

Drinking Water Quality in Northern Ireland, 2018

A Report by the Drinking Water Inspectorate for Northern Ireland



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Northern Ireland Environment Agency

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Foreword

I am pleased to present the 23rd annual report on the quality of drinking water in Northern Ireland. The Drinking Water Inspectorate's (DWI's) primary role is to protect public health through effective drinking water regulation.

In Northern Ireland over 99% of the population receive their drinking water from Northern Ireland Water Limited (NI Water). The remainder is served by private water supplies. This report provides an independent assessment of the quality of both public and private water supplies for the calendar year 2018.

Drinking water quality compliance is assessed against the European Directive on Drinking Water Quality which is enacted through national legislation. Overall public drinking water quality for 2018 remained high at 99.90%, a slight increase from 99.88% in 2017.

The report considers regulatory contraventions and drinking water quality events reported to us, including how these were managed by NI Water in ensuring the ongoing provision of safe, clean drinking water. It also provides details on the number and categories of consumer contacts made to NI Water.

Of particular concern in 2018 was the increased severity of water quality events. One Major and four Serious events were reported to us compared to no Major and one Serious event in 2017. The prolonged hot weather resulted in a Serious event affecting all of Northern Ireland, and the Major event and one of the other Serious events each affected a population of over 400,000. We require NI Water to submit an investigation report for each event, and independently assess its significance and extent in determining the most appropriate course of action. This may include taking forward enforcement in line with our enforcement policy. A total of four enforcement notices were issued against NI Water in 2018, compared to two in 2017. These were required to secure the timely completion of remedial works to improve water quality.

Whilst the highest percentage of consumer concerns continued to relate to the appearance of the water, the overall increase in all consumer contacts of 29.6% in 2018 was mainly attributable to taste and odour complaints. The majority of these were connected to the Major water quality event that affected over 20% of the Northern Ireland population.

Private water supplies are used for a range of purposes, from domestic dwellings to large commercial and public premises such as hospitals and universities. These supplies are monitored to ensure public health protection, and overall compliance for 2018 was 99.11%, a slight increase from 98.74% in 2017 and slightly lower than for public water supplies. The number of supplies is increasing steadily with 12 new supplies being registered in 2018.

I embrace the challenges and opportunities in continuing our work with other stakeholders to maintain our high quality drinking water across Northern Ireland. Our priority remains to ensure that the work we undertake continues to actively contribute to safe, clean drinking water for the whole population. I trust you will find this report both interesting, and a useful reference document on drinking water quality in Northern Ireland.



Catriona Davis
Chief Inspector of Drinking Water
September 2019

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Executive Summary

This is the 23rd report in a series published by the Drinking Water Inspectorate, acting in our role as the drinking water quality regulator for both public and private water supplies.

The report provides an independent assessment of the quality of drinking water provided by NI Water. It also presents details of the quality of private water supplies for which we have a regulatory responsibility and undertake a monitoring programme.

Public Water Supplies

Comprehensive monitoring is undertaken by NI Water to assess public drinking water quality, and compliance is based on the results of key tests carried out throughout the water supply chain: from water treatment works; service reservoirs; and consumers' taps.

Compliance is assessed against EU and national standards and in 2018 the overall public drinking water compliance remained high at 99.90%. The 0.10% non-compliance relates to 98 tests that failed to meet the required standard, a lower figure than the 122 (0.12%) in 2017.

Compliance at consumers' taps also remained high at 99.83% in 2018, a slight increase from 2017 (99.81%). However, of the 43 regulatory parameters tested, eleven did not achieve full compliance. Those parameters failing to meet full compliance were: lead, iron, odour, taste, total trihalomethanes (THMs), *Clostridium perfringens*, aluminium, nickel, coliform bacteria, manganese and pesticides - individual (MCPA).

The parameter with the lowest reported compliance in 2018 was lead at 98.71%. This is an increase in compliance from the 96.72% reported for 2017. However, it is recognised that the percentage lead compliance is prone to fluctuations, and any increase or decrease can be unduly influenced by the low sampling frequency required by the regulations. In 2018, five of the 388 samples failed the standard, compared to 13 fails out of 396 samples in 2017. As there are only trace amounts of lead in the water leaving the water treatment works (WTWs), contamination of the supply occurs in the distribution system, including where lead has been used for service pipes or in domestic plumbing. This increases the risk of lead contraventions at the consumers' tap. NI Water's lead strategy, as well as key targets within the [Long Term Water Strategy \(LTWS\)](#), is vital to addressing non-compliances and improving drinking water quality for the future.

Total trihalomethanes (THMs) reported 99.48% compliance in 2018, an improvement from the 2017 figure of 98.48%. Operational practices at water treatment works, and water travelling longer distances thus spending more time in the distribution system, are contributing factors to the presence of THMs.

Contraventions of microbiological parameters may indicate a failure in the treatment process or a breach in the integrity of the water supply system. A slightly higher compliance figure for coliform bacteria at consumers' taps was reported in 2018 with 99.75% compliance compared to 99.61% in 2017. This is reflected in the overall microbiological compliance figure at

consumers' taps of 99.87% compared to 99.82% in 2017. *E. coli* were not detected at consumers' taps by NI Water during the 2018 regulatory monitoring programme.

All contraventions must be investigated by NI Water, and in some cases these may be traced to internal plumbing systems in domestic dwellings or distribution systems within public buildings. In 2018, 13 reported contraventions related to internal plumbing systems in domestic properties. These were related to the following parameters: five coliform bacteria; five lead; two odour; and one nickel. These were investigated by NI Water and letters issued to consumers advising them of the contraventions and offering appropriate advice to protect public health.

Although compliance in 2018 was the highest reported by NI Water, water quality events (Annex 2) continued to occur within the water supply system. NI Water must report these events to us and in 2018 there were 52 water quality events reported by NI Water. Of these, we categorised one as Major, four as Serious, 27 as Significant, eight as Minor and 12 as Not Significant.

The one major event related to an algal bloom at Castor Bay WTW, with the treatment at the time of the event being inadequate, and this subsequently led to widespread taste and odour complaints within the distribution system. The four serious events were related to; (i) treatment difficulties at Drumaroad WTW leading to aluminium contraventions within the distribution system; (ii) the prolonged spell of hot weather during June/July affecting all of Northern Ireland; (iii) contamination of a water main with oil in the Meigh area of County Down; and (iv) discoloured water affecting around 16,000 consumers in Belfast following operational work. Of the 27 significant events reported, 17 occurred at water treatment works and were primarily related to a lack of effective treatment or difficulties with the treatment process. As part of the event assessment process, NI Water is required to implement mitigation measures identified in its risk assessments for the management of its drinking water supplies. The lessons learnt through this ongoing evaluation should ensure the likelihood of similar events occurring in the future is reduced.

To enable us to evaluate consumer confidence in the quality of drinking water at their taps, we receive information relating to consumer concerns and complaints from NI Water. The highest number of contacts concerned the visual appearance, with 63.4% of total contacts reported in 2018 related to this. The total number of consumer contacts reported in 2018 was 7468 compared to 5764 in 2017, a significant increase of 1704 (29.6%). This increase is mainly attributed to Taste & Odour complaints (73.3% increase) and discolouration complaints (31% increase).

Where necessary we take enforcement action (Annex 4) to ensure the delivery of remedial action within specified timeframes. In 2018, enforcement was initiated at four water treatment works: (i) Glenhordial WTW, to deal with contraventions of the individual pesticide (MCPA); (ii) Rathlin WTW, to deal with contraventions of the disinfection by-product, THMs; (iii) Drumaroad WTW to deal with contraventions of the aluminium standard; and (iv) Castor Bay WTW to deal with contraventions relating to odour.

Private Water Supplies

The same drinking water quality standards apply for private water supplies as for the public water supply. Although less than 1% of the population receives water from a private supply

many more are exposed to them through their use in both commercial activities and public buildings. A number of premises in Northern Ireland that have a private supply also have a mains supply. Private supplies are used as an alternative to, or in conjunction with the public supply for a range of activities including food processors, holiday accommodation, and public buildings, mainly for economic reasons.

During 2018 our private water supply sampling programme monitored 164 sites, with 12 new sites being registered during that period. Samples at private water supplies are collected by Environmental Health staff, acting on our behalf.

Overall compliance for 2018 is reported as 99.11%, an increase from 98.74% reported for 2017. The regulatory requirements were not met on 123 occasions for 19 parameters, namely: coliform bacteria, enterococci, *E. coli*, *Clostridium perfringens*, hydrogen ion (pH), manganese, iron, nickel, copper, sulphate, sodium, total trihalomethanes (THMs), turbidity, boron, lead, bromate, individual pesticides (diuron and glyphosate), and radon.

Full compliance was achieved for 57% (93 sites) of the private water supplies tested in 2018. Of the 71 sites which did not comply with the regulatory standards, 39% (28 sites) contravened microbiological standards; 52% (37 sites) chemical standards; and 9% (6 sites) failed to comply with both microbiological and chemical standards.

The presence of micro-organisms in a private water supply is indicative of contamination of the water either at source or at some point within the distribution system. In particular, the detection of *E. coli* or enterococci bacteria specifically indicates faecal contamination of a water supply and can be a risk to public health. These faecal indicators were found to be present in 11 supplies during 2018, eight small shared domestic supplies with no treatment and three commercial/public supplies, two of which had disinfection treatment in place at the time of sampling.

Iron and manganese continue to be chemical parameters with a high incidence of non-compliance at private supplies. In 2018, 15 sites were found to have contraventions for either iron or manganese or both. Pesticide contraventions were identified at two private water supplies in 2018, a hotel and a workplace.

All contraventions at private water supply sites are investigated and action taken dependent on the severity of the failure. In 2018, of the 123 contraventions identified, 62 (48 microbiological; 14 chemical) were notified to the Public Health Agency (PHA) for health advice; resulting in new restrictions on water usage at 17 sites.

We continue to work with owners and users of private water supplies to assist them in meeting their regulatory duty to provide safe, clean wholesome water by providing technical advice and guidance.

In 2018 we continued to develop and test our risk assessment application prior to its launch in early 2019. This new standardised risk assessment process will assist in the effective identification and assessment of all risks associated with a private water supply. A benchmarking exercise, with drinking water regulators in Scotland, England and Wales, on the risk assessment of private water supplies was conducted in late 2018.

Looking Forward

The challenge of ensuring the provision of safe, clean, sustainable drinking water supplies into 2019 and beyond continues.

During 2018 we worked alongside NI Water, the Utility Regulator, the Department for Infrastructure and the Consumer Council as well as our Northern Ireland Environment Agency (NIEA) colleagues in monitoring the PC15 investment programme. We acknowledge the financial constraints within the PC15 process, and the requirement to re-prioritize work programmes to reflect funding availability. Looking forward, we have now started preparations for the next price control process, PC21. Throughout this we will continue to ensure that the provision of safe, clean drinking water remains a key priority for NI Water.

We will continue to work with NI Water in their ongoing management of our drinking water supplies, and provide advice and guidance to ensure an effective risk management process is implemented. In particular, we have been, and will continue to engage with NI Water as new regulatory requirements which came into force in 2019 provide for a more standardised approach (BS:EN 15975-2¹) in the ongoing development of the risk assessment methodology.

The Long Term Water Strategy for Northern Ireland, sets out key targets to maintain and improve drinking water quality, and DWI will continue its work with all stakeholders in the delivery of these goals.

Protecting the catchments from which water is abstracted not only improves the raw water quality and reduces the potential contamination risks, but it can also reduce the need for additional treatment and purification processes. We will continue to advocate the improvement in the quality of abstraction sources through working with colleagues in the NIEA and NI Water, in implementing the second cycle of the River Basin Management Plans (RBMPs). We will also work within this process in promoting the ongoing management of drinking water protected areas (DWPAs) and safeguard zones. We will continue to be represented on the project board for the 'Source to Tap' Interreg VA funded project focusing on the management of Derg and Erne catchments.

The implementation of our new risk assessment application for private water supplies will continue to be taken forward in 2019 through the delivery of training and the provision of technical guidance to local council staff. This more consistent approach (BS:EN 15975-2¹) to risk assessment will facilitate effective risk management at these drinking water supplies and provide the foundation for a review of the processes for the regulation of private water supplies.

¹ BS:EN 15975-2: concerning security of drinking water supply, guidelines for risk and crisis management

Section 1
Public Water Supplies

Part 1
Drinking Water Quality



Part 1

Drinking Water Quality

- Overall drinking water quality compliance remains high at 99.90% (Overall microbiological compliance: 99.95%)
- Water quality at consumers' taps remains high at 99.83% compliance (Microbiological compliance at consumers' taps: 99.87%)
- 11 parameters did not achieve full compliance at consumers' taps
- Lead was again the parameter with the lowest consumer tap compliance at 98.71%
- Consumer contacts on drinking water quality increased by 29.6%
- Discoloured water is still the main issue of concern to consumers

NI Water is a government-owned company with responsibility for supplying and distributing public drinking water throughout Northern Ireland.

Drinking Water Quality Testing

During 2018, NI Water sampled drinking water across Northern Ireland to test for compliance with the standards in The Water Supply (Water Quality) Regulations (Northern Ireland) 2017. The regulations require sampling programmes to be in place to ensure that water quality is monitored at: water treatment works (WTWs); service reservoirs (SRs); water supply points¹; and consumers' taps in water supply zones (WSZs).

In 2018, 97,496 tests were carried out for a range of different parameters. A description of each parameter and its regulatory limit (or prescribed concentration or value [PCV]) is available on our [website](#).

Sampling and Analysis Frequencies

NI Water is required to meet specified sampling frequencies in demonstrating the wholesomeness of drinking water supplies. We undertake an assessment of these requirements throughout the water supply chain: at water treatment works; at service reservoirs; and in water supply zones.

In 2018, there was a shortfall of five tests from the 97,501 individual tests required to be carried out under the regulations. The missed tests covered three pesticides: two each for Diflufenican and Fenpropimorph; and one for Glyphosate.

Overall Drinking Water Quality

Compliance with the standards is important as contraventions may indicate a failure in the treatment process or a breach in the integrity of the water supply system which could pose a potential risk to human health. It also ensures that water quality meets aesthetic standards and is acceptable to consumers.

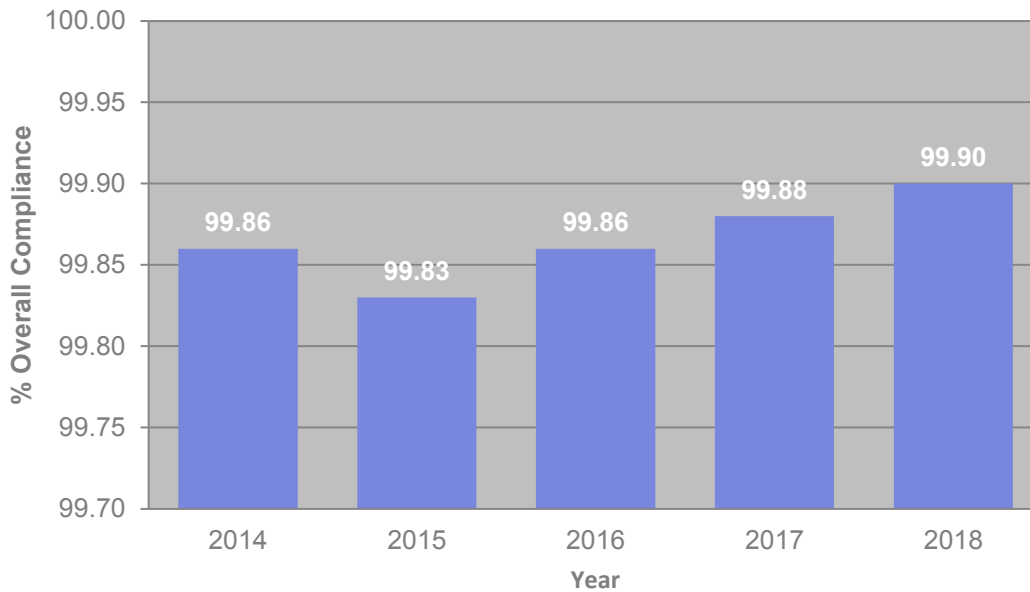
¹ a point, other than a consumer's tap, authorised for the taking of samples for compliance with the Regulations

Of the 97,496 tests we used to assess overall compliance, 98 (0.10%) contravened the regulatory standards (122; 0.12% in 2017). Table 1.1 provides further information on these contraventions.

Table 1.1: Overall Drinking Water Quality in 2018

	No. of Tests	No. of Tests not Meeting the Standards	% Compliance
Water Leaving Water Treatment Works (WTWs)			
<i>E. coli</i>	6409	0	
Coliform Bacteria	6409	2	
Microbiological Total	12818	2	99.98
Nitrite	236	0	
Turbidity	6409	4	
Chemical Total	6645	4	99.94
Total (Microbiological and Chemical)	19463	6	99.97
Water in Service Reservoirs (SRs)			
<i>E. coli</i>	14921	3	
Coliform Bacteria	14921	8	
Total (Microbiological)	29842	11	99.96
Water at Consumers' Taps or Supply Points (WSZs)			
<i>E. coli</i>	5280	0	
Coliform Bacteria	5280	13	
Enterococci	388	0	
<i>Clostridium perfringens</i>	236	1	
Microbiological Total	11184	14	99.87
Zone Chemical Analysis	28232	65	
Supply Point Chemical Analysis	8775	2	
Chemical Total	37007	67	99.82
Total (Microbiological and Chemical)	48191	81	99.83
Overall Water Quality			
Overall Microbiological Quality	53844	27	99.95
Overall Chemical Quality	43652	71	99.84
Overall Drinking Water Quality	97496	98	99.90

The results confirm that overall drinking water quality in 2018, for the key parameters monitored at water treatment works, service reservoirs and consumers' taps remains high at 99.90%, a slight increase on the 2017 compliance (99.88%). Figure 1.1 illustrates the percentage compliance over the last five years.

Figure 1.1: Overall Drinking Water Quality, 2014 – 2018

Water Quality at Consumers' Taps

To assess the quality of water that is being supplied to consumers, we assess results of regulatory samples taken by NI Water from consumers' taps. Table 1.2 shows the percentage compliance for 34 of the Schedule 1 (directive and national) parameters and nine of the Schedule 2 (indicator) parameters. Drinking water quality compliance at consumers' taps increased from 99.81% in 2017 to 99.83% in 2018.

Eleven parameters did not achieve full compliance at consumers' taps in 2018: lead, iron, odour, taste, total trihalomethanes (THMs), *Clostridium perfringens*, aluminium, nickel, coliform bacteria, manganese, pesticides - individual (MCPA).

Table 1.2: Consumer Tap Compliance 2018

	No. of Samples	No. of Tests not Meeting the Standards	% Compliance
Schedule 1 (Directive and National parameters)			
Lead	388	5	98.71
Iron	1892	20	98.94
Odour	1892	20	98.94
Taste	1892	11	99.42
Total Trihalomethanes	388	2	99.48
Aluminium	1892	5	99.74
Nickel	388	1	99.74
Manganese	1892	1	99.95
Pesticides – individual	8255	2	99.98
1,2 dichloroethane	388	0	100.00
Antimony	388	0	100.00
Arsenic	388	0	100.00
Benzene	388	0	100.00
Benzo(a)pyrene	388	0	100.00
Boron	388	0	100.00
Bromate	388	0	100.00
Cadmium	388	0	100.00
Chromium	388	0	100.00
Colour	1892	0	100.00
Copper	388	0	100.00
Cyanide	236	0	100.00
<i>E. Coli</i>	5280	0	100.00
Enterococci	388	0	100.00
Fluoride	388	0	100.00
Mercury	388	0	100.00
Nitrate	388	0	100.00
Nitrite	388	0	100.00
PAH - Sum of four substances	388	0	100.00
Pesticides - Total Substances	236	0	100.00
Selenium	388	0	100.00
Sodium	388	0	100.00
Tetrachloroethene & Trichloroethene	388	0	100.00
Tetrachloromethane	388	0	100.00
Turbidity	1892	0	100.00
Total (Schedule 1)	36175	67	99.81
Schedule 2 (Indicator parameters)			
<i>Clostridium perfringens</i>	236	1	99.58
Coliform bacteria	5280	13	99.75
Ammonium	1892	0	100.00
Chloride	388	0	100.00
Conductivity	1892	0	100.00
Hydrogen Ion (pH)	1892	0	100.00
Sulphate	388	0	100.00
Indicative Dose	24	0	100.00
Tritium	24	0	100.00
Total (Schedule 2)	12016	14	99.88
Overall Total	48191	81	99.83

Chemical/Physical Quality

Lead

In 2018, lead was the parameter with the lowest percentage compliance at 98.71%. This is an increase in compliance from the 96.72% reported for 2017. However, it is recognised that the percentage lead compliance is prone to fluctuations and any increase or decrease can be unduly influenced by the low sampling frequency required by the regulations.

In 2018, of the 388 tests carried out for lead, five (1.29%) contravened the standard of 10µg/l. Four of the five contraventions were related to lead pipework and/or fittings belonging solely to the consumer and one was a result of lead on both sides of the property boundary. NI Water has since replaced the lead pipe on its side.

When a sample has contravened the standard and NI Water's investigation finds the property's service pipe contains lead, it notifies the consumer. It is the owner's decision whether or not to replace their supply pipe and any other lead pipes within the property. A customer advice leaflet "[Lead in Drinking Water](#)" (Figure 1.2) can also be found on NI Water's website.

The Regulations require NI Water to treat the water to eliminate or reduce the risk of the concentration of lead being greater than 10µg/l. NI Water have a lead strategy in place to deliver improved compliance for lead.

Through the use of treatment and lead pipe replacement, the strategy involves:

- optimisation of orthophosphoric acid dosing and pH control at WTWs to reduce the uptake of lead from pipes and fittings;
- monitoring lead, pH and phosphate levels throughout the distribution networks;
- regulatory requirement to replace lead service pipes where there is a lead failure, or at the request of the consumer; and
- targeted replacement of lead service pipes within identified hotspots

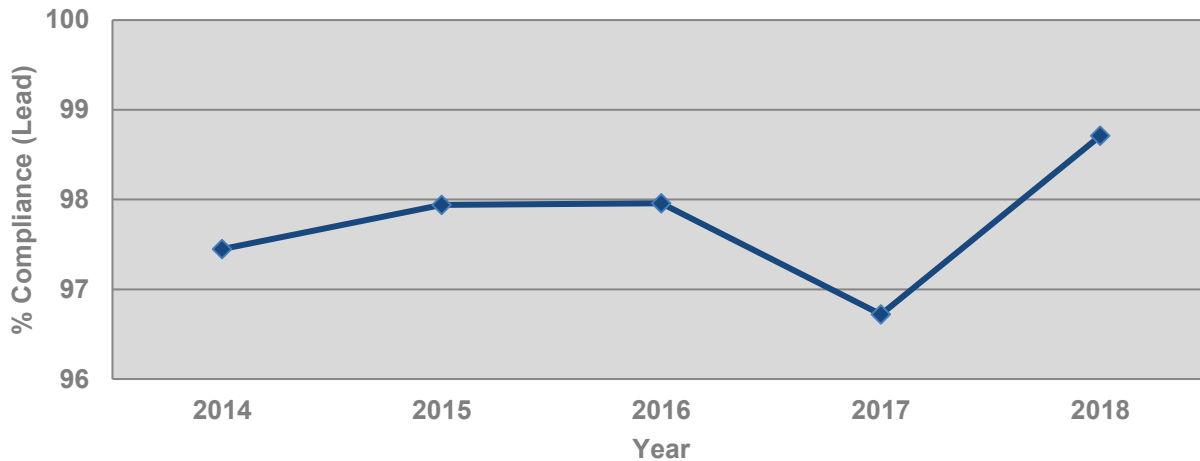
In addition to the sampling for lead compliance required by the Regulations, NI Water also undertakes a separate operational sampling programme. Results from this programme highlight those water supply areas which have not achieved the optimisation target of 98% lead compliance. Five of the 25 lead zones (20%) did not achieve this target (five in 2017). Three of these, Dunore, Dunore/Drummaroad and Seagahan also failed to meet the compliance target in 2017. The majority of these contraventions occurred in the greater Belfast area (Dunore and Dunore/Drummaroad lead zones) which historically has a high percentage of older properties with lead supply pipes.

Figure 1.2 Lead Leaflet



Looking at the overall trend in lead compliance in Figure 1.3, there has been a gradual trend upwards. However, there was a decrease in compliance in 2017 and a significant amount of work is still required to ensure compliance improves in 2019 and beyond.

Figure 1.3: Percentage of Regulatory Tests Meeting the Lead Standard, 2014 – 2018



Iron

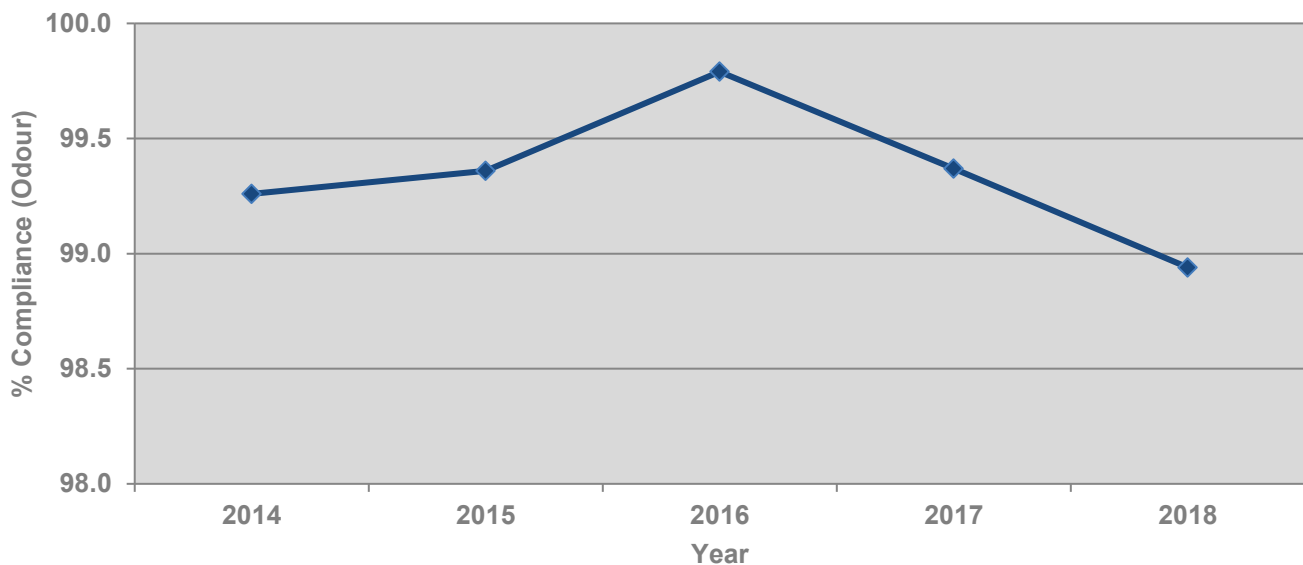
The regulatory standard for iron is set for aesthetic reasons as levels above this can give rise to discoloured water. Corrosion of iron water mains is the most common reason for contraventions.

In 2018, iron was joint with odour as the chemical parameter for which there was the greatest number of tests failing to comply with the standard. Of the 1,892 samples taken, 20 (1.06%) failed to meet the 200µg/l standard. This is a slight improvement on 2017 figures when 22 (1.15%) samples contravened. These were mostly due to the build-up, and subsequent disturbance, of deposits found within water mains. Where this is identified, there are a number of remedial measures which NI Water will carry out, including scheduled flushing programmes and replacement of older iron mains. NI Water have an extensive mains rehabilitation programme ongoing to replace old cast iron mains to improve water quality in the longer term. Fig. 2.7 in Part 2 provides iron compliance figures for the last five years.

Odour

The regulatory requirement for odour is “Acceptable to consumers and no abnormal change”. DWI have issued guidance to NI Water on the interpretation of this regulatory requirement.

In 2018, odour was joint with iron as the chemical parameter for which there was the greatest number of tests failing to comply with the regulations. Of the 1,892 samples taken, 20 (1.06%) were non-compliant. We note the downward trend in odour compliance since 2016 (Figure: 1.4). No single cause has been identified for this downward trend.

Figure 1.4: Percentage of Regulatory Tests Meeting the Odour Standard, 2014 – 2018

Microbiological Quality

The overall safety of drinking water at consumers' taps in 2018 is confirmed with a high level of microbiological compliance (99.87%), (see Table 1.1). This is an increase in compliance from the 99.82% reported in 2017 and relates to the higher compliance reported for coliform bacteria (99.75% compared to 99.61% in 2017) and *E.coli* (100% compared to 99.94% in 2017).

Clostridium perfringens was found in one sample taken in 2018 (Compliance 99.58%) compared to 100% compliance in 2017.

Enterococci were not detected in any of the samples at consumers' taps in 2018 (the same as 2017).

Domestic Dwellings Distribution Systems

NI Water's investigation into contraventions must determine if they are due to the internal distribution systems within domestic dwellings. Where this is identified it must inform the owner with details of the failure and provide appropriate advice in relation to actions the owner may take to rectify the contravention and protect public health. The investigations, where appropriate, should also ensure consumers' internal plumbing is compliant with The Water Supply (Water Fittings) Regulations (Northern Ireland) 2009.

In 2018, there were 13 contraventions reported to us which NI Water determined were due to the internal plumbing within domestic properties. These were related to the following parameters: five coliform bacteria; five lead; two odour; and one nickel. These contraventions were investigated by NI Water and letters sent to consumers advising them of the contraventions and offering appropriate advice to protect public health.

Public Buildings Distribution Systems

At premises where water is made available to members of the public (such as schools, hospitals or restaurants) there were 440 samples taken during 2018. Of these, seven contravened the standards: three for lead; one for odour; two for aluminium; and one for nickel.

NI Water must take appropriate action to rectify the failure where it is attributable to either the water supplied by it, or is a contravention of the Water Fittings Regulations. For any other failures within such premises, we are required to follow-up with the owners under The Water Supply (Domestic Distribution Systems) Regulations (Northern Ireland) 2010. If we assess the failure as likely to recur, or if it constitutes a potential risk to human health, a notice may be served on the owner to undertake the necessary actions to protect public health and bring the supply back into compliance.

In 2018, we received notification from NI Water of four public premises where the contraventions related to the presence of lead pipework within the internal domestic distribution system. We issued letters to each of these premises, requiring them to put in place the appropriate measures to deal with these contraventions.

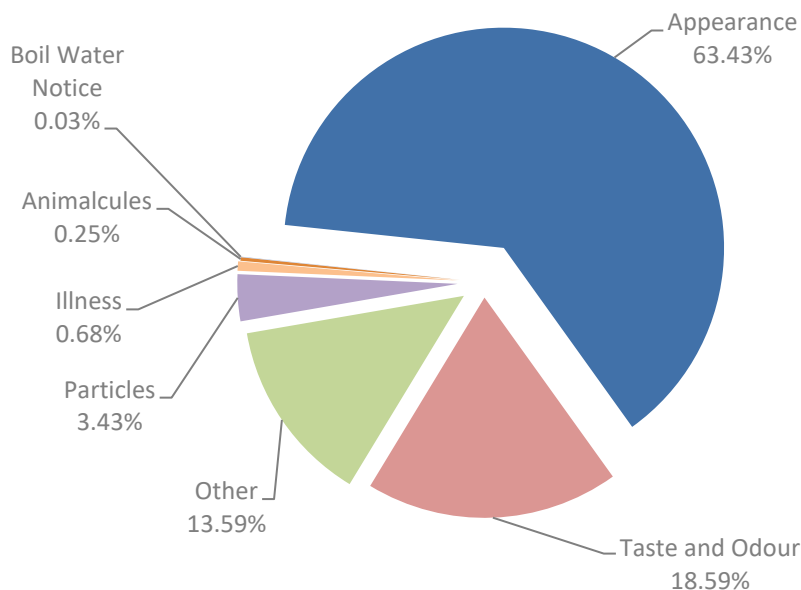
Consumer Contacts

NI Water provides us with consumer contact information to help us assess consumers' satisfaction of their drinking water quality (Table 1.3 refers). The total number of consumer contacts reported in 2018 was 7468 compared to 5764 in 2017, a significant increase of 1704 (29.6%). This increase is mainly attributed to Taste & Odour complaints (73.3% increase) and discolouration complaints (31% increase). It is incumbent on NI Water to fully investigate these upward trends and ensure any appropriate remedial work is carried out. We will continue to monitor the trends in consumer concerns.

Table 1.3: Water Quality Contacts received by NI Water in 2018

Contact Category	Contact Sub-Category	Number of Contacts
Appearance	Colour	3447
	General	64
	Hardness	5
	Stained Washing	4
	White - Air	822
	White - Chalk	395
Taste and Odour	Chlorinous	339
	Earthy/Musty	533
	Other	421
	Petrol/Diesel	68
	TCP	27
Illness		51
Particles		256
Animalcules		19
Boil Water Notice		2
Other	Water Quality Concern - Campaigns	2
	Water Quality Concern - Incident Related	112
	Water Quality Concern - Lifestyle	1
	Water Quality Concern - Pets/Animals	8
	Water Quality Concern - Sample	484
	Water Quality Concern - Lead	340
	Water Quality (No Concern) Fluoride	1
	Water Quality (No Concern) Other Information	37
	Water Quality (No Concern) Water Hardness	20
	Water Quality (No Concern) Water Quality Report	10
TOTAL		7468

The highest percentage of contacts and concerns continued to relate to the appearance of drinking water, with 63.4% in 2018 (66.6% in 2017). This is illustrated in Figure 1.5.

Figure 1.5: Consumer Contacts and Concerns received by NI Water in 2018

Appearance

Within the overall appearance categories there are a number of different sub-categories that are a cause of concern for consumers.

Colour

In 2018, 72.8% of appearance concerns related to discoloured water (68.6% in 2017). The most common cause of coloured water concerns is an orange, brown or black discoloration caused by suspended particles of iron (orange/brown) and manganese (black).

Iron discolouration may occur through natural iron present in the raw water passing through inadequate treatment, from the treatment process, or from corrosion of cast-iron distribution mains as discussed earlier. Manganese is naturally present in some raw waters and may not be fully removed if treatment is inadequate.

White Water

'White water' is mainly caused by air dissolved in the water, making it appear cloudy or milky white. It can be caused by internal plumbing, burst water mains or when NI Water has been carrying out maintenance work on pipes. Where air is the cause, the cloudy appearance will clear in a glass of water from the bottom up.

Another cause of white water may be chalk. Chalk has a white powdery appearance and is made up of natural minerals found in water which forms what is known as 'hardness'. A glass of water containing chalk will take up to an hour to clear from the top downwards, leaving fine white sediment in the bottom of the glass.

'White water' accounted for 25.7% of appearance concerns in 2018.

Taste and Odour

All water sources contain naturally occurring minerals. Water also contains dissolved gases, such as oxygen and carbon dioxide, which give tap water a characteristic taste. One substance, which is added to drinking water for disinfection, is chlorine, and this can give rise to consumer complaints (see next section on Chlorinous).

Other taste and odours should not be present in drinking water for aesthetic reasons e.g. TCP or earthy/musty or health reasons e.g. petrol/diesel.

Earthy/Musty tastes and odours accounted for the highest number of taste and odour complaints reported by consumers in 2018 (38%).

Taste and odour complaints accounted for 18.6% of the total consumer concerns in 2018.

Chlorinous

Some individuals are more sensitive than others to the taste and odour of chlorine which is used to maintain hygienic conditions within the water supply network. 24% of taste and odour consumer contacts in 2018 were related to a chlorinous taste and odour in the water.

Consumer Advice

A useful consumer guide, '[Looking after water in your home](#)', was produced by the water industry to help you maintain and enjoy the quality of tap water once it enters your home.

It contains a number of household tips, from how to reduce unwanted taste and odours and address appearance issues, to advice on water filters and storage tanks.



Section 1
Public Water Supplies

Part 2
The Drinking Water Cycle



Catchment

Treatment



Distribution



Consumer



Part 2

The Drinking Water Cycle

- Catchment: MCPA continues to be the pesticide most commonly detected in 2018
- Treatment & Distribution: THM compliance improved in 2018
- Events: There was one Major; four Serious; and 27 Significant Events reported in 2018
- Risk Management: NI Water have 23 Risk Assessments in place to cover each Water Treatment Works and associated supply area

This part of the report will detail the drinking water cycle, from the **catchment** through to **treatment** at Water Treatment Works (WTWs) and onto NI Water's **distribution network** to **consumers**. It also summarises the risk management approach adopted by NI Water in ensuring that water supplies remain safe and wholesome throughout its journey to homes and businesses.

Catchments

NI Water mainly abstracts its raw water from 38 sources including rivers and loughs (57.3%), impounding reservoirs (42.7%), and one borewell which supplies a small resident population on Rathlin Island.

NI Water is required to assess all the potential risks within its catchments through a risk assessment process. As the potential list of contaminants within catchments is diverse, it must risk assess each catchment to determine the specific risks, and ensure appropriate mitigation is in place. It also undertakes a risk based annual monitoring programme to determine water quality within the catchment and at its abstraction points.

This monitoring plays an important role in providing information on the risks within the catchment and for the operational management of water treatment works to ensure treatment processes provide an effective barrier against the identified levels of contaminants.

Pesticides

During 2018, 35 individual pesticides were monitored by NI Water under its sampling programmes. There are two separate sampling programmes in place. The compliance programme is based on the set regulatory frequencies required to be monitored by NI Water for assessing compliance. There is also the operational programme to identify potential risks and assist in the operation of its treatment processes.

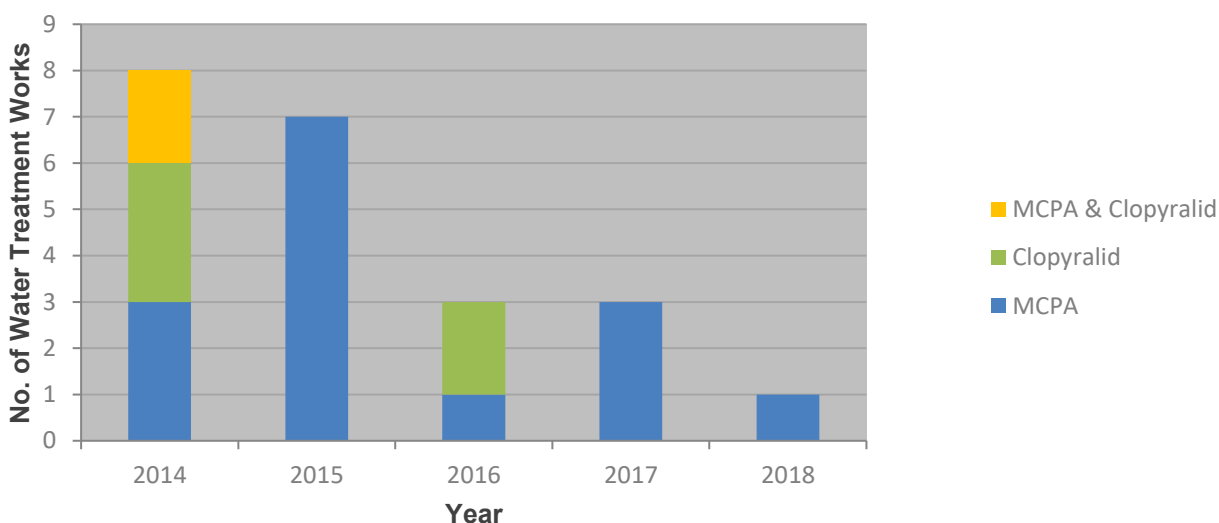
Within the compliance programme there were 236 samples taken for pesticides giving a total of 8,256 individual determinations. In 2018, two samples contravened the standard for MCPA at Derg WTW.

During 2018, within the operational programme, NI Water reported MCPA above the standard on three occasions at Derg WTW.

Water treatment works with contraventions for pesticides from 2014 to 2018 are summarized within Figure 2.1.

The number of pesticide contraventions reported from both compliance and operational sampling in 2018 was 5 which is significantly lower than for 2017 (23 contraventions).

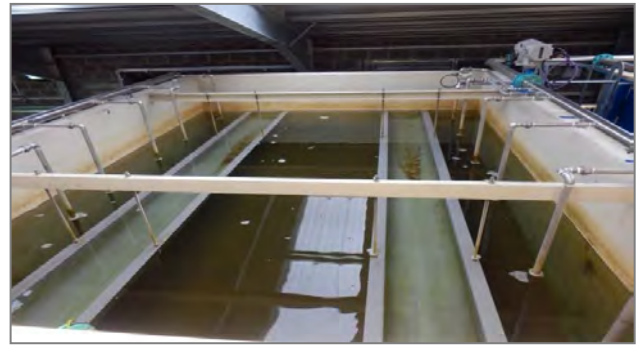
Figure 2.1: Number of WTWs where pesticides have been detected above the regulatory limit 2014 – 2018.



NI Water liaise with the Northern Ireland Environment Agency’s (NIEA’s) Pollution Control Team regarding pesticide detections, usage, and the control measures in place within drinking water catchments. There are a range of mitigation and control measures for pesticides which NI Water has in place. These include liaison with and providing advice to groups and individuals who use pesticides through Water Catchment Partnerships. NI Water is also developing catchment management plans and implementing sustainable catchment management solutions. Where catchment solutions alone are unable to reduce the risks sufficiently, NI Water must ensure that it has appropriate treatment processes in place.

Water Treatment

Water treatment processes normally include the physical removal of potential contaminants by using chemical coagulation/flocculation, sedimentation or flotation (Figure 2.2), and filtration (Figure 2.3) before disinfection. Additional treatments such as ozone dosing and GAC (Granular Activated Carbon) filtration can also be required to remove unpleasant tastes and odours, and for pesticide reduction.

Figure 2.2: Flotation Stage**Figure 2.3: Filtration Stage**

An important measure of the effectiveness of treatment is the assessment of the water quality throughout the treatment process and the quality of the final water leaving the works.

In Table 2.1, two sets of parameters are used to describe the effectiveness of water treatment processes: process control parameters; and disinfection parameters.

Table 2.1: Water Quality at Water Treatment Works, 2018

Parameters	Place of Sampling	Total No. of Tests in 2018	No. of Tests not Meeting the Standards in 2018	% of Tests Meeting the Standards	
				2018	2017
Process Control Parameters					
Aluminium	WSZ	1892	5	99.74	99.79
Trihalomethanes	WSZ	388	2	99.48	98.48
Disinfection Parameters					
Coliform bacteria	WTW	6409	2	99.97	100
<i>E. coli</i>	WTW	6409	0	100	100
Turbidity	WTW	6409	4	99.94	99.84
Indicator Parameter					
<i>Clostridium perfringens</i>	WTW	236	1	99.58	100

WSZ = Water Supply Zone (consumer tap sample)

Process Control Parameters

Process control parameters are used to measure the effectiveness of treatment, and are based on a selection of chemical parameters relevant to the processes in place at the water treatment works.

In 2018, results from the compliance monitoring programme, shown in Table 2.1, reported non-compliances for two of the process control parameters: aluminium and trihalomethanes (THMs).

Aluminium

Aluminium compliance, which is measured at consumers’ taps, was slightly lower in 2018 with five regulatory contraventions (0.26%) reported compared with four (0.21%) in 2017.

Operational sample results and outputs from on-line monitors often highlight elevated aluminium levels at WTW before they become apparent in distribution. In many cases the remedial measures taken by NI Water in response to these early detections prevent, or limit the impact of, water quality events.

Overall, there was one Serious event and 11 Significant events at WTWs in 2018 relating to elevated levels of aluminium – see Annex 2 for details. The one Serious event and five of the Significant events all occurred at Drumaroad WTW. Details of the enforcement action taken as a result of these events can be found in Annex 4. Although these events do not always directly correlate with regulatory contraventions at consumers’ taps at the time of the event, they can lead to the accumulation of aluminium in the distribution system and contribute to contraventions at a later date.

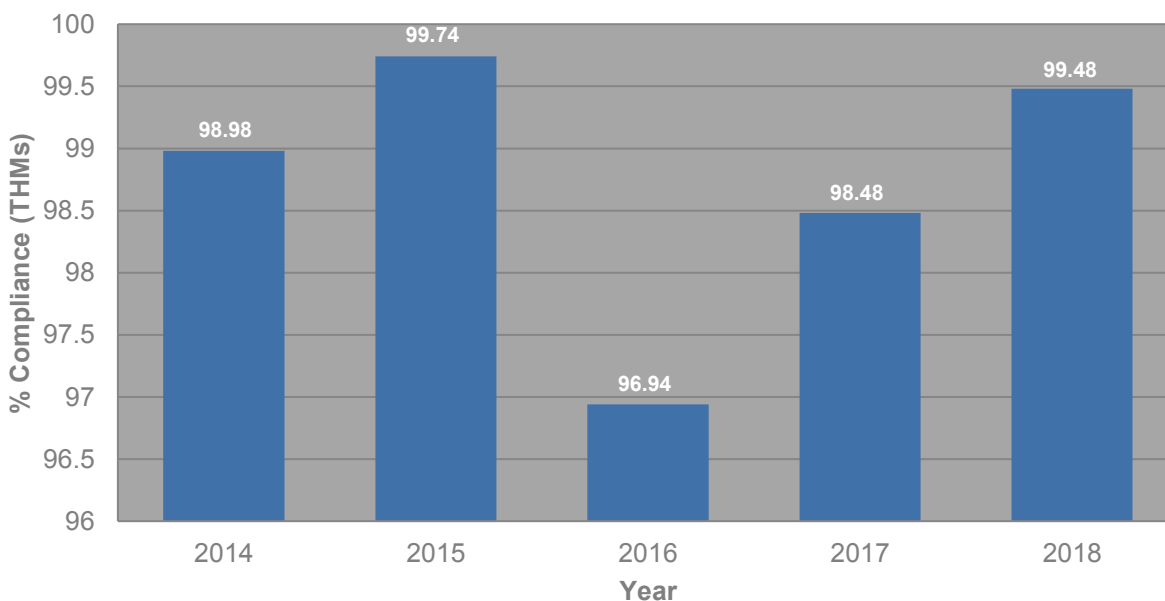
Overall, there has been an upward trend in aluminium compliance over the last five years. However, NI Water must continue to maintain, manage and operate its treatment works effectively to maintain this level of compliance.

Trihalomethanes (THMs)

THMs are a group of disinfection by-products that form when naturally occurring organic substances combine with chlorine, which is added to disinfect the water and make it safe to drink. Effective and well managed treatment processes reduce the levels of these organics, which are directly related to the level of THMs that occur in the final water.

Figure 2.4 displays the levels of THM compliance over the last five years. There has been an improvement in 2018 with two samples (0.52%) contravening the standard of 100 µg/l, compared to the six samples (1.52%) in 2017.

Figure 2.4: Percentage Compliance for THMs at Consumers’ Taps, 2014 – 2018



There are a number of reasons for THM non-compliance including: the quality of the raw water; the performance of the water treatment works; the condition of the networks; and the length of time water spends in the distribution system (residence time). NI Water must ensure that: good operational practices prevail within the catchments and at water treatment works. It is also important there is careful management of the storage levels in service reservoirs and the distribution network is adequately maintained. NI Water must also ensure a suitable disinfection policy is in place to further improve THM compliance in the future.

Disinfection Parameters

The parameters, coliform bacteria, *E.coli* and turbidity (Table 2.1 refers) look at the effectiveness of disinfection and pathogen removal. To safeguard consumers from the risk of microbiological organisms being present in drinking water, effective disinfection is fundamental to treatment works' operation. Testing for *E.coli* and coliform bacteria at water treatment works provides a level of assurance that water is being adequately treated to ensure safe, clean drinking water. In 2018, NI Water reported 100% compliance for *E.coli* and 99.97% compliance for coliform bacteria at water treatment works.

Turbidity is caused by finely suspended particles in the water and these must be removed by effective water treatment in preparation for the disinfection process. It is a regulatory requirement that turbidity values are below 1 NTU before disinfection takes place. There was a slight improvement in compliance with the turbidity standard in 2018 (99.94% compared to 99.84% in 2017). Turbidity contraventions occurred at four (16.7%) water treatment works in 2018. Of the 6,409 samples taken for turbidity analysis from WTWs, four (0.06%) failed to meet the standard. Of these failures, one was caused by ineffective treatment; one by external disturbance of the sample line; and no specific reason could be identified for the other two contraventions.

Indicator Parameter

Clostridium perfringens

Clostridium perfringens can be used in association with other parameters to assess the efficiency of the water treatment processes. This organism is a spore-forming bacterium that is exceptionally resistant to unfavourable conditions in the water environment such as extremes of temperature and pH; and disinfection by chlorination.

In 2018, of the 236 tests carried out for *Clostridium perfringens*, one (0.43%) contravened the standard. NI Water were unable to determine a cause for this contravention.

Distribution

The water distribution network in Northern Ireland is extensive, consisting of 288 service reservoirs (SRs) and approximately 26,800 km of mains pipe. Water mains transfer drinking water from the water treatment works to service reservoirs and onwards to the consumer. Service reservoirs provide storage close to the point of distribution to help ensure that sufficient water is available to meet the varying demands of consumers.

In Table 2.2 two measures are used to describe the water quality within a distribution system: reservoir integrity, and distribution networks.

Table 2.2: Water Quality Indicators within the Distribution System

Parameters	Place of Sampling	No. of Tests in 2018	No. of Tests not Meeting the Standards in 2018	% of Tests Meeting the Standards in 2018	% of Tests Meeting the Standards in 2017
Reservoir Integrity					
Coliform bacteria	SR	14921	8	99.95	99.91
<i>E. coli</i>	SR	14921	3	99.98	99.99
Distribution Networks					
Turbidity	WSZ	1892	0	100	100
Iron	WSZ	1892	20	98.94	98.85
Manganese	WSZ	1892	1	99.95	99.90

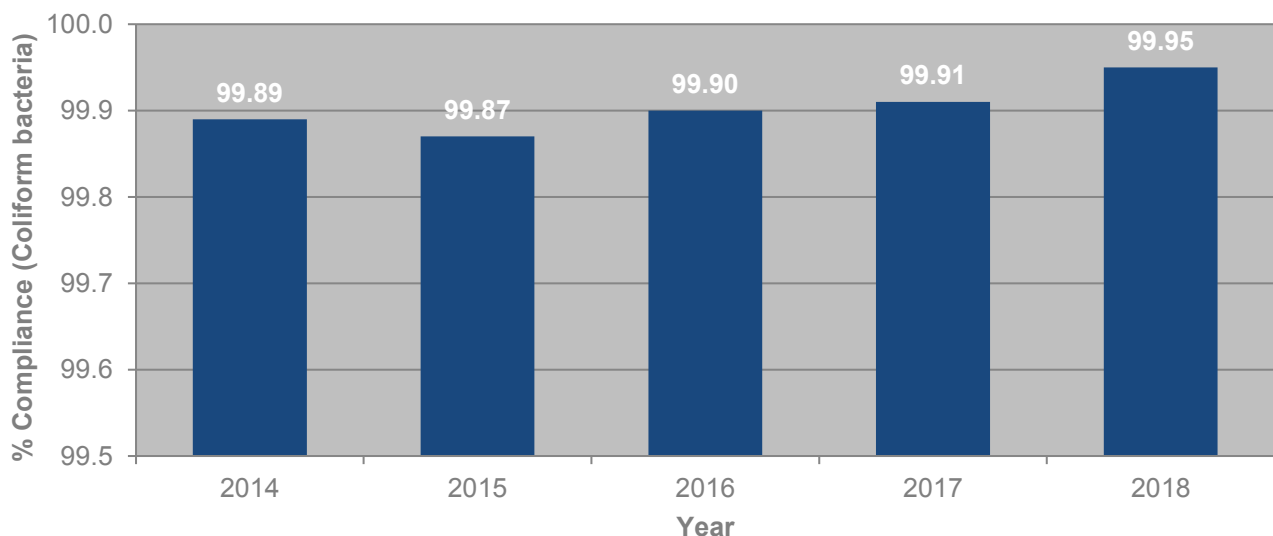
Service Reservoirs

Samples are collected weekly at every service reservoir. An example of a reservoir is shown in Figure 2.5. It is a regulatory requirement that at least 95% of samples collected annually from each reservoir are free from coliform bacteria. The 288 reservoirs sampled in 2018 met this requirement. Figure 2.6 shows coliform bacteria compliance was 99.95% in 2018, a slight improvement on 99.91% reported in 2017. Coliform bacteria were detected on eight occasions at seven (2.43%) different service reservoirs which is an improvement on the 13 detections reported in 2017. *E. coli* were detected on three occasions at three different service reservoirs in 2018 compared to two occasions at two different service reservoirs in 2017.

Figure 2.5: Service Reservoir



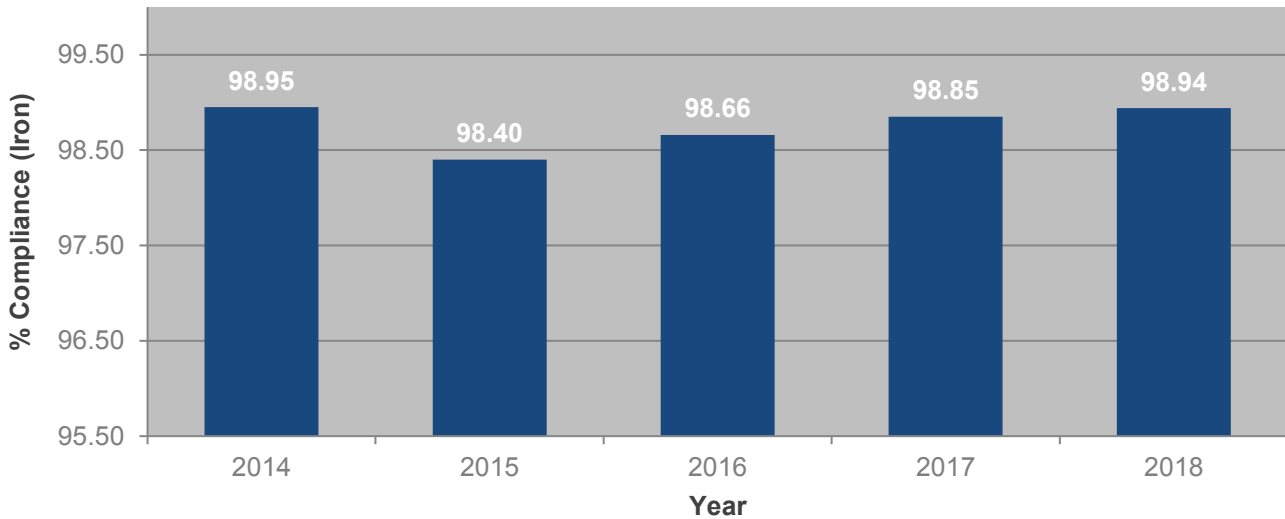
Figure 2.6: Percentage Compliance of Coliform Bacteria at Service Reservoirs, 2014– 2018



Water Mains

In 2018 a total of 1,892 samples taken from consumers' taps were tested for iron. Of these, 20 (1.06%) contravened the regulatory standard of 200 µg/l. This reflects a slight improvement in compliance from 2017 when there were 22 (1.15%) contraventions reported as illustrated in Figure 2.7.

Figure 2.7: Percentage Compliance of Iron in Distribution, 2014 – 2018



Many of the mains delivering water to consumers' taps are made of cast iron and the deterioration of older mains may result in consumers receiving discoloured drinking water due to the presence of iron and manganese. NI Water has an ongoing Water Mains Rehabilitation Programme and this enables corrective action to be taken on a priority basis to improve the water quality being supplied to consumers. A typical new mains installation is shown in Figure 2.8.

Figure 2.8: New mains installation



Events and Risk Management

Drinking Water Quality Events

NI Water inform us of events that have affected, or are likely to affect, drinking water quality or sufficiency, and subsequently there may be a risk to consumers' health. Each event is assessed into one of five categories based on severity: not significant, minor, significant, serious or major. It is important that lessons are learnt from events and any necessary remedial action is undertaken. For events categorised as Significant or above the risk assessments in place for each water supply system are required to be reviewed.

Fifty two events were reported to us in 2018. Of these, we categorised one as Major; four as Serious; 27 as Significant; eight as Minor; and 12 as Not Significant.

The one major event related to an algal bloom at Castor Bay WTWs, with the treatment at the time of the event being inadequate, this subsequently lead to widespread taste and odour complaints within the distribution system.

The four serious events were related to: treatment difficulties leading to aluminium contraventions within the distribution system from Drumaroad WTW; the prolonged spell of hot weather during June/July affecting all of Northern Ireland; contamination of a water main with oil in the Meigh area of Co. Down; and discoloured water following operational work affecting around 16,000 consumers in Belfast.

There were 17 Significant events at ten WTWs (Altnahinch; Ballinrees; Carmoney; Caugh Hill; Derg; Drumaroad; Dungonnell; Killylane; Lough Bradan; and Lough Fea) in 2018. The majority of these events were due to treatment difficulties or lack of adequate treatment relating to aluminium, *Cryptosporidium*, hydrogen ion (pH), iron, individual pesticide (MCPA), taste & odour, THMs and turbidity contraventions. Annex 2 provides further information on the 32 events in 2018 which were Significant or above.

Risk Management

NI Water are required to carry out a risk assessment of each water supply system. This is part of the drinking water safety plan (DWSP) methodology adopted by NI Water. It is a 'source to tap' approach in the management and control of the potential risks. The assessments are required to be kept under review, to ensure ongoing risks are adequately controlled and any new or emerging risks are properly identified. We monitor these plans to ensure, where risks are identified, there are control measures in place to ensure the protection of public health. There are 23 risk assessments in place covering all of NI Water's drinking water supplies.

Regulatory Control

The Technical Audit Process

Through a process of technical audits we check NI Water's compliance with statutory obligations and best practice. We operate a risk-based approach to technical audit which takes into consideration factors such as water quality monitoring, events and previous audits. The recommendations from technical audits form part of the risk management approach in protecting drinking water supplies. A summary of the 2018 Technical Audit Programme is detailed in Annex 3.

During 2018 we attended an audit with the Drinking Water Quality Regulator for Scotland. This benchmarking opportunity allowed us to confirm that there is a consistent approach to the technical audit processes adopted by all UK regulators. It also allowed us to compare Scottish Water practices with those of NI Water. We have also attended audits with the Drinking Water Inspectorate for England and Wales in previous years.

Enforcement Action

In order to protect, maintain and improve drinking water supplies, NI Water has investment programmes and systems of work in place to manage risks. These are driven by NI Water's assessment of need, and large scale investments are managed through the current Price Control process (PC15). However, there are occasions when it is necessary for DWI to undertake enforcement action against NI Water. When enforcement is taken forward it is done so to ensure compliance and the provision of safe clean drinking water. The details on enforcements in place during 2018 are contained in Annex 4.

Section 2 Private Water Supplies

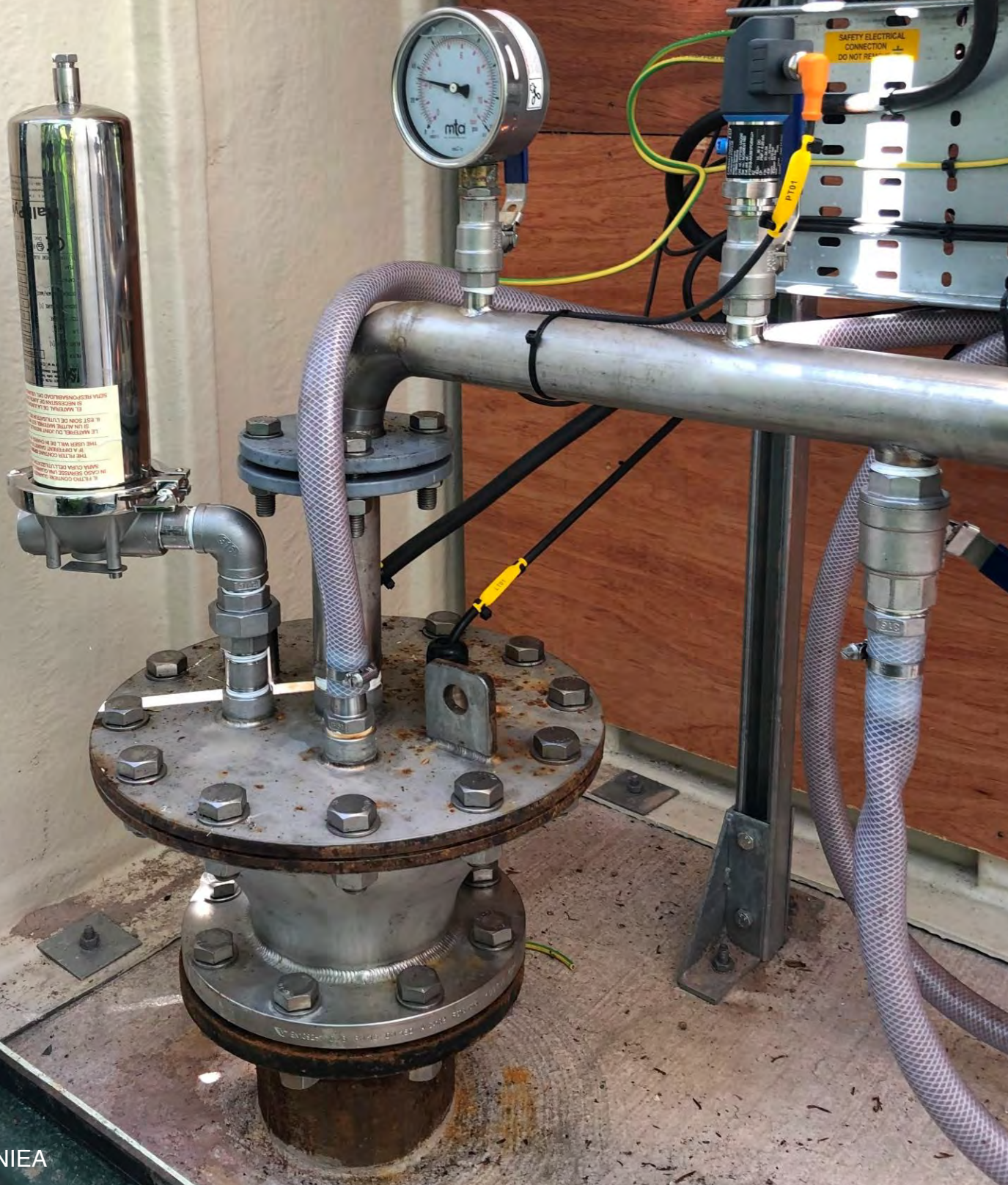


Image: NIEA

Section 2

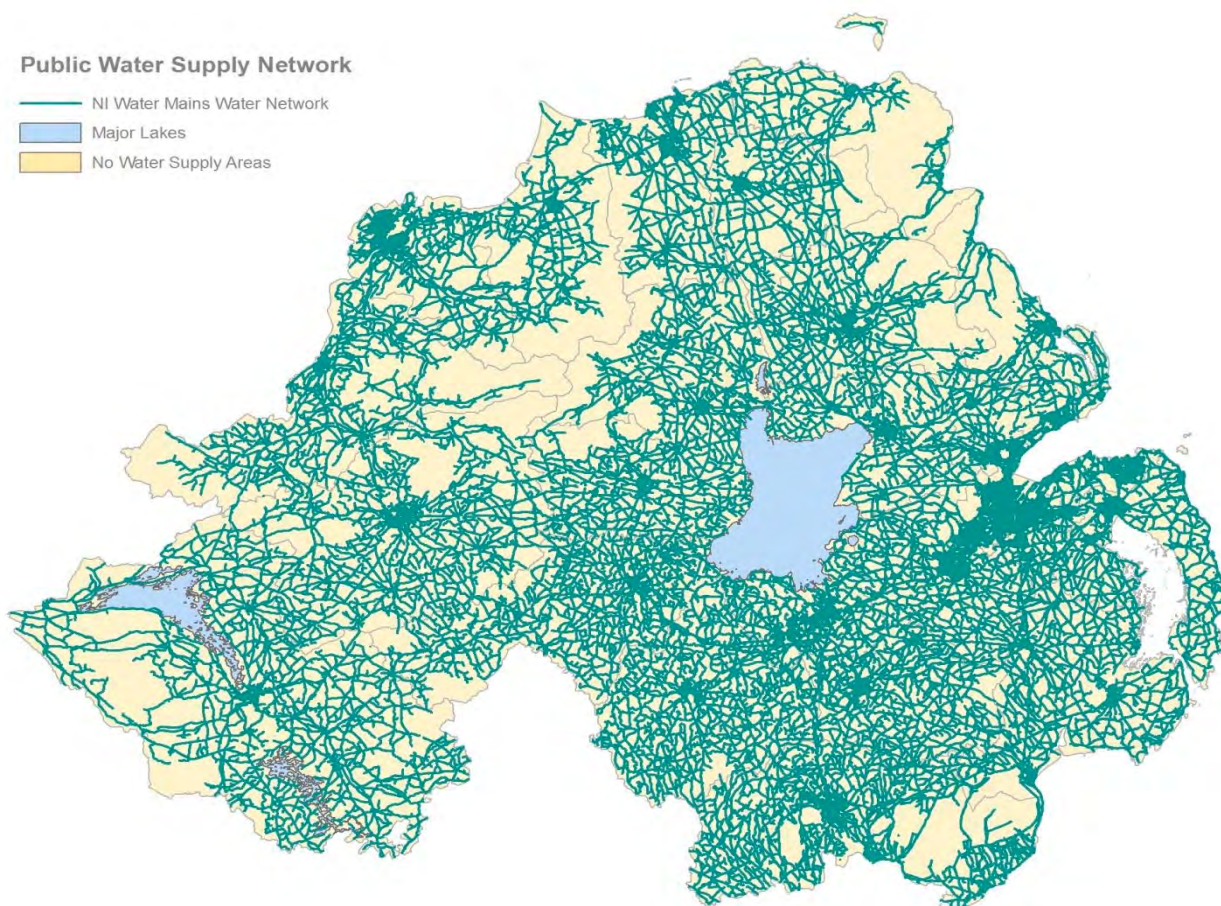
Private Drinking Water Supplies

- 164 registered private water supplies in 2018, including 12 new supplies
- 84% are commercial / public supplies; and 16% are small domestic supplies
- 99.4% of the supplies are from groundwater sources
- Of the 13,861 tests taken, 99.11% complied with the regulatory standards
- Full compliance was achieved at 57% of registered private water supply sites
- 39% of non-compliant sites showed microbiological contraventions, 52% chemical contraventions and 9% had both microbiological and chemical contraventions

NI Water supplies water to over 99% of the Northern Ireland population; the remainder is served by private water supplies. The extent of the NI Water mains network is shown in Figure 1.1. The areas of no water supply are those where domestic properties are most likely to be served by a private water supply.

Consumers often assume the water they are drinking is the public water supply. However, although the number of people directly served by a private supply may be small, many more people are exposed to them through their use in both commercial activities and public buildings.

Figure 1.1: NI Water Mains Network (and no water supply areas)



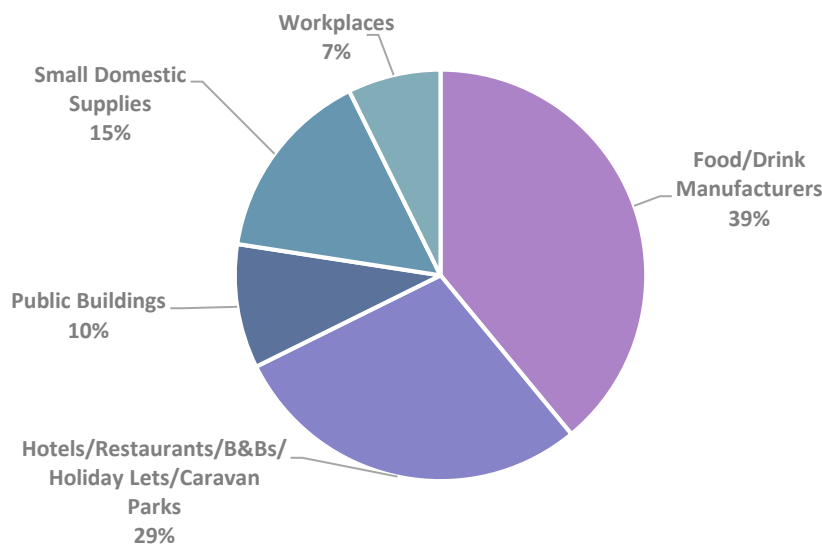
Private water supplies are often used as an alternative to or in conjunction with the public water supply at a range of sites such as:

- food and drink manufacturers;
- public buildings including hospitals, workplaces and universities; and
- within the hospitality industry such as hotels, restaurants, or bed & breakfast facilities.

Register of Supplies

There was a total of 164 private water supplies on our register in 2018 which required monitoring under The Private Water Supplies Regulations (Northern Ireland) 2017. The categories of these supplies are presented in Figure 1.2. It is estimated there are approximately a further 1,200 supplies to single private dwellings which are not required to be monitored under the regulations. The Environmental Health departments of local councils test these supplies on request.

Figure 1.2: Categories of Private Water Supplies in Northern Ireland in 2018



Private water supplies may be drawn from either surface or groundwater sources. Surface sources can include streams, rivers and reservoirs; groundwater sources include wells, boreholes and springs. Presently, 99.4% of registered private supplies in Northern Ireland are from groundwater sources, most commonly, boreholes.

Monitoring of Supplies

An annual sampling programme is in place for each registered supply. The frequency of the sampling and the range of parameters tested for are determined by the type of the supply and the volume of water used or population served. Samples at private water supplies are collected by Environmental Health staff, acting on our behalf.

Of the 164 private water supplies on our monitoring schedule for 2018, 84% are commercial/public supplies; and 16% are small domestic supplies (groupings of two or more houses). A breakdown of the numbers and sizes of private water supplies in 2018 is shown in Table 1.1.

Table 1.1: Numbers and Types of Private Water Supplies in 2018

Types of Private Water Supplies - Volume (m ³ /day)	Number of Supplies	Frequency of Sampling (per annum)
(i) Commercial/Public Supplies		
>1000 ≤2000	2	10
>100 ≤1000	23	4
>10 ≤100	49	2
≤10	63	1
(ii) Small Domestic Supplies (two or more dwellings)		
≤10	27	1
TOTAL	164	

During 2018, five sites were removed from the sampling programme as they no longer met the criteria to be registered. In addition a total of 12 new supplies registered with us, these were:

- four food/drink manufacturers;
- two public buildings (a nursing home and an open farm);
- three workplaces;
- one caravan park;
- one hotel; and
- a small domestic supply serving two or more properties.

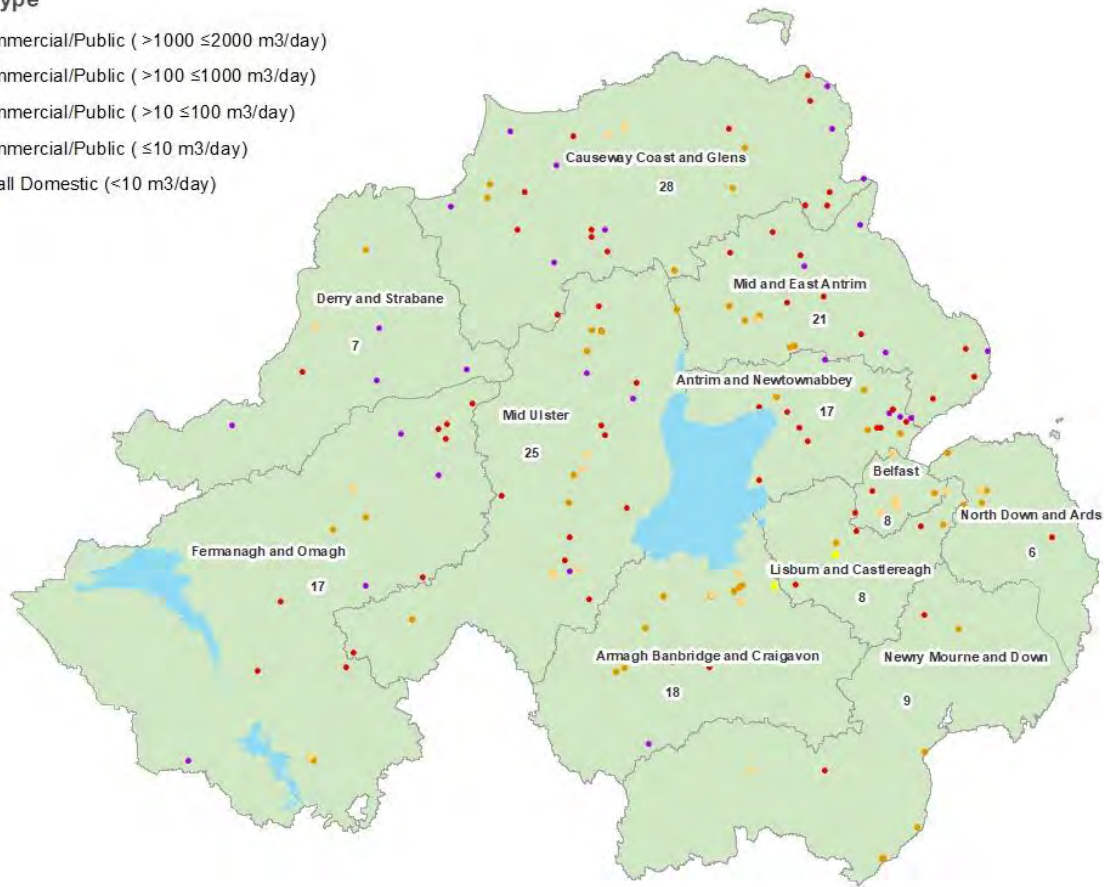
Although the sampling frequency for compliance sampling is set within the regulations, many supplementary samples are taken throughout the year during follow-up investigations. In addition, where necessary, sites can be put on an increased sampling frequency for a set period of time to monitor any parameters identified as a risk in the supply. During 2018, a total of 92 ancillary samples were collected. The results of the individual tests of these samples are not included in the calculation of the overall compliance for private water supplies.


A breakdown of registered supplies in Northern Ireland in 2018, categorised by size, is shown in Figure 1.3. The 2018 sampling programme included premises using private water supplies in all eleven council areas.

Figure 1.3: Distribution of Registered Private Water Supplies by Council Area in 2018

Supply Type

- Commercial/Public (>1000 ≤2000 m³/day)
- Commercial/Public (>100 ≤1000 m³/day)
- Commercial/Public (>10 ≤100 m³/day)
- Commercial/Public (≤10 m³/day)
- Small Domestic (<10 m³/day)



 The number of private water supplies in each council area (due to the small scale of the map all sites are not distinguishable).

Risk Assessment

The regulations require a risk assessment to be carried out for each supply to identify areas where there may be potential risks to the water quality. This assessment includes the whole private water supply system, from source to the point where the water is used. These assessments are required to follow the same standard (BS:EN 15975-2¹) as is used for the risk assessment of the public water supply. The risk assessment of private water supplies are undertaken by Environmental Health staff, acting on our behalf.

The new web based application for the risk assessment of private water supplies underwent further development and testing during 2018 to comply with this standardised approach and the completed application was launched to local councils in early 2019. A benchmarking exercise, with drinking water regulators in Scotland, England and Wales, on the risk assessment of private water supplies was conducted in late 2018.

The information gathered through the risk assessment process is used to provide sites with an action plan to mitigate identified risks and to assist sites with the ongoing management of their water supplies. It can also be used to fine-tune the monitoring requirements for each site.

¹ BS:EN 15975-2: concerning security of drinking water supply, guidelines for risk and crisis management

Overall Drinking Water Quality

Drinking water regulations in Northern Ireland apply equivalent water quality standards to private drinking water supplies as to public water supplies. The number of private water supplies registered with us in 2018 was higher than in 2017, therefore, the overall number of parameters analysed for in 2018 was higher than in the previous year.

The results in Table 1.2 show that, out of a total of 13,861 tests carried out in 2018, 99.11% met the regulatory standards. The regulatory requirements were not met on 123 occasions for 19 parameters, namely: coliform bacteria, enterococci, *E. coli*, *Clostridium perfringens*, hydrogen ion (pH), manganese, iron, nickel, copper, sulphate, sodium, total trihalomethanes (THMs), turbidity, boron, lead, bromate, individual pesticides (diuron and glyphosate), and radon.

Table 1.2: Overall Water Quality in Private Water Supplies in 2018

Parameters	Determinations in 2018		
	Total Number of Tests	Number of Tests not Meeting the Standards	% Compliance
Coliform bacteria	297	28	90.57
Enterococci	167	8	95.21
<i>E. coli</i>	297	10	96.63
<i>Clostridium perfringens</i>	267	2	99.25
Microbiological Total	1028	48	95.33
Hydrogen ion (pH)	297	25	91.58
Manganese	267	19	92.88
Iron	267	7	97.38
Nickel	136	3	97.79
Copper	136	2	98.53
Sulphate	136	2	98.53
Sodium	136	2	98.53
Trihalomethanes (THMs)	138	2	98.55
Turbidity	297	3	98.99
Boron	136	1	99.26
Lead	136	1	99.26
Bromate	137	1	99.27
Individual pesticides	6420	2	99.97
Other parameters	3770	0	100.00
Chemical Total	12409	70	99.44
Radon	109	5	95.41
Radioactivity	315	0	100.00
Radiochemical	424	5	98.82
Overall Total	13861	123	99.11

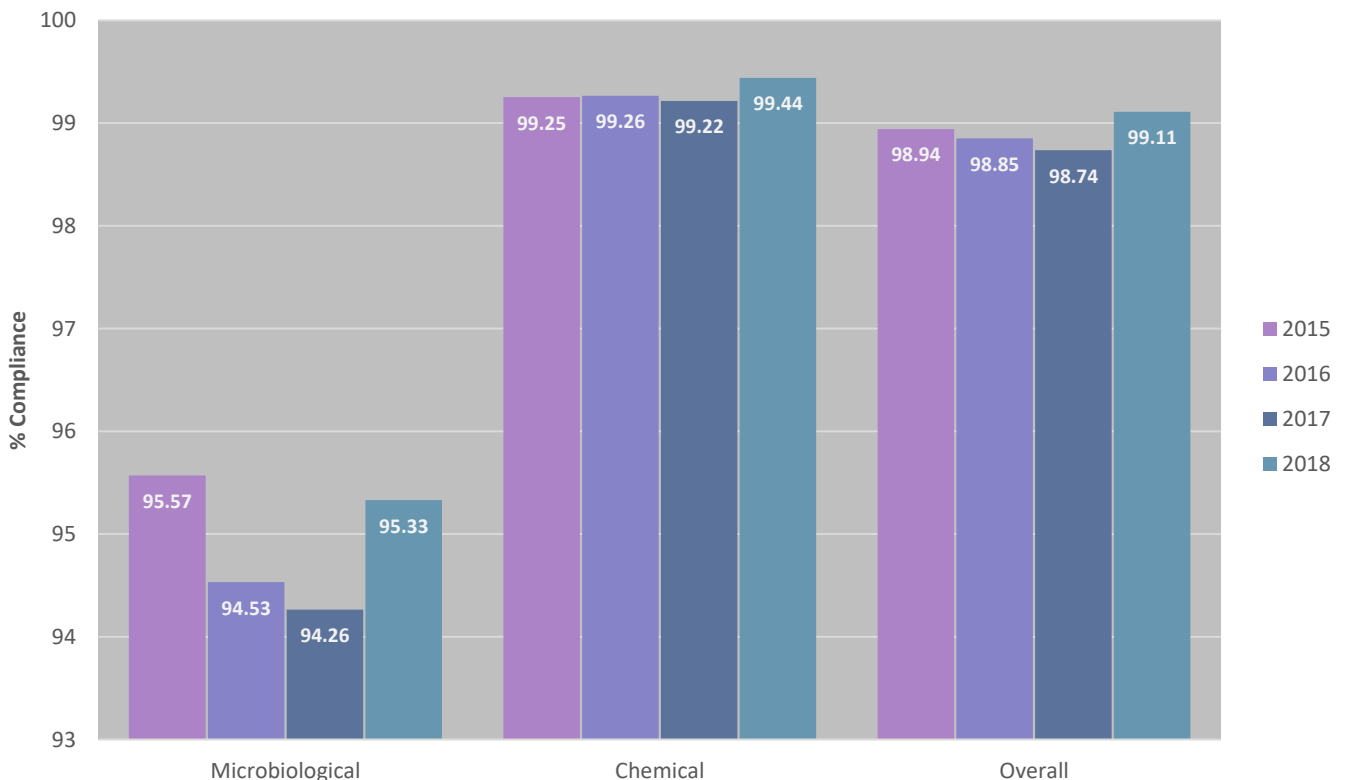
Under the private water supplies regulations, the sampling frequency and suites of parameters analysed at a private water supply may be adjusted based on previous test results and any identified risks. As a consequence, many commercial/public supplies had been analysed for a reduced suite of chemical parameters since 2012. To carry out a review of this position, all supplies were returned to their full monitoring requirements during 2018.

Microbiological contraventions account for 48 (39.02%) of the 123 contraventions at private water supplies in 2018. There has been an increase in the level of microbiological compliance reported as 95.33% in 2018 compared to 94.26% in 2017 and 94.53% in 2016, as illustrated in Figure 1.4.

Contraventions of the chemical standards have been reported for a range of parameters listed in Table 1.2. Overall, the number of chemical contraventions only decreased slightly from 71 in 2017 to 70 in 2018. However, with the higher numbers of chemical parameters analysed, there was a greater increase in chemical compliance for 2018, 99.44% compared with 99.22% in 2017, also illustrated in Figure 1.4.

As with previous years, where the chemical standards have not been met, they relate mainly to contraventions for hydrogen ion, manganese and iron.

Figure 1.4: Comparison of Compliance in Private Water Supplies, 2015 - 2018



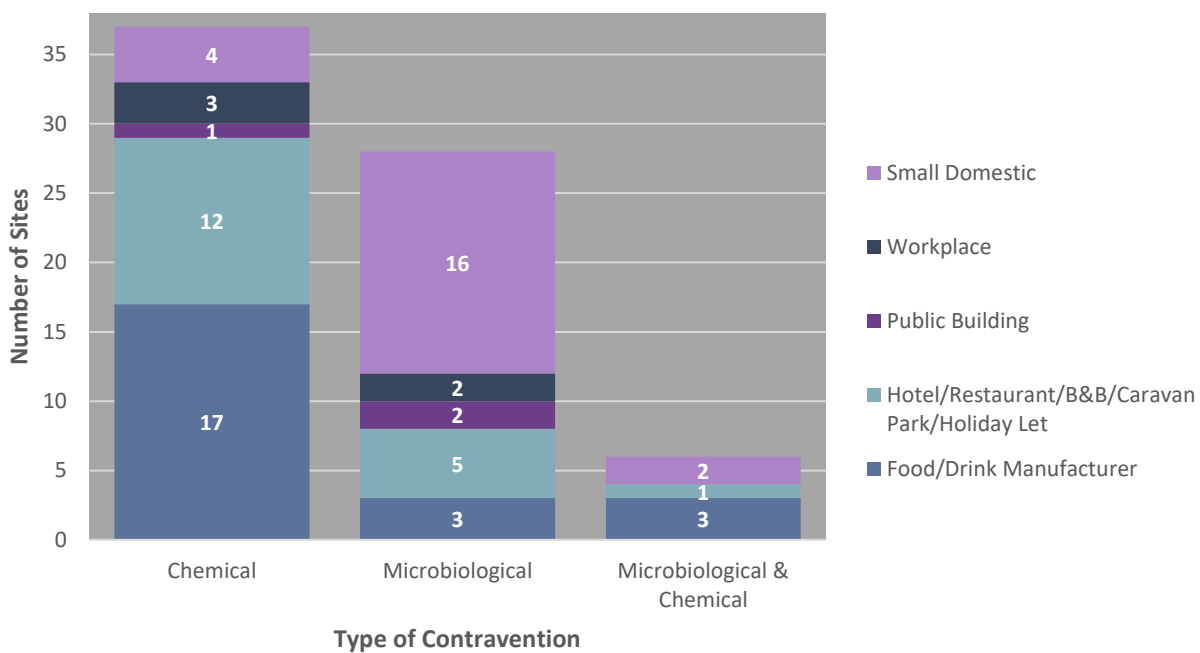
Full compliance was achieved for 57% (93 sites) of the private water supplies tested in 2018. Of the 71 sites which did not comply with the regulatory standards, 39% (28 sites) contravened microbiological standards; 52% (37 sites) chemical standards; and 9% (six sites) failed to comply with both microbiological and chemical standards.

The categories of these non-compliant sites, presented in Figure 1.5, show that the chemical only contraventions occurred largely at commercial/public sites such as food/drink manufacturers, hotels, or holiday lets whereas for the microbiological only contraventions 57% were at small shared domestic supplies and 43% were at commercial/public sites.

The significance of each contravention not only depends on the category or size of the sites but often, more importantly, on the purpose for which the water is used at the sites. In summary, for the 71 sites which did not comply with all the drinking water standards in 2018:

- 49 use the private water supply as the primary source of drinking water;
- 12 use the supply as an ingredient in food or drink; and
- 10 are used for the washing of equipment and surfaces in contact with food or drink.

Figure 1.5: Categories of Non-Compliant Private Water Supply Sites in 2018



Factors Affecting Drinking Water Quality

Different aspects of the water supply chain contributed to the microbiological and chemical water quality contraventions reported in 2018 such as: catchment (including source protection); treatment; distribution; and sampling point (tap) issues.

Micro-Organisms

The presence of micro-organisms in a private water supply is indicative of contamination of the water either at source or at some point within the distribution system. In particular, the detection

of *E. coli* or enterococci bacteria specifically indicates faecal contamination of a water supply and can be a risk to public health. These faecal indicators were found to be present in 11 supplies during 2018, eight small shared domestic supplies with no treatment and three commercial/public supplies, two of which had disinfection treatment in place at the time of sampling.

Rural water supplies in the vicinity of where animals graze or manure is spread are most at risk. This is particularly prevalent at times of heavy rainfall, when water may run directly off farmland and carry micro-organisms into unprotected private supplies. Guidance on source protection is available in the [Private Water Supplies Technical Manual](#).

Poor microbiological quality also highlights where there is a lack of suitable treatment or the treatment installed is not being operated and maintained appropriately. The quality of the raw water is a key element in selecting the correct treatment for a private water supply which may require pre-treatment prior to disinfection.

Metals

Some groundwaters may contain high levels of naturally occurring iron and manganese. Iron levels can also be raised due to deterioration of cast iron pipe work and/or storage tanks within the distribution system. In 2018, 15 sites reported contraventions for one or both of these metals.

High levels of iron and manganese may affect the appearance, taste or smell of the water resulting in turbidity, colour, taste, and odour contraventions and discoloration or staining of water fittings. It can also affect treatment systems, such as ultra-violet lamps, due to metal deposits causing a reduction in their effectiveness for disinfection. Sites are encouraged to purge wells/boreholes, clean out storage tanks and flush through pipe work or, where required, replace parts of their distribution network to reduce the levels of iron in their supplies.

In 2018: one site had copper and nickel contraventions due to the acidic nature of the source water; one site had a lead contravention due to the presence of lead in the source water as the well is located in a lead mining area; one site had a copper contravention due to operational issues leading to stagnation of water in a storage tank prior to sampling; and two sites had nickel contraventions due to either leaching from fittings or from the source water.

Lead, and other heavy metals such as nickel and copper, are usually detected at elevated levels due to the use of inappropriate fixtures and fittings. The regulations specify that only products and substances approved for use with drinking water supplies should be used.

Details of [approved products](#) are available through the Drinking Water Inspectorate for England and Wales website.

Pesticides

Pesticide contraventions were identified at two private water supplies in 2018, a hotel and a workplace. Trace levels of a range of other pesticides below the regulatory limit of 0.10 µg/l for individual pesticides were also detected at 69 other sites.

Actions in the Event of Failure

Contraventions are investigated through site visits conducted by Environmental Health staff and the collection of follow up samples. Depending on the nature and significance of the contraventions, it may also be necessary for us to carry out a site inspection. Site visits ensure owners/users of the supply are provided with practical advice on source protection and treatment options and best practice for the management of their water supply to reduce the potential risks of contamination.

Any contraventions at supplies, where the water is used as an ingredient in food production or as drinking water, and that are considered as a potential risk to health, are reported to the Public Health Agency (PHA) for appropriate health advice. Where necessary, the regulations contain a provision to issue Notices which can be used to restrict or prohibit the use of a supply.

Out of the 123 contraventions identified in 2018, 62 were notified to PHA for advice: 48 microbiological and 14 chemical. As a consequence, new restrictions in the use of the private water supply were put in place at 17 sites to protect public health. In addition, restrictions on use were initiated at a further two sites as a result of unacceptable taste or odour.

These restrictions of private water supplies can include switching to, or blending with, the public water supply (where this is available), boil water before use notifications, and do not use instructions.

Removal of these restrictions requires investigation into the cause of the water quality contravention, completion of work to remedy any issues identified and the achievement of two consecutive satisfactory resamples. Accordingly, the restrictions were removed at 13 sites and the private water supply taken out of service at a further site.

We continue to work with the owners and users of private water supplies and Environmental Health staff to bring the remaining supplies into compliance. Priority is given to advancing improvements to the water quality through: provision of advice and guidance; agreeing action plans (particularly at the larger commercial/public sites); and promotion of water safety plans for the ongoing management of these supplies.

We have a duty to ensure compliance with the water quality standards in The Private Water Supplies Regulations (Northern Ireland) 2017. Our approach, where there is no known health risk, is initially through informal negotiations. However, where necessary, we may take formal enforcement action to secure compliance and ensure a safe, clean supply of drinking water from private water supplies.

Annexes

Annex 1 Glossary

Annex 2 Events

Annex 3 Technical Audit Programme

Annex 4 Enforcement Orders



Annex 1

Glossary and Definition of Terms

Aesthetic	associated with the senses of taste, smell and sight.	Diflufenican	a herbicide used to control grasses and broad-leaved weeds.
Animalcule	a tiny or microscopic life form.	Diuron	a herbicide used to control weeds and mosses.
Catchment	the area of land that drains into a watercourse.	Drinking Water Standards	the prescribed concentrations or values listed in the Regulations.
Clopyralid	a herbicide used for controlling broad-leaved weeds such as docks and creeping thistle in grassland.	Enterococci	a sub-group of faecal streptococci commonly found in the faeces of humans and warm-blooded animals.
<i>Clostridium perfringens</i>	a spore-forming bacterium which is exceptionally resistant to unfavourable conditions in the water environment.	<i>Escherichia coli</i> (<i>E. coli</i>)	a type of faecal coliform bacteria commonly found in the intestines of animals and humans. The presence of <i>E. coli</i> in water is a strong indication of recent sewage or animal waste contamination.
Coagulation	a process employed during drinking water treatment to assist in the removal of particulate matter.		
Coliforms	a group of bacteria which may be faecal or environmental in origin.	Event	a situation affecting, or threatening to affect, drinking water quality.
Communication Pipe	the connection from the water main to the consumer property boundary (normally at the outside stop tap).	Faecal Coliform	a sub-group of coliforms, almost exclusively faecal in origin.
Compound	a compound consists of two or more elements in chemical combination.	Fenpropimorph	a fungicide used to control various fungal pathogens.
Contravention	a breach of the regulatory requirement.	Filtration	the separation of suspended particulate matter from a fluid.
Determination	an analysis for a specific parameter.	Flocculation	a process where colloids come out of suspension in the form of floc or flakes.

Glyphosate	a herbicide used to control broadleaved weeds and grasses amongst crops.	MI/d	megalitres per day (one MI/d is equivalent to 1,000 m ³ /d or 220,000 gallon/d).
Granular Activated Carbon (GAC)	an absorbent filtration media used to remove trace organic compounds from water.	µg/l	micrograms per litre (one millionth of a gram per litre).
Groundwater	water from aquifers or other underground sources.	Parameters	the substances, organisms and properties listed in Schedules 1 and 2, and regulation 2 of the Regulations.
Hydrogen ion (pH)	gives an indication of the degree of acidity of the water. A pH of 7 is neutral; values below 7 are acidic and above 7 are alkaline. A low pH water may result in pipe corrosion. This is corrected by adding alkali during water treatment.	Pathogen	an organism which causes disease.
		Pesticides	any fungicide, herbicide, insecticide or related product (excluding medicines) used for the control of pests or diseases.
Impounding reservoir	is a reservoir of stored water that may be used when supply is insufficient.	Prescribed Concentration or Value (PCV)	the numerical value assigned to drinking water standards, defining the maximal or minimal legal concentration or value of a parameter.
Indicator Parameter	something that is measured to check that the control measures, such as water treatment, are working effectively.	Raw Water	water prior to receiving treatment abstracted for the purpose of drinking water provision.
MCPA	a herbicide used for controlling broad-leaved weeds in grass or cereal crops.	Remedial Action	action taken to improve a situation.
Mecoprop (MCP)	a herbicide used for controlling broad-leaved weeds in grass or cereal crops.	Sedimentation	the tendency for particles in suspension to settle out of the water under the influence of gravity.
Microbiological	associated with the study of microbes.		
m³/d	cubic metres per day.		
mg/l	milligrams per litre (one thousandth of a gram per litre).		

Service Pipe	pipe that connects the consumer's property to NI Water's main. It comprises two parts: the communication pipe which is the connection from the water main to the consumer's property boundary (normally at the outside stop tap); and the supply pipe which runs from the boundary of the property to the consumer's inside stop tap.
Service Reservoir	a water tower, tank or other reservoir used for the storage of treated water within the distribution system.
Water Supply Point	a point, other than a consumer's tap, authorised for the taking of samples for compliance with the Regulations.
Trihalomethanes (THMs)	a group of organic substances comprising, for the purposes of the Regulations, four substances: trichloromethane (also known as chloroform), tribromomethane (also known as bromoform), dibromochloromethane and bromodichloromethane.
Water Supply Zone	a pre-defined area of supply for establishing sampling frequencies, compliance with standards and information to be made publicly available.
Wholesome/ Wholesomeness	a concept of water quality which is defined by reference to standards and other requirements set out in the Regulations.

Annex 2 – Events

Major Drinking Water Quality Events in 2018

Date of Major Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Major Event	Associated Council Area(s)
12/06/18 - 02/07/18	Castor Bay WTW (415,293 population)	Algal bloom in Lough Neagh led to a major drinking water quality event with widespread taste and odour complaints. The treatment available at the time of this event was inadequate. A Provisional Enforcement Order (PEO) has been issued by the Inspectorate in relation to this event.	Armagh Banbridge Craigavon District; Belfast City; Lisburn & Castlereagh City; Mid-Ulster District; and Newry Mourne & Down District

Serious Drinking Water Quality Events in 2018

Date of Serious Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Serious Event	Associated Council Area(s)
15/02/18 - 22/02/18	Drumaroad WTW (408,595 population)	Treatment difficulties following power spikes led to aluminium contraventions in the works final water and the related supply area. A Consideration of Provisional Enforcement Order (CPEO) has been issued by the Inspectorate in relation to this event.	Belfast City; Lisburn & Castlereagh City; Newry Mourne & Down District; and North Down & Ards Borough
28/06/18 - 19/07/18	Northern Ireland (1.8m population)	A prolonged spell of hot weather resulted in significant increased demand on the water network throughout N. Ireland. Tankering was required to keep people on supply, and a hosepipe ban was in place for 3 weeks.	All council areas
29/07/18 - 07/08/18	Carn Road & Green Road, Meigh (43 properties)	Consumers experienced a significant hydrocarbon odour after the mains water was contaminated with oil.	Newry Mourne & Down District
13/12/18 – 16/12/18	Finaghy Area (16,603 population)	Consumer complaints of discoloured water were received following operational work by NI Water. There were also contraventions of the iron and manganese standards.	Belfast City

Significant Drinking Water Quality Events in 2018

Date of Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Significant Event	Associated Council Area(s)
03/01/18 - 09/01/18	Lough Bradan WTW (48,158 population)	Contraventions of the taste parameter occurred in the works final water. NI Water's investigation was unable to determine a cause for the contraventions.	Fermanagh & Omagh District
05/01/18	Killylane WTW (51,120 population)	Contraventions of the aluminium, iron, and turbidity standards occurred in the works final water. The most probable cause for this event was the use of a chemical past its recommended shelf-life.	Mid & East Antrim Borough
16/01/18 - 21/01/18	Drumaroad WTW (556,706 population)	Contraventions of the aluminium parameter occurred in the works final water following treatment difficulties. The treatment difficulties were caused by a telecommunications failure. A CPEO has been issued by the Inspectorate in relation to this event.	Belfast City; Lisburn & Castlereagh City; Newry Mourne & Down District; and North Down & Ards Borough
19/01/18 - 26/01/18	Bleary Road, Portadown (2 properties)	Coliform bacteria contraventions led to "Boil Water before Use until Further Notice" advice being issued to two properties. NI Water's investigation was unable to determine a cause for the contraventions, and resamples were satisfactory.	Armagh City, Banbridge & Craigavon Borough
02/02/18 - Present	Friary Road, Armoy (6 properties)	Consumer complaints of discoloured water were received by NI Water. Samples taken in response to this event contravened the aluminium, iron and manganese standards and were above the Health Notification Values (HNVs).	Causeway Coast & Glens Borough
09/02/18 - 14/02/18	Killyglen SR (9,500 properties)	A large number of consumers complained about discoloured water following a burst main at the inlet to the reservoir. A contravention of the turbidity standard (above the HNV) was reported.	Mid & East Antrim Borough

Significant Drinking Water Quality Events in 2018

Date of Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Significant Event	Associated Council Area(s)
28/02/18 - 09/03/18	Northern Ireland (1.8m population)	Severe weather event. Interruptions to water supply occurred over many areas of Northern Ireland primarily due to frozen and burst pipes, necessitating the use of alternative water supplies.	Most council areas
02/03/18	Drumaroad WTW (408,595 population)	Elevated aluminium levels occurred in the works final water following treatment difficulties. These were caused by a generator failure. A CPEO has been issued by the Inspectorate in relation to this event.	Belfast City; Lisburn & Castlereagh City; Newry Mourne & Down District; and North Down & Ards Borough
04/03/18	Lough Fea WTW (43,872 population)	Contraventions of the aluminium, iron and turbidity parameters occurred in the works final water following treatment difficulties. This event was related to the "Severe weather event" reported previously.	Mid Ulster District
06/03/18 - 11/03/18	Drumaroad WTW (408,595 population)	A <i>Cryptosporidium oocyst</i> was detected in the works final water and a further one detected in Sampsons Stone SR. A warning letter was issued by the Inspectorate in relation to this matter.	Belfast City; Lisburn & Castlereagh City; Newry Mourne & Down District; and North Down & Ards Borough
09/04/18	Lough Fea WTW (43,872 population)	Contraventions of the aluminium and iron parameters occurred in the works final water following treatment difficulties.	Mid Ulster District
23/04/18 - Present	Rathlin Island (296 population)	The elevated level of bromoform (produced by the disinfection of the raw water which has a high bromide level) in the works final water led to trihalomethane (THM) contraventions and WHO Index values for THMs > 1. A CPEO was issued by the Inspectorate in relation to this matter.	Causeway Coast & Glens Borough

Significant Drinking Water Quality Events in 2018

Date of Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Significant Event	Associated Council Area(s)
02/05/18 - 04/05/18	Edenaveys SR (34,941 properties)	Chlorine was overdosed due to a component failure in the chlorinator. Elevated chlorine levels were detected in the related supply area. There is now a critical alarm in place to prevent a recurrence.	Armagh City, Banbridge & Craigavon Borough and Newry Mourne & Down District
15/05/18 - Sept. 18	Ballinrees WTW (111,856 population)	Taste & Odour complaints occurred in the area supplied by Ballinrees WTWs due to insufficient treatment.	Causeway Coast & Glens Borough and Derry City & Strabane
23/05/18 - Present	Derg WTW (38,989 population)	Contraventions of the individual pesticide standard for MCPA occurred in the works final water due to insufficient treatment. There is an ongoing PEO in place in relation to these contraventions.	Derry City & Strabane and Fermanagh & Omagh District
28/06/18 - 06/07/18	Killyhevlin Enniskillen (2,502 properties)	Consumer complaints of discoloured water were received in the Glenchuil SR supply area. Samples taken in response to this event contravened the aluminium, iron, manganese and turbidity standards. This event was related to the "high network demand event" reported previously.	Fermanagh & Omagh District
27/07/18 - 31/07/18	Unagh SR (2,432 properties)	<i>E. coli</i> were detected in the SR final water and in the related supply area. The chlorine levels were lower than normal at the time of these contraventions and all subsequent samples have been satisfactory.	Mid Ulster District
07/08/18 - 20/08/18	Glenelly Road, Plumbridge (6 properties)	<i>E. coli</i> and coliform bacteria contraventions led to " Boil Water before Use until Further Notice " advice being issued to three properties. NI Water's investigation was unable to specify a cause for the contraventions. Further resamples were satisfactory.	Derry City & Strabane

Significant Drinking Water Quality Events in 2018

Date of Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Significant Event	Associated Council Area(s)
28/08/18	Drumaroad WTW (382,217 population)	Elevated aluminium levels occurred in the works final water following treatment difficulties caused by instrument failure. A CPEO has been issued by the Inspectorate in relation to this event.	Belfast City; Lisburn & Castlereagh City; Newry Mourne & Down District; and North Down & Ards Borough
04/09/18 - 18/09/18	Dungonnell WTW (Population 26,601)	A contravention of the trihalomethanes (THMs) parameter occurred in the works supply area after a period of sub-optimal treatment. Resamples were satisfactory.	Mid & East Antrim Borough
26/09/18 - 27/09/18	Carmoney WTW (51,470 population)	A low chlorine event occurred following the leakage of some filter cleaning reagent into the works final water.	Derry City & Strabane
15/10/18 - 19/10/18	Caugh Hill WTW (75,020 population)	Contraventions of the aluminium, iron and turbidity parameters occurred in the works final water and iron contraventions occurred in the related supply area following treatment difficulties.	Causeway Coast & Glens Borough and Derry City & Strabane
09/10/18 - Present	Rathlin Island (296 population)	The elevated level of bromoform (produced by the disinfection of the raw water which has a high bromide level) in the works final water led to trihalomethane (THM) contraventions and WHO Index values for THMs > 1. A CPEO was issued by the Inspectorate in relation to this matter.	Causeway Coast & Glens Borough
19/10/18 - 21/10/18	Altnahinch WTW (31,903 population)	Contraventions of the aluminium, hydrogen ion (pH) and turbidity parameters occurred in the works final water.	Causeway Coast & Glens Borough
23/10/18 - 26/10/18	Dungonnell WTW (Population 26,601)	Contraventions of the aluminium parameter occurred in the works final water following treatment difficulties.	Mid & East Antrim Borough

Significant Drinking Water Quality Events in 2018

Date of Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Significant Event	Associated Council Area(s)
02/11/18 - 09/11/18	Drumaroad WTW (408,595 population)	Contraventions of the aluminium parameter occurred in the works final water and the related supply area following treatment difficulties. The treatment difficulties were caused by chemical dosing problems. A CPEO is in place at this WTWs.	Belfast City; Lisburn & Castlereagh City; Newry Mourne & Down District; and North Down & Ards Borough
30/12/18 - 02/01/19	Drumaroad WTW (408,595 population)	A contraventions of the aluminium parameter occurred in the works final water. NI Water's investigation was unable to specify a cause for the contravention. A CPEO is in place at this WTWs.	Belfast City; Lisburn & Castlereagh City; Newry Mourne & Down District; and North Down & Ards Borough

Annex 3

Technical Audit Programme

In 2018, the technical audit programme of the public water supplies was completed as detailed in Table 5.1 and we acknowledge NI Water's continued co-operation during the audits. NI Water has implemented or provided comment on, the recommendations and suggestions we provided in our audit reports.

The following table provides a summary of our 2018 Inspection Programme.

Table 3.1: Summary of the 2018 Inspection Programme

Date of Audit	Location	Audit Activity	Number of Recommendations ¹	Number of Suggestions ²
21/03/18	Sampling Procedures	To check the sampling technique and ensure sample points are fully compliant.	9	5
27/03/18	Drumaroad WTW	To check that good operational practice is used in the water treatment process (audit carried out in response to four water quality events).	9	0
25/06/18	Operational Networks Audit - Kilrea	To check that good practice is being operated during Mains Rehabilitation Works.	2	4
31/10/18	Laboratory Information Management System	To check that data is adequately managed by the 'Laboratory Information Management System'	6	1
11/12/18	Lough Bradan WTW	To check that good operational practice is used in the water treatment process.	7	5

¹ Recommendations are made where, in our opinion, action is required to avoid a foreseeable risk or a breach of a regulatory duty. If such a breach occurs, then we may consider 'enforcement action'. A formal written response from NI Water is required.

² Suggestions are made in relation to matters which relate to best practice.

Annex 4

Enforcement Orders

The [DWI website](#) publishes details of all Enforcement actions during 2018.

Table 4.1: Summary of Enforcement Actions 2018

Type of Enforcement	Water Treatment Works (WTW)	Reason for Undertaking Or Notice	Summary
PEO ¹ /16/01	Derg WTW	Contravention of the regulatory standard for the herbicide, MCPA	DWI accepted and published a series of undertakings from NI Water on 30/06/2018. One undertaking was revoked and new undertakings accepted by DWI on the 22/03/2018. Remedial measures to be completed by the 31/03/2019.
CPEO ² /17/01	Ballinrees WTW	Contravention of the regulatory standard for the herbicide, MCPA	DWI accepted and published a series of undertakings from NI Water on 24/07/2017. A further undertaking was accepted and published by DWI under the same enforcement on the 05/07/18. Remedial measures to be completed by the 31/03/2019
CPEO/18/01	Glenhordial WTW	Contravention of the regulatory standard for the herbicide, MCPA	DWI accepted and published a series of Undertakings from NI Water on the 15/03/2018. Remedial measures to be completed by the 31/01/2019.
CPEO18/02	Rathlin WTW	Contravention of the regulatory standard for THMs (Trihalomethanes : Total)	DWI accepted and published a series of undertakings from NI Water on the 17/04/2018. Remedial measures to be completed by the 31/03/2019.

¹ PEO is a Provisional Enforcement Order issued under the Water and Sewerage Services Order (Northern Ireland) 2006

² CPEO is a Consideration of Provisional Enforcement Order issued under the Water and Sewerage Services Order (Northern Ireland) 2006

Type of Enforcement	Water Treatment Works (WTWs)	Reason for Undertaking Or Notice	Summary
PEO/18/01	Castor Bay WTW	Contravention of the standard for Odour	DWI accepted and published a series of undertakings from NI Water on the 16/07/2018. One undertaking was revoked and a new undertaking accepted on the 30/08/2018. Undertakings are scheduled for completion in 31/03/2021.
CPEO/18/03	Drumaroad WTW	Contravention of the regulatory standard for Aluminum	DWI accepted and published a series of Undertakings from NI Water on the 07/02/19. Undertakings are scheduled for completion in 31/12/2019.

Useful Information

(To access the information click on the links below)

[Regulatory Framework](#) – provides details and links to current legislation relating to drinking water quality.

[Drinking Water Quality Tables](#) – provides details of drinking water compliance within individual water supply zones.

Drinking Water Advice and Guidance for [Public](#) and [Private](#) Supplies – provides a list of links for consumers and professionals requiring further information on drinking water quality.

[Useful Contacts](#) – provides a list of organisations and contact details related to drinking water.

Request for Feedback on this Report

Did you find what you were looking for?

The Drinking Water Inspectorate is constantly aiming to improve the standard of information provided in this report.

Any views or opinions you may have would be highly valued by us and we would greatly appreciate your feedback.

Any feedback can be provided by either

Email: dwi@daera-ni.gov.uk

or

Post: **Drinking Water Inspectorate
Northern Ireland Environment Agency
Klondyke Building
Cromac Avenue
Gasworks Business Park
Malone Lower
BELFAST
BT7 2JA**



Drinking Water Inspectorate for Northern Ireland
Resource Efficiency Division
Northern Ireland Environment Agency
Klondyke Building
Cromac Avenue
Gasworks Business Park
Malone Lower
Belfast BT7 2JA

Tel: 028 9056 9282

Email: DWI@daera-ni.gov.uk

Email: privatewatersupplies@daera-ni.gov.uk

www.daera-ni.gov.uk

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