aberdeenshire	182	12	93.4
Angus	44	5	88.6
Argyll and Bute	477	85	82.2
Clackmannanshire	10	0	100
Dumfries and Galloway	21	3	85.7
Dundee	-	-	-
East Ayrshire	2	2	0
East Dunbartonshire	1	0	100
East Lothian	6	0	100
East Renfrewshire	3	0	100
Edinburgh City of	1	0	100
Eilean Siar	9	5	44.4
Falkirk	1	0	100
Fife	32	3	90.6
Glasgow	-	-	-
Highland	684	65	90.5
Inverclyde	7	1	85.7
Midlothian	5	0	100
Moray	98	7	92.9
North Ayrshire	4	0	100
North Lanarkshire	-	-	-
Orkney Islands	17	4	76.5
Perth & Kinross	276	38	86.2
Renfrewshire	5	0	100
Scottish Borders	101	10	90.0
Shetland Islands	-	-	-
South Ayrshire	22	4	81.8
South Lanarkshire	23	3	87.0
Stirling	68	11	83.8
West Dunbartonshire	5	0	100
West Lothian	10	3	70.0
SCOTLAND	2116	261	87.7

As in previous years, DWQR had met with local authorities to discuss private water supplies that have recorded *E. coli* failures for a number of years in succession. Similar discussions have taken place previously and these identified issues with the reporting dataset and a variety of reasons for these results. These include the fluctuating raw water quality, inadequate or inconsistent treatment processes and poor or no maintenance of treatments

systems. With Type A supplies, the requirement to take a representative sample of the supply invariably results in some samples being taken from properties where the water may be untreated or treated to a lower quality than the standard of treatment in the commercial properties on the supply. These discussions will seek to understand the reasons for the recurring failures and what the local authority has done in an effort to improve the quality of the supply.

Although the quality of private supplies is a complex area and improvements are not always easy to achieve or maintain, DWQR and local authorities believe that owners and users must take greater responsibility for the quality of their private supplies, especially where the parameters failing are of significance for health, such as *E. coli*.

Enforcement and Outcomes

Once a local authority has identified that a supply has quality or quantity issues and poses a risk to health, action is taken by local authorities to ensure that all users are informed and given appropriate advice to safeguard their health in the short term (e.g. boil water for human consumption). Users must also be informed of any required improvement works and the timescales in which these works must be carried out. Where public health is not at risk, other advice may relate to cleaning and disinfecting storage tanks, replacing UV tubes or filter cartridges or cleaning out the catchment area. In many instances, local authorities work with users of the supply to achieve improvement and only where this is unsuccessful, is a formal Improvement Notice issued.

DWQR is of the opinion that when local authorities efforts to bring about improvements through the provision of advice and support for owners and users has failed, then lasting improvements must be achieved by putting in place a Notice formally setting out the requirements. The benefit of a Notice compared to informal advice is that if there is any disagreement about the need for a supply to be improved or who is responsible for carrying out the work, there is a formal legal process in place and the relevant person(s) is under a legal duty to carry out the necessary improvements. It also ensures any required works are carried out in a suitable timescale, as this is determined by the local authority based on the risk to health and the extent of the improvement works required.

In 2015, 26 Notices were served on thirteen failing supplies across the whole of Scotland. DWQR finds this number low when compared to the number of supplies failing to meet drinking water quality standards. However, this has increased from that of the previous two years. A total of 80 type A supplies failed for *E. coli* for the past three years or more, a vast improvement on 2014 where 138 supplies failed for this time period. 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.

Type B Private Water Supplies

Table 6 shows some of the key parameters that Type B supplies are monitored for and how supplies are complying with the relevant standards.

Table 6 Type B Private Water Supply Compliance for Key Parameters

Parameter	Type B	Type B Failed	Type B % failed	Type B Compliance
All Parameters	18,356	1,836	10.00	90.00
Coliform Bacteria	1381	515	37.29	62.71
<i>E. coli</i>	1382	254	18.38	81.62
Colour	398	43	10.8	89.2
Turbidity	1253	48	3.83	96.17
Hydrogen ion (pH)	1323	324	24.49	75.51
Aluminium	186	11	5.91	94.09
Iron	694	105	15.13	84.87
Manganese	667	81	12.14	87.86
Lead (10)	1040	80	7.69	92.31

For most of the main parameters, the smaller Type B supplies show a similar trend to the Type A supplies, although compliance is often slightly worse, reflecting an even greater tendency for there to be minimal treatment and management of the supply. This is especially true with microbiological compliance where 18% of samples contained *E. coli* and 37% contained coliforms. This suggests that disinfection of these supplies is only present and consistently effective in less than two thirds of supplies. In addition to this the data is influenced by the fact that most Type B supplies are first sampled when applying for a grant to upgrade the supply and therefore the sample will reflect the poor quality of untreated supplies. Further samples are taken once treatment has been installed to demonstrate the efficacy of the treatment before the grant funding is awarded. This 'before and after' effect is not distinguished in the table.

As in previous years, source type appears to have a significant bearing on microbiological quality of both Type A and Type B supplies. **Table 7** shows compliance of scheduled samples for microbiological parameters (in this instance, comprising coliforms, *E. coli*, *Clostridium perfringens*, *Enterococci*) by water source type, regardless of any treatment present on the supply. This clearly shows that groundwater sources, especially boreholes, are far less likely to suffer from microbiological contamination than surface water sources. Having said this, they are not completely compliant and it should not be assumed that underground waters are immune from contamination. In Scotland many groundwater supplies are heavily influenced by surface water, so are vulnerable to faecal contamination. Further contamination may occur between the point of abstraction and the location the water is consumed.

Table 7 Microbiological Compliance by Source Type

Source Type	Compliance	
	Type A	Type B
Groundwater Borehole	95	86
Groundwater Spring	89	78
Groundwater Well	91	75
Surface Water Loch	83	74
Surface Water Rainwater	84	82
Surface Water Watercourse	83	74

4 Private Water Supply Grant

The Scottish Government introduced a grant scheme in conjunction with the 2006 Regulations to assist owners and users of private supplies to bring their supplies up to modern standards. The scheme is non-means tested and available to domestic households and businesses. The maximum grant which may be awarded is £800 per property. However the local authority may pay in excess of £800 where they are satisfied that the eligible person could not, without undue hardship, finance the expense of the approved works without such a grant.

The scheme is intended to assist with the one-off capital cost of installing treatment to help ensure the provision of safe drinking water. It does not cover the ongoing maintenance and disinfection of a private supply which is the responsibility of the user.

In the 2015-2016 financial year £811,668 was awarded for PWS improvements. According to the data provided by local authorities this money improved 480 supplies.

The grant scheme for the improvement of private water supplies provides for real short-term and longer-term public health benefits to users and is delivered by local authority environmental health services, funded by the Scottish Government. Whilst designed to be all encompassing (domestic and commercial properties are eligible) and straightforward to administer, solutions can be complex, particularly where there are supplies serving multiple properties and no agreement or management committees in place. The work undertaken by Argyll and Bute Council, working with the community in the village of the Bridge of Orchy and other agencies illustrates these complexities.

The Bridge of Orchy supply serves 18 properties and is a category A1 supply due to the presence of a hotel, community hall, bunkhouse and fire station. Microbiological water quality was variable with *E. coli* being detected on occasion. The rudimentary chlorination system was failing, resulting in the microbiological quality of the supply being unreliable, and the supply frequently ran out of water. With its prominent location on the route of the West Highland Way, the surface water supply posed a risk not only to the local community but a large transient population. Attempts by the environmental health service informally to secure improvements were unsuccessful largely due to a lack of consensus within the community on what solutions were required, and their expectation that the Council or Scottish Water were responsible.

After many meetings with the community ; with national and local politicians and Scottish Water, the community acknowledged the need to improve the supply to protect their health and to support further economic development of the village (there was a planning policy restricting development until the water supply had been improved in term of capacity and quality), but could not collectively agree on responsibility to co-ordinate and the detail of improvements. Given the potential risks to users of the supply, including residents and the large number of transient population the Council's environmental health service identified that the only means of securing improvement and protecting public health, was through the

service of a formal Notice, under the Water (Scotland) Act 1980. This Notice was served on all relevant persons on the supply, including Argyll and Bute Council who owned a property on the supply, requiring improvements to be made to the supply to ensure its quality met the EC Drinking Water Directive requirements. Financial support was offered and discussed widely with the community and included a number of different funding streams, including the private water supply grant scheme.

The current situation is that the works have been completed, the water supply has been improved in terms of quantity and quality, and it is expected that the final grant will be paid shortly. However, this case study identifies a number of complex issues which had to be resolved during the process which included proving legal advice to establish a community group, with responsibility for the water supply and subsequent maintenance; legal rights of way and servitude; the design of a water treatment system and the development of a tender for the contract which was complicated by the Council and other public bodies having properties on the supply and the fact that there was no management committee for the supply or single relevant person; the award of the contract and subsequent project management; ongoing liaison with the whole community and managing the political situation, including the implications of service of a legal Notice by Environmental Health on its own Council.

5 DWQR Activity and Research

Legislation

The Private and Public Supplies (Miscellaneous Amendments) (Scotland) Regulations 2015

The Private and Public Water Supplies (Miscellaneous Amendments) (Scotland) Regulations 2015 (2015 No. 346), came into force on 28 November 2015. The main purpose of the Regulations was to implement Council Directive 2013/51/Euratom (“the Euratom Directive”) laying down requirements for the protection of the health of the general public with regard to radioactive substances in water intended for human consumption. Part 2 of the 2015 Regulations amended the Private Water Supplies (Scotland) Regulations 2006 to implement the Directive in relation to drinking water supplied other than by Scottish Water. An indicator parameter for radon was introduced with a threshold set at 100 Bq/l. If this is exceeded, local authorities must determine if this poses a risk to human health and, if so, ensure that appropriate remedial steps are taken. Local authorities are not required to monitor for radon in private water supplies which lie out-with a high risk area for radon in water and those with private supplies which come into that category have been advised accordingly by DWQR.

The 2015 Regulations also inserted a new provision into the 2006 Regulations to make provision in relation to the application and introduction of substances and products into private water supplies in accordance with the EU Drinking Water Directive. Some other adjustments were made to the parameters in Schedule 1 of the 2006 Regulations, for consistency with both the Directive and also the 2014 Regulations. In particular, hydrogen ion, odour and taste were moved from Table B (chemical parameters) to Table C (indicator parameters).

DWQR Activity

During 2015 DWQR staff were involved in a number of activities and strands of work involving private supplies. A lot of this work will only fully show benefits in the longer term.

This includes:

PWS Strategy

The three main objectives which the strategy aims to ensure are:

- A robust, clear regulatory framework to ensure that Scotland is complying with European obligations;
- Comprehensive information and advice is available for owners and users of private water supplies and local authorities; and
- Measurable improvements in compliance and reduction in risk to public health.

V(TEC) Action Group

Following recent *E. coli* outbreaks in Scotland a multi-agency group was formed to consider ways to disrupt the transmission of VTEC/ *E. coli* O157 from source to humans. The resulting Action Plan comprises 86 recommendations designed to tackle VTEC/ *E. coli* O157 infection in Scotland. An Implementation Group oversees the progress on implementation of the recommendations. A number of the recommendations relate to drinking water and DWQR is represented on the public and private water supply sub-groups, which report to the Implementation Group. These actions have been included in the PWS Strategy. A copy of the Action Plan can be found at <http://www.scotland.gov.uk/Publications/2013/11/8897/0>

Rural Provision

DWQR are working with the Scottish Government Rural Provision Group to support the delivery of the Scottish Government priorities in rural communities, in particular with a view to improving water and sewerage provision in rural areas.

Communication

DWQR have been increasing the amount of information on the website www.dwqr.scot/private-supply/ to assist local authorities and owners and users of private water supplies.

Lead

Lead in drinking water arises mostly from plumbing in buildings: from lead pipes, lead tanks, lead solder on copper pipes or inferior quality brass fittings and taps. The Scottish Government, with support from DWQR, has established a project to review policy to drive achievement of a reduction of exposure to lead in drinking water, both in private and public supplies. The project is looking to identify enablers and to strengthen or introduce mechanisms with a range of stakeholders and influencers for the removal of lead services pipes and plumbing. The project update can be found at <http://dwqr.scot/media/14148/research-current-dwqr-lead-in-drinking-water-project-briefing.pdf>

Current and Completed Research

During 2015 DWQR has contributed and supported a number of research projects commissioned either by the Scottish Government or other agencies, which relate to private water supplies. Completed research papers are available either on our website: <http://dwqr.scot/information/research/previous-research-projects/> or on the Centre of Expertise for Waters (CREW) website; <http://www.crew.ac.uk/publications>

Colour

A research project looking into the effect of raw water quality on the effectiveness of UV disinfection of private supplies was undertaken in 2014. The results of the research were presented during a Private Water Supplies seminar for local authorities in Spring 2016

Governance of Private Water Supplies

The Scottish Government commissioned this project in 2015 to gain a better understanding of the capability of the current regulatory framework for private water supplies in Scotland to deliver required water quality improvements. The study identified considerable complexity associated with regulating private water supplies, particularly due to the diverse nature of supplies and parties responsible for them. The study also identified considerable scope for private water supply regulators in Scotland (local authorities and DWQR) to improve practices without the need for changes to legislation. This project is now complete.

Radon

This project was commissioned by the Scottish Government to support the implementation of the 'Euratom' Directive 2013/51 which introduced the requirement for monitoring for radon in drinking water. The study reviewed existing datasets to produce a 'risk map' for Scotland to enable both Scottish Water and local authorities to determine which supplies required monitoring. This project is now complete.

Epidemiological Impact of Private Water Supplies

This project commenced during 2015 and aims to assess the health risks from exposure to a range of microbiological contaminants commonly found in private water supply source waters. The study will also examine existing water quality data and reported cases of illness in order to quantify the potential disease burden from untreated private water supplies. This project will report during the latter part of 2016.

Innovative Solutions for Sustainable Drinking Water Treatment at Small to Medium Scale

This project aims to survey the technology landscape (national and International) and develop a rationale for assessing the technology across a range of operational scenarios predominantly in managed private water systems. It will report in the latter part of 2016.

Community Pilots

The primary aim of this project is to engage communities about PWS issues and to identify improvements in engagement practices specifically relating to private/waste water supply challenges. The project also aims to understand where there is a perceived lack of need, whether this is associated with a lack of interest or a lack of knowledge and understanding about the health risks associated with PWS. It will report in early 2017.

ANNEX A THE REGULATORY FRAMEWORK

The regulatory standards for drinking water quality in Scotland largely stem from European Directives. These standards are based on guidelines developed by the World Health Organisation to protect public health.

Our key domestic water quality legislation includes:

Water (Scotland) Act 1980 (as amended)

- Scottish Water must supply wholesome water for domestic purposes. It is a criminal offence to supply water unfit for human consumption;
- Scottish Ministers must take enforcement action against Scottish Water if it fails in its duty to supply wholesome water (as defined in the relevant regulations) unless the failure is trivial or Scottish Water is complying with a legally binding undertaking to remedy the matter;
- Local authorities must take appropriate steps to keep themselves informed about the wholesomeness of public water supplies in their area and notify Scottish Water if not satisfied; and
- Local authorities are required to secure improvements to private water supplies if they consider them necessary.

Water Industry (Scotland) Act 2002

- Created the post of Drinking Water Quality Regulator for Scotland (DWQR);
- Set out responsibility for enforcing the Water Supply (Water Quality) (Scotland) Regulations 2001;
- Defines DWQR's independent status;
- Defines DWQR power to obtain information, power of entry or inspection and power of enforcement; and
- DWQR also has emergency power to require a water supplier to carry out works to ensure quality of water supplied is safe for public consumption.

The Private Water Supplies (Scotland) Regulations 2006

- Define wholesomeness in accordance with the EC Drinking Water Directive 98/83/EC;
- Require local authorities to classify private supplies according to size and use;

- Require local authorities to monitor, risk assess and report on private supplies in their area according to classification and risk; and
- Require local authorities to provide advice to private supply owners and ensure improvements are carried out.

The Private Water Supplies (Grants) (Scotland) Regulations 2006

- Provides for grants to be paid to eligible persons to enable them to improve their private water supply; and
- Is administered by local authorities and provides for non-means tested grants of up to £800 per property.

The Water Quality (Scotland) Regulations 2010

- Further transpose the requirements of Directive 98/83/EC most particularly in respect of water quality failures which are attributable to the domestic distribution system in establishments and premises where water is supplied to the public;
- Require local authorities to investigate such water quality failures to determine its cause;
- Instruct remedial action through the service of a Notice on the person who owns, or is responsible for, the domestic distribution system;
- Ensure that affected consumers are notified of any risk to their health;
- The 2010 Regulations also make a number of technical amendments to The Water Supply (Water Quality) (Scotland) Regulations 2001 and The Private Water Supplies (Scotland) Regulations 2006; and
- Create a duty to minimise contamination from disinfection by-products and to verify the effectiveness of the disinfection process.

The Private and Public Supplies (Miscellaneous Amendments) (Scotland) Regulations 2015

- Adds radon as an indicator parameter; and
- Moves colour, taste and odour and pH from national parameters to indicator parameters.

ANNEX B PWS INFORMATION LETTERS ISSUED DURING 2015

Information

Letter Number

2015-1

Title

Changes to DWQR Operations Team

Copies of these letters are available on the DWQR website:

www.dwqr.scot



© Crown copyright 2016

The maps presented in this publication are based on Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright 2016.

Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.

Published for the Drinking Water Quality Regulator for Scotland, September 2016