Drinking Water Quality in Northern Ireland, 2022

A Report by the Drinking Water Inspectorate for Northern Ireland

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Foreword

I am pleased to present the 27th 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. This report provides an independent assessment of drinking water quality of both public and private supplies for the calendar year 2022.

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.

Overall public drinking water quality for 2022 remained high with 99.91% compliance, a slight increase from 2021 (99.88%). Compliance at private water supplies was 99.02% a slight decrease from 2021 (99.19%).

Safe, clean drinking water is critical for our health and wellbeing, to support business and grow the economy. In December 2021, DWI agreed that there would be no consumer tap sampling required in early 2022 due to the restrictions imposed over the Omicron variant of COVID-19. A return to full consumer tap sampling occurred in March 2022.

Total Trihalomethanes (THMs) was the parameter with the lowest compliance in 2022, at 98.83%. 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. Work is planned at a number of water treatment works (WTWs) in NI Water's Price Control capital investment programmes (PC21 & PC27) to improve THM compliance.

DWI continues to work with all stakeholders on the PC21 process to ensure the effective prioritisation of investment in drinking water quality in areas where there is greatest need. In addition, work is underway for the PC21 Mid-Term review.

Enforcement action is taken where necessary, and in 2022, there were four Notices in place requiring improvements at three water treatment works. During 2022, NI Water continued construction on a major capital investment programme (£12m) to improve water quality at Derg WTW as required by DWI, to comply with the regulatory limit for the herbicide MCPA.

As well as domestic properties, commercial businesses, and public buildings such as food producers; hospitals and health care premises use private drinking water supplies. Notwithstanding some rescheduling of samples due to COVID-19 restrictions, private water supply monitoring returned to normal in 2022, and I am pleased to report that the 99.77% of scheduled sampling was completed to meet DWI's regulatory duty. I take this opportunity to recognise and thank council staff, for their contribution in achieving this target and for their ongoing work in the completion of risk assessments on behalf of DWI.

Looking ahead, challenges continue, as we strive to tackle climate change and work towards net zero. We will continue to work with stakeholders and engage with NI Water on innovative, low carbon treatment solutions, to ensure continued high quality drinking water for Northern Ireland.

I trust you will find this report a useful reference.

Colin Clements
Interim Chief Inspector of Drinking Water
September 2023

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Executive Summary

This is the 27th report in a series published by the Drinking Water Inspectorate (DWI), 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 Limited (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.

COVID-19

The Omicron variant of COVID-19 had a small impact on the monitoring of the quality of drinking water supplies across Northern Ireland in the first three months of 2022. However, the full regulatory monitoring programme of public water supplies returned in March 2022. Private water supplies monitoring was completed for 99.77% of scheduled parameters in 2022.

Public Water Supplies

In 2022 the overall public drinking water compliance remained high at 99.91%, a slight increase from 2021 (99.88%). The 0.09% non-compliance relates to 88 tests that failed to meet the required standard. Compliance at consumers' taps, measured either directly or through surrogate zonal sampling, depending on COVID-19 restrictions, also remained high at 99.88%, again, an improvement on 2021 (99.82%). However, of the 43 regulatory parameters tested, nine did not achieve full compliance. Those parameters failing to meet full compliance were: Total Trihalomethanes, Lead, Iron, Nickel, Aluminium, Taste, Odour, *E. coli* and Coliform bacteria.

The parameter with the lowest reported compliance in 2022 was Total Trihalomethanes (THMs) at 98.83%. Compliance with the THMs standard is mainly related to the efficiency of the water treatment works, the condition of the distribution system and the residence time of the water in the distribution system.

Contraventions of microbiological parameters may indicate a failure in the treatment process or a breach in the integrity of the water supply system. A microbiological compliance figure at consumers' taps of 99.81% was reported in 2022, a slight decrease in compliance from the 99.82% in 2021. Coliform bacteria were detected in 22 samples and *E. coli* was also detected in one of those samples.

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.

NI Water reported two contraventions for 2022, due to the internal plumbing within domestic properties. These contraventions were for the lead parameter. The contraventions were investigated by NI Water and letters sent to the consumers advising them of the contraventions and offering appropriate advice to protect public health.

The total number of water quality events (Annex 2) that occurred in 2022 was higher than in 2021, with 48 events reported to us by NI Water. Of these, we categorised four as Serious, 24 as Significant, six as Minor and 14 as Not Significant.

Of the four Serious events, one related to discoloured water in the Kilrea area and associated consumer complaints. This was caused by a short-lived high flow in the ductile iron trunk main from Ballinrees WTW to Garvagh caused by an unknown third-party. The second involved damage to a water main and two sewers in the same location by a third-party contractor. Due to the contamination risk, and on the advice of PHA, a “Boil Water” notice was issued to the affected consumers. Subsequent isolation of the water main caused a loss of supply to consumers. The third Serious event involved elevated levels of aluminium and turbidity in the final water from Forked Bridge WTW following maintenance on a pumping main. The final Serious event was the interruption to supply due to the freeze/thaw which occurred in December requiring Alternative Water Supplies to be provided throughout Northern Ireland.

Eighteen of the 24 Significant events occurred at 13 water treatment works and were primarily related to difficulties with the treatment process or a lack of effective treatment. The other six Significant events occurred in the distribution network.

To enable us to evaluate consumer confidence in the quality of drinking water, we receive information relating to consumer concerns and complaints from NI Water. The total number of consumer contacts reported in 2022 was 5,733 compared to 7,305 in 2021, a decrease of 21.5%. However, 2021 was higher than normal and this figure is similar to the number of contacts in 2020. Of the complaints received by NI Water, 62.0% related to the visual appearance of the water, a decrease from 2021 (64.8%).

Where necessary, we take enforcement action (Annex 4), to secure remedial action within specified timeframes. One of the Notices issued by DWI led to a major capital investment at Derg WTW which was ongoing in 2022.The planned work, costing over £12 million, will also improve the removal of organics and improve the quality of the water supplied to over 40,000 people in the Tyrone area. NI Water also commenced work on treatment improvements at Ballinrees WTW to comply with the two Notices which we issued in 2020 in relation to the individual pesticide MCPA contraventions and taste and odour contraventions. During 2022, NI Water carried out pilot studies to identify the preferred treatment solution to deal with aluminium contraventions at Drumaroad WTW, also in response to a notice we issued in 2021.

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 processing, holiday accommodation, and public buildings, including hospitals and care homes. Over 80% of the private water supplies registered with DWI are classified as commercial or public supplies, a number of which are used for economic reasons.

During 2022 our private water supply sampling programme monitored 171 sites. Three new sites were registered, and four sites were removed as they were taken out of supply or no longer met the criteria for registration. Samples at private water supplies are collected by local councils' Environmental Health staff, acting on our behalf.

Overall compliance for 2022 is reported as 99.02%, a decrease from 99.19% reported for 2021. The regulatory requirements were not met on 117 occasions for 18 parameters, namely: Coliform bacteria, Enterococci, *E. coli*, *Clostridium perfringens*, Manganese, Sodium, Copper, Hydrogen ion (pH), Sulphate, Iron, Lead, Bromate, Nitrate, Colour, Aluminium, Turbidity, Individual pesticides (Clopyralid) and Radon.

Full compliance was achieved for 64% (109 sites) of the private water supplies tested in 2022. Of the 62 sites which did not comply with the regulatory standards, 45% (28 sites) contravened microbiological standards; 39% (24 sites) chemical standards; and 16% (10 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 38 supplies during 2022: 18 small shared domestic supplies, three of which had disinfection treatment in place at the time of sampling; and 20 commercial / public supplies, 13 of which had disinfection treatment in place at the time of sampling.

Overall, the number of chemical contraventions remained stable at 50 in 2022, which is the same as 2021. Hydrogen ion (pH), Iron, Manganese and Sodium contraventions were the chemical parameters with the most contraventions in 2022.

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 human 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 62 sites with contraventions identified in 2022, 60 were notified to PHA for advice: 41 microbiological and 19 chemical. As a consequence, restrictions on the use of the private water supply were put in place at 15 sites to protect public health.

We continue to work with owners and users of private water supplies and Environmental Health staff in local councils to ensure the risk assessment of private water supply sites is progressed to bring the remaining supplies into compliance. Priority is given to advancing improvements in water quality through provision of advice and guidance, agreeing action plans (particularly at the larger commercial / public sites) and promotion of drinking water safety plans for the ongoing management of these supplies. However, where necessary we may take formal action to secure compliance to ensure a safe, clean supply of drinking water from private supplies.

The DWI routinely provides advice and guidance to the owners / users of all private water supplies across Northern Ireland. However, currently limited information is available on the 1,200 plus single dwellings in Northern Ireland, mainly in rural and remote areas, served by a

private water supply. The Single Well Application which was launched in 2021, continues to be a valuable resource for these owners by identifying potential risks and identifying measures to improve their quality of water.

Looking Forward

The Department and NIEA's key priorities are Green Growth and Climate Change. The effects of human activity on the environment and the fresh water sources that are abstracted to produce our drinking water are becoming more evident. There are increasing pressures on the security of small private drinking water supplies with more extreme temperatures and the impacts of climate change. The need to secure the provision of a resilient public water supply into the future as well as the need to achieve net zero is driving the need for more innovative, lower carbon treatment solutions to be identified by NI Water. NI Water has set an ambitious target of attaining net zero by 2040.

As the drinking water quality regulator, we are committed to collaborating with all stakeholders in the development and implementation of policies and strategies to secure the future of a high quality, safe and sustainable supply of drinking water for Northern Ireland.

Section 1
Public Water Supplies

Part 1
Drinking Water Quality

Image: NIEA

Public Water Supplies
2022 Key Facts

Drinking Water Sources

Rivers & Loughs - **57.3%**

Impounding Reservoirs - **42.6%**

Boreholes - **0.1%**

There are **27,086km** of drinking water distribution pipes.

Supply System

25 Water Treatment Works & **25** Supply Points

287 Service Reservoirs

55 Water Supply Zones

% Compliance

Consumer Tap 99.88%

Overall 99.91%

Overall Micro 99.91%

Lead 99.07%

Iron 99.15%

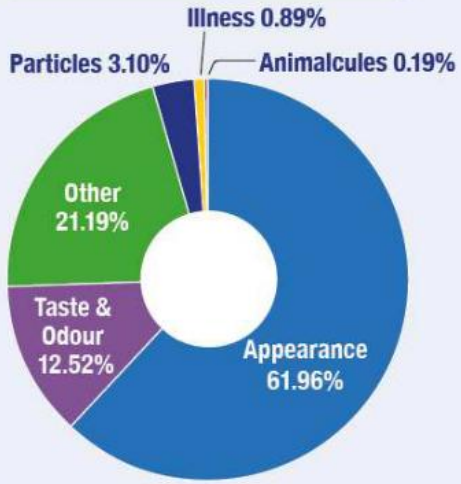
Nickel 99.54%

Total Trihalo-methanes 98.83%

Aluminium 99.80%

11 Public Building Contraventions

Consumer Complaints



Down 21.5% from 2021

Discoloured water was the main issue of concern

Actions

Audits	Enforcements	Events	Product Approvals	Regulatory Contraventions
5 technical audits of NI Water	**4** Regulation 31 (4) Enforcement Notices ongoing	**48** Water Quality Events assessed & categorised	**88** Regulation 33 Product Approval letters issued	**88** regulatory contraventions reviewed & assessed

Drinking Water Quality

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

Drinking Water Quality Testing

During 2022, 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); supply points[1]; and consumers' taps in water supply zones (WSZs). A summary of the number of sites that were in service in 2022 is shown in Table 1.1.

In 2022, 99,447 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.

Table 1.1: Number of sites in service in 2022

Sites	No. in service
Water treatment works	25
Service reservoirs	287
Supply points[1]	25
Water supply zones	55

Sampling and Analyses 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 WTWs; SRs; and WSZs.

During 2022, out of the 99,447 tests carried out, we identified a shortfall of 113 individual tests. The shortfall mainly related to the analysis of samples taken at supply points or at consumers taps where there were quality control issues with the analysing laboratory or where samples arrived at the laboratory too late for analysis.

Overall Drinking Water Quality

Compliance with the quality 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 meets aesthetic standards and is acceptable to consumers.

Of the 99,447 tests we used to assess overall compliance, 88 (0.09%) contravened the regulatory standards compared to 111 (0.12%) from 95,661 tests in 2021. Table 1.2 provides further information on these contraventions. It should be noted that the sampling programme continued to be disrupted by the COVID-19 pandemic at the start of 2022, however, any missed samples during this period were rescheduled to later in the year with no notable shortfall in sampling.

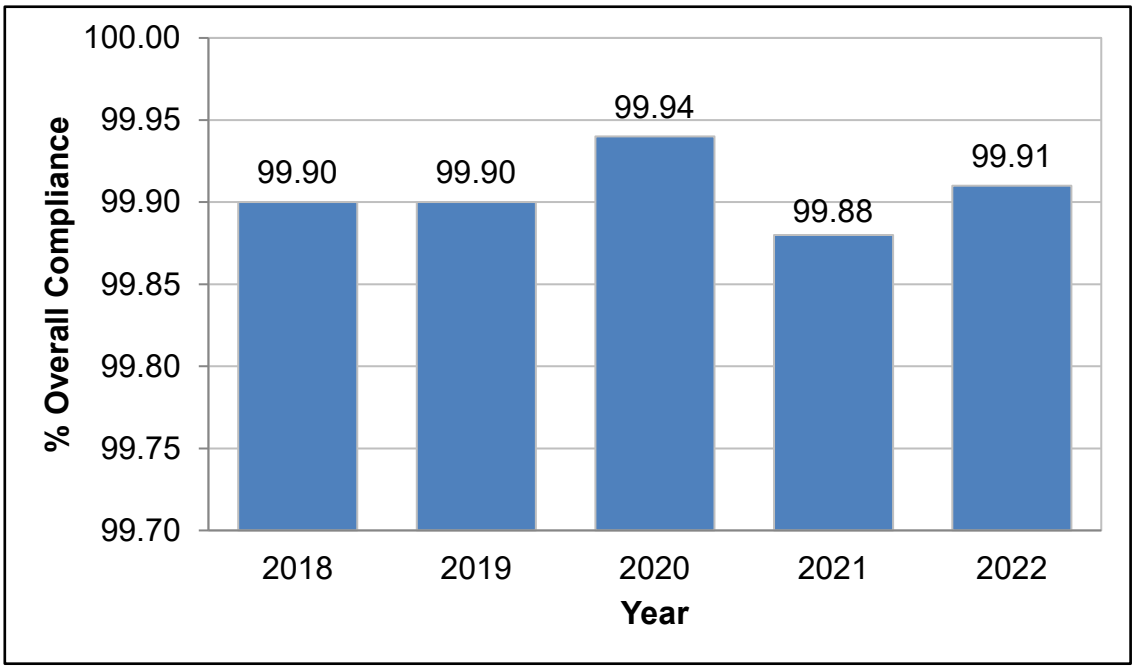
[1] a point, other than a consumer's tap, authorised for the taking of samples for compliance with the Regulations

Table 1.2: Overall Drinking Water Quality in 2022

	No. of Tests	No. of Tests not Meeting the Standards	% Compliance
Water Leaving Water Treatment Works (WTWs)			
E. coli	6428	0	
Coliform bacteria	6428	6	
Microbiological Total	**12856**	**6**	**99.95**
Nitrite	239	0	
Turbidity	6424	6	
Chemical Total	**6663**	**6**	**99.91**
Total (Microbiological and Chemical)	**19519**	**12**	**99.94**
Water in Service Reservoirs (SRs)			
E. coli	14886	1	
Coliform bacteria	14886	17	
Total (Microbiological)	**29772**	**18**	**99.94**
Water at Consumers' Taps or Supply Points (WSZs)			
E. coli	5568	1	
Coliform bacteria	5568	22	
Enterococci	432	0	
Clostridium perfringens	239	0	
Microbiological Total	**11807**	**23**	**99.81**
Zone Chemical Analysis	28768	35	
Supply Point Chemical Analysis	9581	0	
Chemical Total	**38349**	**35**	**99.91**
Total (Microbiological and Chemical)	**50156**	**58**	**99.88**
Overall Water Quality			
Overall Microbiological Quality	54435	47	99.91
Overall Chemical Quality	45012	41	99.91
Overall Drinking Water Quality	**99447**	**88**	**99.91**

The results confirm that overall drinking water quality in 2022, for the key parameters monitored at water treatment works, service reservoirs and consumers' taps remains high at 99.91%. This is a slight increase in overall compliance on last year (99.88%). Figure 1.1 illustrates the percentage compliance over the last five years.

Figure 1.1: Overall Drinking Water Quality, 2018 – 2022



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 1.3 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 99.82% in 2021 to 99.88% in 2022.

Nine parameters did not achieve full compliance at consumers' taps in 2022: Total Trihalomethanes, Lead, Iron, Nickel, Aluminium, Taste, Odour, *E. coli and* Coliform bacteria.

Table 1.3: Consumer Tap Compliance 2022

Parameter	No. of Samples	No. of Tests not Meeting the Standards	% Compliance
Schedule 1 (Directive and National parameters)			
Total Trihalomethanes	429	5	98.83
Lead	432	4	99.07
Iron	2003	17	99.15
Nickel	432	2	99.54
Aluminium	2003	4	99.80
Taste	1985	2	99.90
Odour	1986	1	99.95
E. coli	5568	1	99.98
1,2 dichloroethane	427	0	100.00
Antimony	432	0	100.00
Arsenic	432	0	100.00
Benzene	427	0	100.00
Benzo(a)pyrene	431	0	100.00
Boron	432	0	100.00
Bromate	432	0	100.00
Cadmium	432	0	100.00
Chromium	432	0	100.00
Colour	2004	0	100.00
Copper	432	0	100.00
Cyanide	239	0	100.00
Enterococci	432	0	100.00
Fluoride	432	0	100.00
Manganese	2003	0	100.00
Mercury	430	0	100.00
Nitrate	432	0	100.00
Nitrite	432	0	100.00
Other Pesticides	9041	0	100.00
PAH - Sum of four substances	431	0	100.00
Pesticides - Total Substances	239	0	100.00
Selenium	432	0	100.00
Sodium	432	0	100.00
Tetrachloroethene & Trichloroethene Sum	427	0	100.00
Tetrachloromethane	427	0	100.00
Turbidity	2003	0	100.00
Total (Schedule 1)	**38983**	**36**	**99.91**
Schedule 2 (Indicator parameters)			
Coliform bacteria	**5568**	**22**	**99.60**
Ammonium	432	0	100.00
Chloride	432	0	100.00
Clostridium perfringens	239	0	100.00
Conductivity	2004	0	100.00
Hydrogen Ion (pH)	2004	0	100.00
Indicative Dose	31	0	100.00
Sulphate	432	0	100.00
Tritium	31	0	100.00
Total (Schedule 2)	**11173**	**22**	**99.80**
Overall Total	**50156**	**58**	**99.88**

Chemical/Physical Quality

Trihalomethanes (THMs)

In 2022, there was a decrease in THMs compliance to 98.83% compared to 99.07% reported in 2021. Further discussion on THMs is contained in Part 2 of this section.

Lead

In 2022, lead compliance was 99.07% compared to 98.08% compliance in 2021. Fluctuations in lead compliance are related to lead having a lower sampling frequency compared to aluminium and iron. Compliance with the lead standard is still an issue in properties built before 1970 so it is important that NI Water continues to implement its lead strategy to effectively manage the risk to public health.

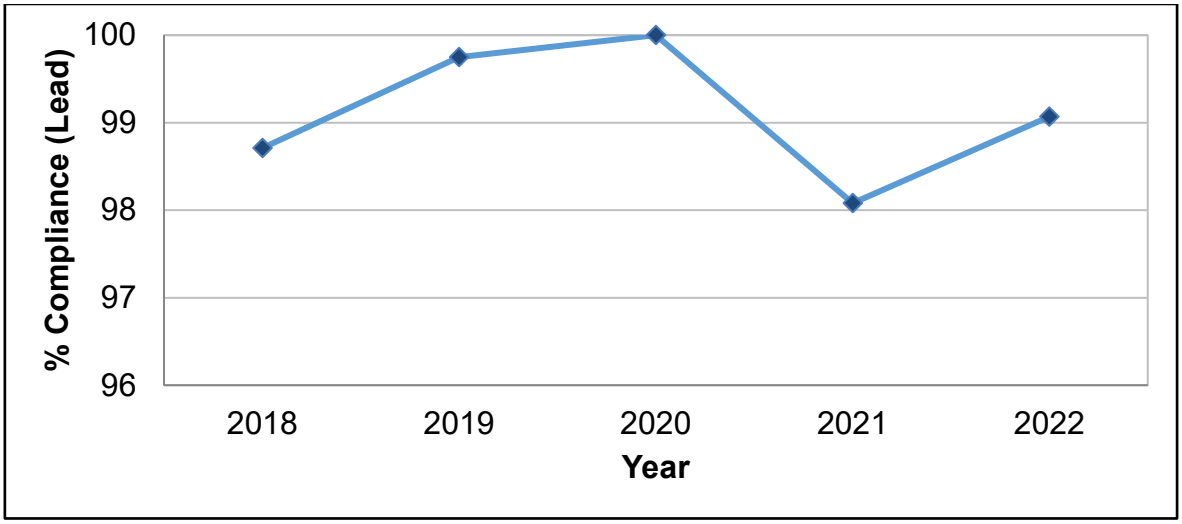
When a sample has contravened the lead standard and NI Water's investigation finds the property's service pipe contains lead; it notifies the consumer. It is the owner's decision whether to replace their supply pipe and any other lead pipes within the property. Further information, including a customer advice leaflet on "Lead in Drinking Water" (Figure 1.2), can be found on NI Water's website.

Figure 1.2 Lead Leaflet

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

Looking at the overall trend in lead compliance in Figure 1.3, there had been a gradual trend upwards. However, there was a decrease in lead compliance in 2021, and notwithstanding the increase in compliance in 2022, a significant amount of work is still required to ensure compliance improves in the future.

Figure 1.3: Percentage of Regulatory Tests Meeting the Lead Standard, 2018 – 2022



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 2022, there was a slight decrease in iron compliance to 99.15% from the 99.35% achieved in 2021.

The contraventions of the standard 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 carry out. Figure 2.6 in Part 2 provides iron compliance figures for the last five years.

Nickel

In 2022, there was an increase in Nickel compliance to 99.54% compared to the 99.23% achieved in 2021. However, this difference may be related to the return to the regulatory sampling frequency at consumer taps in early 2022, as two nickel contraventions were reported in both 2021 and 2022.

Nickel may occur naturally in some ground waters but is rarely found in the mains water supply. Contraventions of the standard (20 µg/l) do occur occasionally, and the main source of nickel in drinking water is leaching from modern taps and other plumbing fittings.

Aluminium

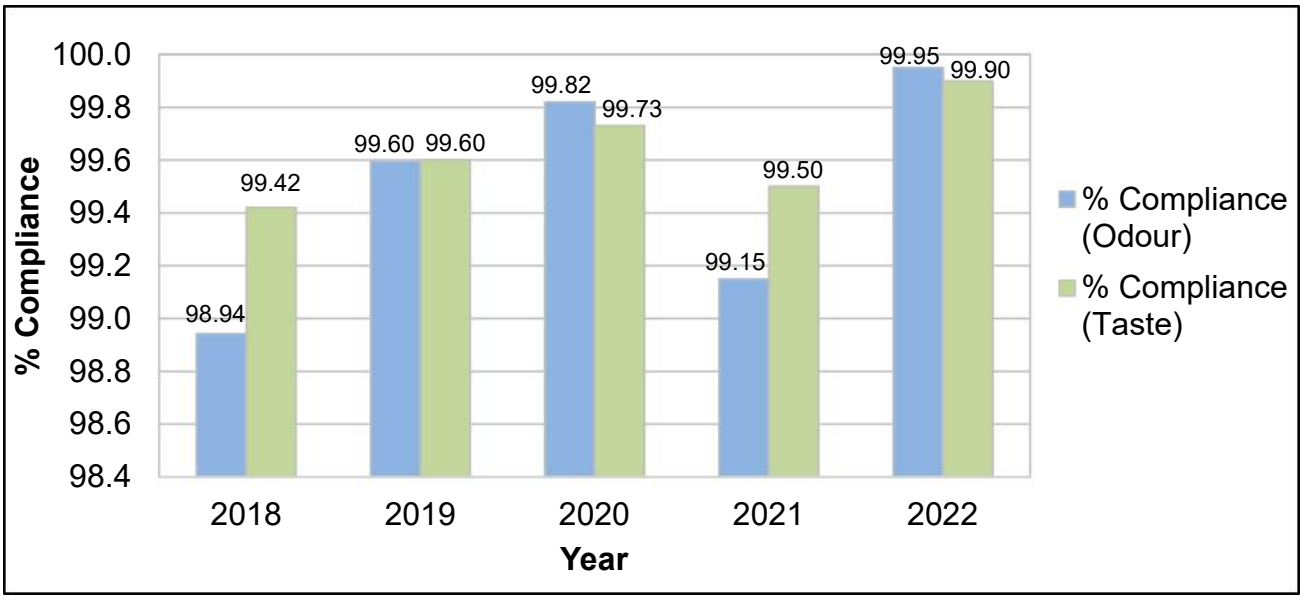
In 2022, the aluminium compliance improved to 99.80% compared to the 2021 figure of 99.65%. Further discussion on aluminium is contained in Part 2 of this section.

Odour & Taste

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

In 2022, odour compliance was 99.95% and taste compliance 99.90%, an improvement on the 2021 compliance (odour compliance 99.15% and taste compliance 99.50%). Odour and taste compliance over the last five years is shown in Figure 1.4. There is further information on odour and taste in the “Consumer Contacts” section later in this part of the report.

Figure 1.4: Percentage of Regulatory Tests Meeting the Odour & Taste Standards, 2018 – 2022



Microbiological Quality

The overall safety of drinking water at consumers' taps in 2022 is confirmed with a 99.81% microbiological compliance (Table 1.2 refers). This is a slight decrease in compliance from the 99.82% reported in 2021. There was one *E. coli* detected in a sample taken at a consumer tap in 2022, and coliform bacteria detected in 22 samples.

Clostridium perfringens were not found in any of the 239 samples taken in 2022 (100% compliance). This is an improvement compared to 2021 when they were found in one of the 236 samples taken (99.58% compliance).

Similarly, Enterococci were not detected in any of the 432 samples taken at consumers' taps by NI Water (100% compliance), compared to being detected in one of the 432 samples taken in 2021 (99.77% compliance).

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.

NI Water reported two contraventions for 2022, due to the internal plumbing within domestic properties. These contraventions were for the lead parameter. The contraventions were investigated by NI Water and letters sent to the 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 872 samples taken during 2022. Of these, 11 samples contravened the Aluminium, Iron, Lead, Nickel, and Coliform bacteria standards.

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. In line with our enforcement policy, an advisory letter is initially issued. 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.

Consumer Contacts

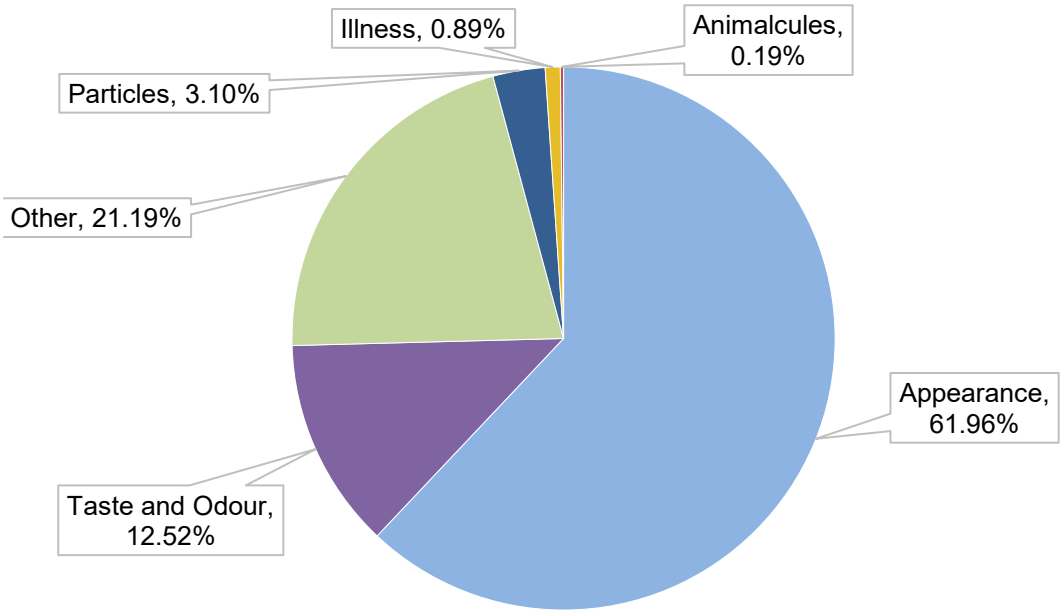
NI Water provides us with consumer contact information to help us assess consumers' satisfaction of their drinking water quality (Table 1.4 refers). The total number of consumer contacts reported in 2022 was 5,733 compared to 7,305 in 2021, a decrease of 1,572 (21.5%). We will continue to monitor the trends in consumer concerns.

Table 1.4: Water Quality Contacts received by NI Water in 2022

Contact Category	Contact Sub-Category	Number of Contacts
Appearance	Colour	2460
	General	43
	Hardness	11
	Stained Washing	3
	White - Air	643
	White - chalk	392
Taste and Odour	Chlorinous	312
	Earthy/Musty	108
	Other	232
	Petrol/Diesel	34
	TCP	32
Illness		51
Particles		178
Animalcules		11
Boil Water Notice		8
Other	Water Quality Concern - Campaigns	0
	Water Quality Concern - Incident Related	10
	Water Quality Concern - Lifestyle	1
	Water Quality Concern - Pets/Animals	3
	Water Quality Concern - Sample	629
	Water Quality Concern - Lead	561
	Water Quality (No Concern) Fluoride	0
	Water Quality (No Concern) Other Information	6
	Water Quality (No Concern) Water Hardness	0
	Water Quality (No Concern) Water Quality Report	5
TOTAL		**5733**

The highest percentage of contacts and concerns continued to relate to the appearance of drinking water, with 61.96% in 2022 (64.8% in 2021). This is illustrated in Figure 1.5.

Figure 1.5: Consumer Contacts and Concerns received by NI Water in 2022



Appearance

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

Colour

In 2022, as in every year, the majority of appearance concerns (69.3%) related to discoloured water. The most common cause of discoloured 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. 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 29.1% of appearance concerns in 2022.

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 for health reasons e.g., petrol/diesel.

Taste and odour complaints accounted for 12.5% of the total consumer contacts in 2022 compared to 18.2% in 2021.

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. In 2022, 43.5% of taste and odour consumer contacts were related to a chlorinous taste and odour in the water (55% in 2021). Although this is a slight decrease, NI Water should continue to investigate the reasons for taste and odour complaints related to a chlorinous taste and odour.

Consumer Advice

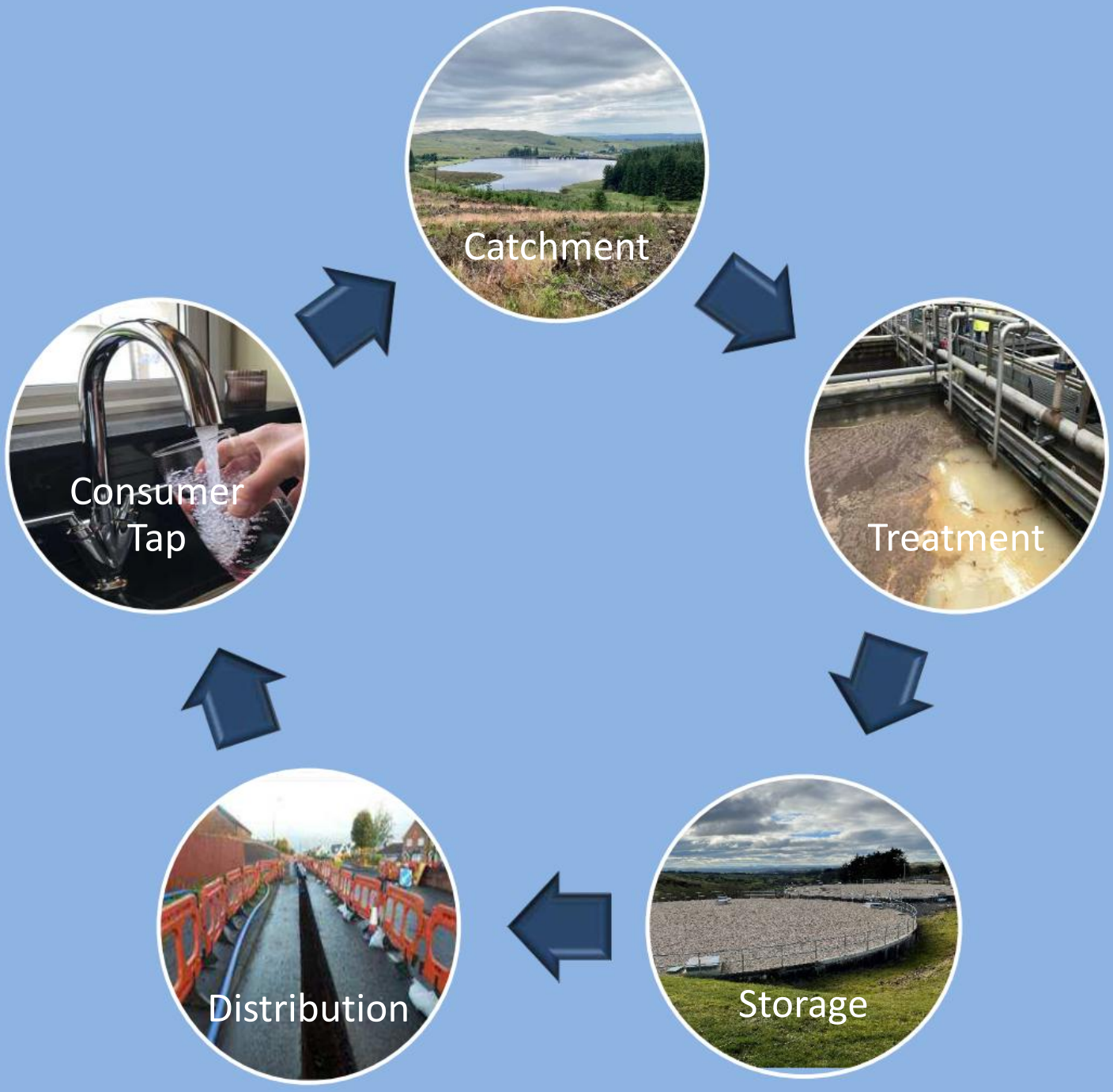
Figure 1.6: Looking after Water Your Home Guide

A useful consumer guide, (Figure 1.6) '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



Part 2

The Drinking Water Cycle

- Catchment: There was a decreased number of MCPA detections in 2022
- Treatment Process Control Parameters: THMs continue to have a lower level of compliance than aluminium in 2022
- Treatment Disinfection Parameters: There were six coliform bacteria contraventions in 2022 compared to two in 2021
- Events: There were four Serious and 24 Significant Events reported in 2022

This part of the report details our assessment of how NI Water manages the drinking water cycle, from the **catchment** to the **treatment** processes at Water Treatment Works (WTWs), through Service Reservoirs (SRs) and into the **distribution network** to supply **consumers**. It also summarises the risk management approach adopted by NI Water in ensuring that water supplies remain safe and wholesome throughout their journey to homes and businesses.

Catchments

NI Water mainly abstracts its raw water from 39 sources including rivers and loughs (57.3%), impounding reservoirs (42.6%), and boreholes which supply a small population on Rathlin Island and in Mid Ulster (0.1%).

A risk assessment of the catchment must be completed as part of the overall ‘source to tap’ approach. NI Water liaises with the Northern Ireland Environment Agency (NIEA) and a range of other stakeholders through Water Catchment Partnerships to identify and put mitigations in place to manage risks within the catchment. The Catchment Management Plans developed by NI Water throughout PC15 are due to be implemented in PC21. Where catchment solutions alone are unable to reduce the risks sufficiently, NI Water must ensure that it has appropriate treatment processes in place.

As the potential list of contaminants within catchments is diverse, it must risk assess each catchment individually to determine the specific risks and identify appropriate mitigations to reduce or adequately control the risks. Where a risk is identified, NI Water must consider if water quality monitoring is required 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 WTWs to ensure treatment processes provide an effective barrier against the identified levels of contaminants.

Pesticides

During 2022, 38 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 239 samples taken for pesticides giving a total of 9,041 individual determinations. In 2022, there was a shortfall 41 tests for 11 individual pesticides in five samples, from five different WTWs, due to quality control issues with the analytical laboratory. There were no regulatory contraventions reported for pesticides in 2022.

Where contraventions arise, DWI may require NI Water to implement enhanced operational sampling to monitor an ongoing risk. During 2022, within the operational programme, NI Water reported six MCPA contraventions. Four of these were at Derg WTW, where enhanced monitoring is ongoing, and DWI has a Notice in place requiring NI Water to install treatment to achieve compliance with the regulatory limit for MCPA in the final water. One of the six contraventions was recorded at Belleek WTW and one at Glenhordial WTW. A Notice previously in place relating to remedial works at Glenhordial WTW was completed in February 2019 and results from this works are being closely monitored, with further action to be taken if deemed necessary. Although there were no contraventions at Ballinrees WTW in 2022, a Notice is in place following the 12 contraventions for MCPA in 2017 which requires remedial works to be completed within a timeframe agreed with DWI.

WTWs with contraventions for pesticides, both regulatory and operational, from 2018 to 2022 are summarised within Table 2.1.

There was a total of six MCPA contraventions reported from both compliance and operational sampling in 2022, a decrease on the 11 contraventions in 2021.

Table 2.1: Pesticides Detected above the Regulatory Limit, 2018 – 2022

Water Treatment Works		2022	2021		2020	2019	2018
		MCPA	MCPA	MCPP	MCPA	MCPA	MCPA
W4722	Belleek	1					
W2509	Clay Lake		3		2		
W4301	Carmoney		1		2		
W4501	Derg	4	6	1	12	12	5
W4541	Glenhordial	1	1		1	1	
W4701	Killyhevlin				1		
All WTWs		**6**	**11**	**1**	**18**	**13**	**5**

Water Treatment

Water treatment processes normally include the physical removal of potential contaminants by using chemical coagulation/flocculation, clarification (Figure 2.1), and filtration. Filters require periodic backwashing to operate effectively (Figure 2.2). Additional treatments such as ozone dosing and GAC (Granular Activated Carbon) filtration or PAC (Powdered Activated Carbon) dosing can also be required to remove unpleasant tastes and odours, and for pesticide reduction. The final stage of treatment is disinfection.

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.

Figure 2.1: Clarification Stage

Figure 2.2: Backwashing a Filter

In Table 2.2, results are outlined for two sets of parameters that are used to assess the effectiveness of water treatment processes: process control parameters; and disinfection parameters.

Table 2.2: Water Quality at Water Treatment Works, 2022

Parameters	Place of Sampling	Total No. of Tests in 2022	No. of Tests not Meeting the Standards in 2022	% of Tests Meeting the Standards	
				2022	2021
Process Control Parameters					
Aluminium	WSZ	2003	4	**99.80**	99.65
Trihalomethanes	WSZ	429	5	**98.83**	99.07
Disinfection Parameters					
Coliform bacteria	WTW	6428	6	**99.91**	99.97
E. coli	WTW	6428	0	**100**	100
Turbidity	WTW	6424	6	**99.91**	99.92
Indicator Parameter					
Clostridium perfringens	WTW	239	0	**100**	99.58

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 WTWs.

In 2022, results from the compliance monitoring programme, shown in Table 2.2, reported non-compliances for both of the process control parameters, aluminium and trihalomethanes (THMs).

Aluminium

Aluminium compliance, which is measured at consumers' taps, was higher in 2022 with four regulatory contraventions (0.20%) reported compared to seven (0.35%) in 2021. Figure 2.3 displays the levels of aluminium compliance over the last five years.

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 and five Significant events at five WTWs in 2022 relating to elevated levels of aluminium – see Annex 2 for details. 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.

It is pleasing to note the continued improvement in regulatory compliance for aluminium in 2022. However, NI Water must continue to review its operational practices at its treatment works and take whatever measures are necessary to ensure this level of compliance is maintained or enhanced. Improvements to the treatment processes at WTWs which have been identified for funding in the PC21 Price Control Process should result in an improving level of aluminium compliance over the next four years.

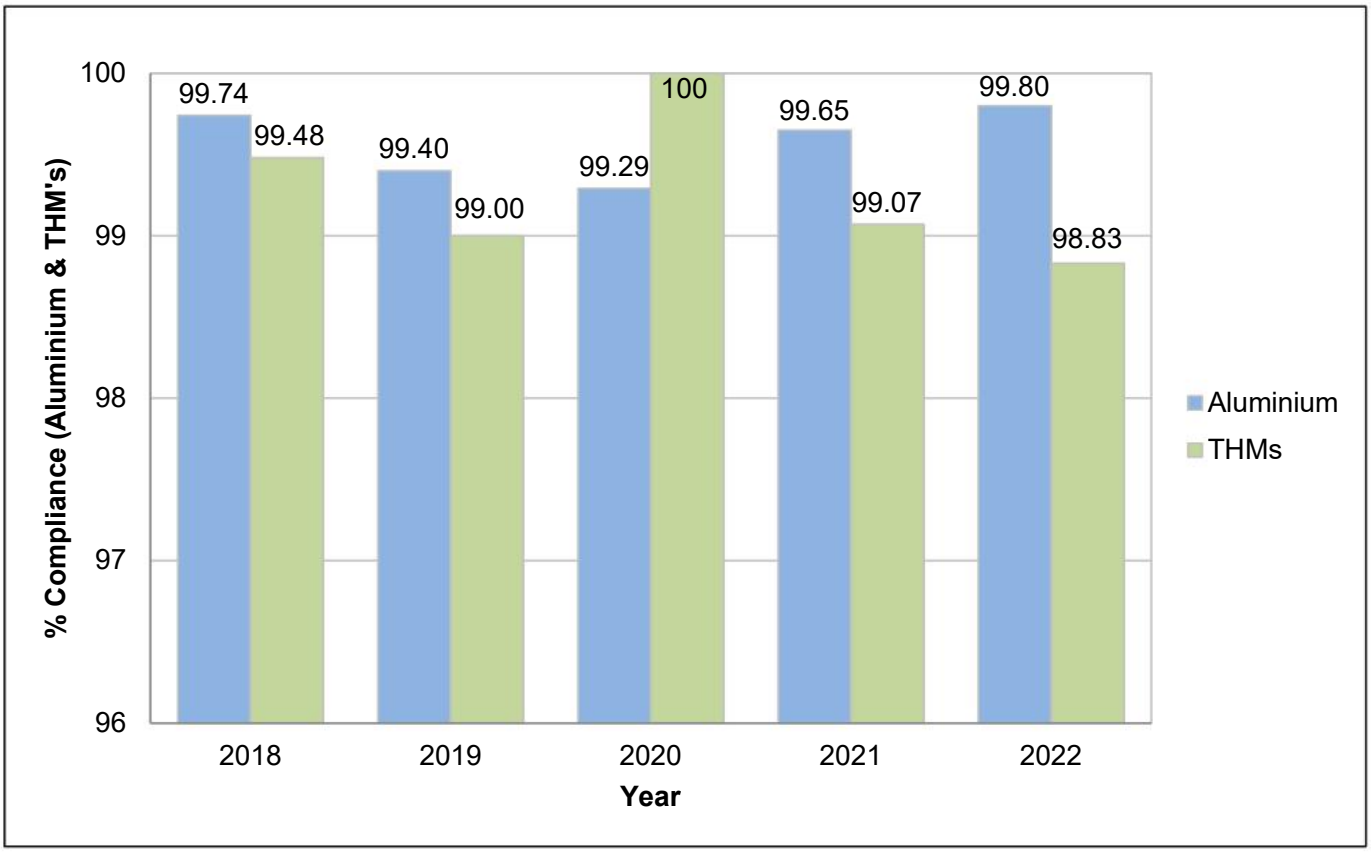
Trihalomethanes (THMs)

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. There are a number of reasons for THM non-compliance including: the quality of the raw water; the performance of the WTWs; the condition of the networks; and the length of time water spends in the distribution system (residence time). 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 2.3 displays the levels of THM compliance over the last five years. In 2022, THM compliance was 98.83%, with five non-compliant samples, compared to 99.07% in 2021, with four non-compliant samples. THM levels are known to increase in the distribution system, and contraventions often occur at or near the end of distribution systems.

NI Water must ensure that good operational practices prevail within the catchments and at WTWs. It is also important that there is careful management of the storage levels in service reservoirs and the distribution network is adequately maintained to control the formation of THMs.

Figure 2.3: Percentage Compliance for Aluminium & THMs at Consumers' Taps, 2018 – 2022



Disinfection Parameters

The parameters, coliform bacteria, *E. coli* and turbidity (Table 2.2 refers) demonstrate the effectiveness of disinfection and pathogen removal. Effective disinfection is fundamental to the treatment process in order to safeguard consumers from the risk of microbiological organisms being present in drinking water. Testing for *E. coli* and coliform bacteria at WTWs provides assurance of adequate treatment and the provision of safe, clean drinking water. In 2022, NI Water reported 100% compliance for *E. coli* and 99.91% compliance for coliform bacteria at its WTWs, compared to 100% and 99.97% respectively in 2021. This is a slight decrease in coliform bacteria compliance, with six contraventions (at five WTWs) in 2022 compared to two contraventions (at two WTWs) in 2021.

Turbidity is caused by finely suspended particles in the water which must be reduced to below 1 NTU to enable adequate disinfection to take place. There was a slight decrease in compliance with the turbidity standard in 2022 (99.91% compared to 99.92% in 2021). Six turbidity contraventions occurred at six WTWs in 2022. Of these, one contravention at Castor Bay WTW was assessed as being a Significant event whilst one contravention at Forked Bridge WTW was assessed as being a Serious event. The latter event also involved an aluminium contravention; however, it occurred following a pumping main repair rather due to treatment difficulties.

Indicator Parameter

Clostridium perfringens

Clostridium perfringens can be used in association with other parameters to assess the effectiveness 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 2022, full compliance was achieved for *Clostridium perfringens*. This is compared to 99.58% in 2021, when one contravention of the standard was reported.

Distribution

The water distribution network in Northern Ireland is extensive, consisting of 287 service reservoirs (SRs) and 27,086 km of mains pipe. Water mains transfer drinking water from the WTWs 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 2.3, two measures are used to assess the water quality within a distribution system: reservoir integrity and distribution networks.

Table 2.3: Water Quality Indicators within the Distribution System, 2022

Parameters	Place of Sampling	No. of Tests in 2022	No. of Tests not Meeting the Standards in 2022	% of Tests Meeting the Standards in 2022	% of Tests Meeting the Standards in 2021
Reservoir Integrity					
Coliform bacteria	SR	14886	17	99.89	99.89
E. coli	SR	14886	1	99.99	99.99
Distribution Networks					
Turbidity	WSZ	2003	0	100.00	99.95
Iron	WSZ	2003	17	99.15	99.35
Manganese	WSZ	2003	0	100.00	99.80

Service Reservoirs

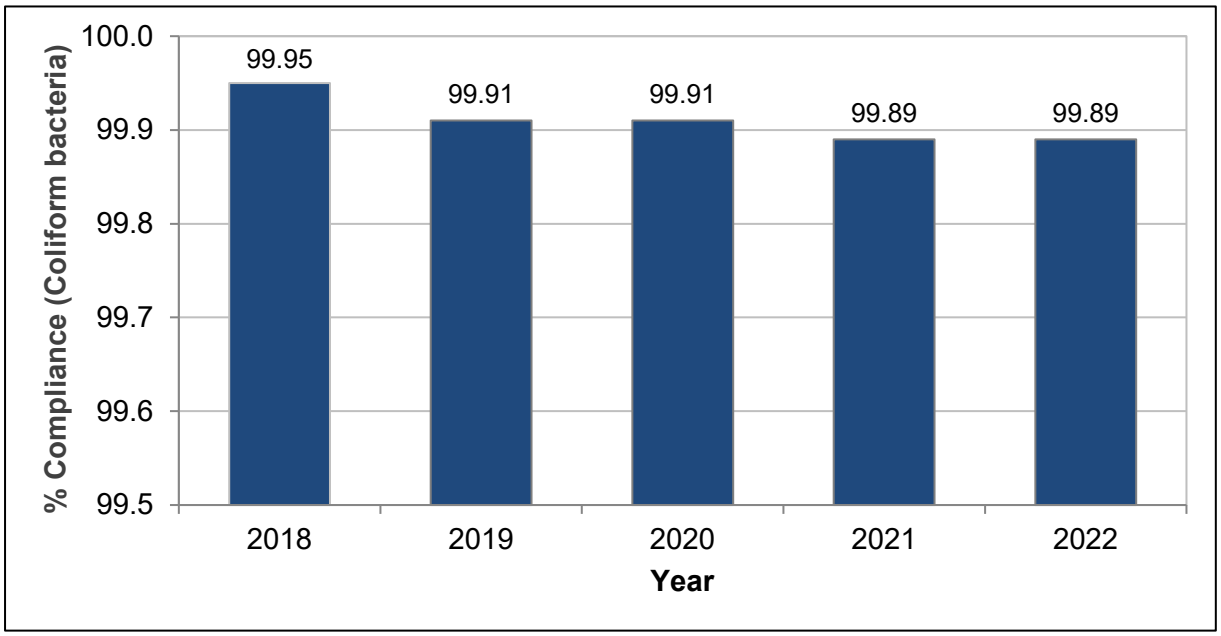
Samples are collected weekly at every service reservoir in Northern Ireland. One such Service Reservoir is shown in Figure 2.4. It is a regulatory requirement that at least 95% of samples collected annually from each reservoir are free from coliform bacteria. The 287 reservoirs sampled in 2022 all met this requirement.

Figure 2.4: Service Reservoir

Figure 2.5 shows coliform bacteria compliance was 99.89% in 2022, the same as in 2021. Coliform bacteria were detected on 17 occasions at 16 different service reservoirs.

E. coli was detected at one service reservoir on one occasion in 2022, consistent with 2021.

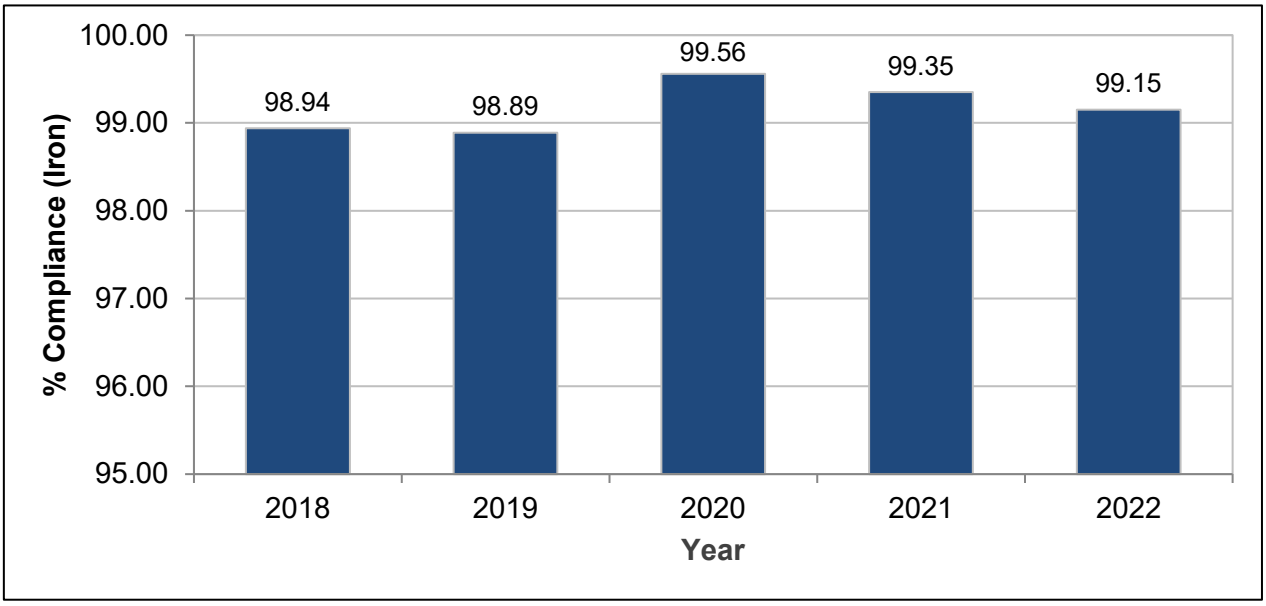
Figure 2.5: Percentage Compliance of Coliform Bacteria at Service Reservoirs, 2018 – 2022



Water Mains

In 2022 a total of 2,003 samples taken from consumers' taps were tested for iron, manganese and turbidity. Of these, 17 (0.85%) contravened the regulatory standard for iron of 200 µg/l. This reflects a slight decrease in compliance from 2021 when there were 13 (0.65%) contraventions reported as illustrated in Figure 2.6. There were no contraventions of the regulatory standards for manganese (50 µg/l) or turbidity (4 NTU) in 2022, compared to four (0.20%) contraventions for manganese and one (0.05%) contravention for turbidity in 2021.

Figure 2.6: Percentage Compliance of Iron in Distribution, 2018 – 2022



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. New mains are also installed or upgraded as required for new developments. A typical new mains installation is shown in Figure 2.7.

Figure 2.7: New mains installation

Photo courtesy of NI Water

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 where there may be a risk to consumers' health. Each event is assessed into one of five categories based on increasing 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.

48 events were reported to us in 2022. Of these, we categorised four as Serious; 24 as Significant; six as Minor; and 14 as Not Significant.

Of the four Serious events, one related to discoloured water in the Kilrea area and associated consumer complaints. This was caused by a short-lived high flow in the ductile iron trunk main from Ballinrees WTW to Garvagh caused by an unknown third party. The second involved damage to a water main and two sewers in the Sligo Road area of Enniskillen by a third-party contractor. Due to the contamination risk, and on the advice of PHA, a "Boil Water" notice was issued to the affected consumers. Subsequent isolation of the water main caused a loss of supply to consumers. The third Serious event involved elevated levels of aluminium and turbidity in the final water from Forked Bridge WTW following maintenance on a pumping main from Castor Bay WTW to Forked Bridge WTW. The final Serious event was the interruption to the supply of water across Northern Ireland due to a prolonged period of freezing conditions followed by a rapid thaw in December 2022.

There were 18 Significant events at 13 WTWs (Ballinrees; Belleek; Castor Bay; Caugh Hill; Derg; Drumaroad; Dungonnell; Fofanny; Forked Bridge; Glenhordial; Killyhevlin; Killylane; and Moneymore) in 2022. The majority of these events were due to treatment difficulties or lack of adequate treatment. One event related to the loss of disinfection control, another due to oil contamination of a filter during planned refurbishment work. The remainder related to aluminium; cryptosporidium; hydrogen ion; individual pesticide (MCPA); iron; odour; THMs and turbidity contraventions.

The other six Significant events occurred in the distribution network: contamination of the mains water supply to 10 properties caused by ingress during operational work; water quality issues on a college campus due to problems with the internal plumbing; discoloured water as a result

of a pumping main burst; and three events relating to consumer complaints due to the condition of the iron mains, each affecting a number of properties.

Annex 2 provides further information on the four Serious and 24 Significant events in 2022.

Risk Management

As part of the drinking water safety plan (DWSP) approach, NI Water is required to carry out a risk assessment of each water supply system. Informed by the information generated from the catchment risk assessment, this supports the 'source to tap' approach in the management and control of the potential risks. The assessments must 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 24 risk assessments in place covering all of NI Water's drinking water supplies.

Regulatory Control

The Technical Audit Process

DWI normally conducts a risk based technical audit programme to check NI Water's compliance with statutory obligations and best practice. The recommendations from technical audits form part of the risk management approach in protecting drinking water supplies. In 2022, following the removal of COVID-19 restrictions, the on-site technical audit inspection programme was resumed with five audits completed. A summary of the 2022 Technical Audit Programme is detailed in Annex 3.

Enforcement Action

In order to protect, maintain and improve drinking water supplies, NI Water's large capital investment needs are prioritised through the Price Control (PC) Process. The PC21 (2021 - 2027) capital investment programme, which commenced in April 2021, was ongoing throughout 2022 and DWI, alongside other stakeholders, continued to monitor the delivery of the agreed outputs which have drinking water quality drivers.

Although it is better to be able to plan investment through the PC process, there are occasions when it is necessary for DWI to take enforcement action against NI Water to secure compliance and protect public health.

During 2022, four Regulation 31(4) Notices issued under The Water Supply (Water Quality) Regulations (Northern Ireland) 2017 (the Regulations) were ongoing. The details of these enforcements are contained in Annex 4.

Figure 2.8: Derg WTW Construction Works

Photo courtesy of NI Water

One of the Notices issued by DWI in 2020 led to a major capital investment at Derg WTW (circa £12m) which was ongoing in 2022. This is primarily required to upgrade the works and ensure future compliance with the regulatory limits for the pesticide MCPA. Figure 2.8 shows the construction work at Derg WTW.

NI Water also commenced work on treatment improvements at Ballinrees WTW to comply with the two Notices which we issued in 2020 in relation to the individual pesticide MCPA contraventions and taste and odour contraventions.

Further, in response to a notice we issued in 2021, NI Water conducted pilot studies at Drumaroad WTW to identify the preferred treatment solution to deal with aluminium contraventions associated with this water supply.

DWI monitors the progress of these projects through site visits to gain assurance that the Statutory Notices are on schedule and will be complied with.

Future Investment in Drinking Water Quality

DWI will continue to work with all stakeholders to ensure the effective prioritisation of investment in drinking water quality through the PC21 Mid-Term review in 2023 and in the preparatory work for the next price control process, PC27.

In identifying the capital investment needs, NI Water will continue to assess the required treatment solutions through the use of mobile pilot plants. These are designed for a range of large-scale, on-site trials on innovative treatment solutions to identify the effectiveness of proposed treatment processes prior to large capital investment projects commencing. This approach provides confidence that the selected process will work at each specific site whilst identifying more carbon neutral solutions for water treatment, thereby contributing to the company's net zero targets. We fully support this approach and will continue to work closely with NI Water to contribute to climate change targets.

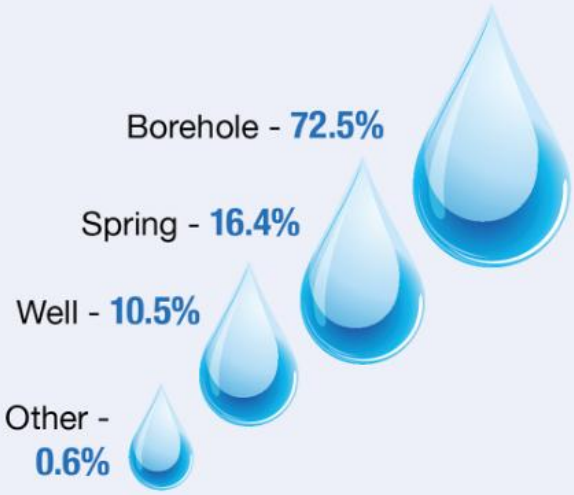
We acknowledge the financial constraints within NI Water's funding model and support the need for sufficient long-term funding to ensure public health protection and economic development. We must ensure that the provision of safe, clean drinking water remains a key priority for NI Water.

Section 2
Private Water Supplies

Image: NIEA

Private Water Supplies
2022 Key Facts

Private Water Supply Sources



Register

171 Registered PWS Sites

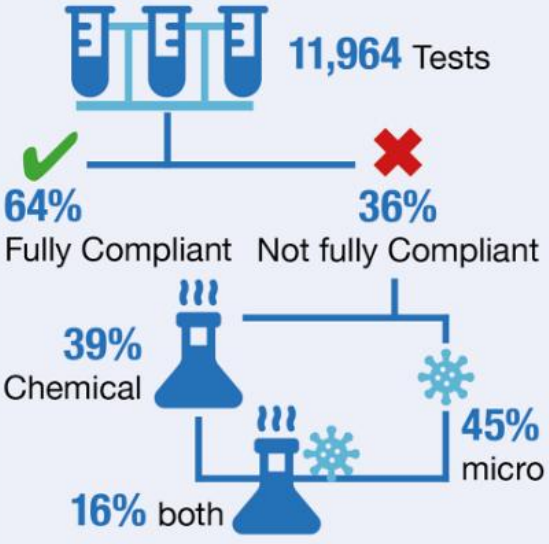
83% Commercial / Public

17% Small Shared Domestic

3 New Sites
4 Sites Removed

% Compliance

Monitoring Programme



Actions

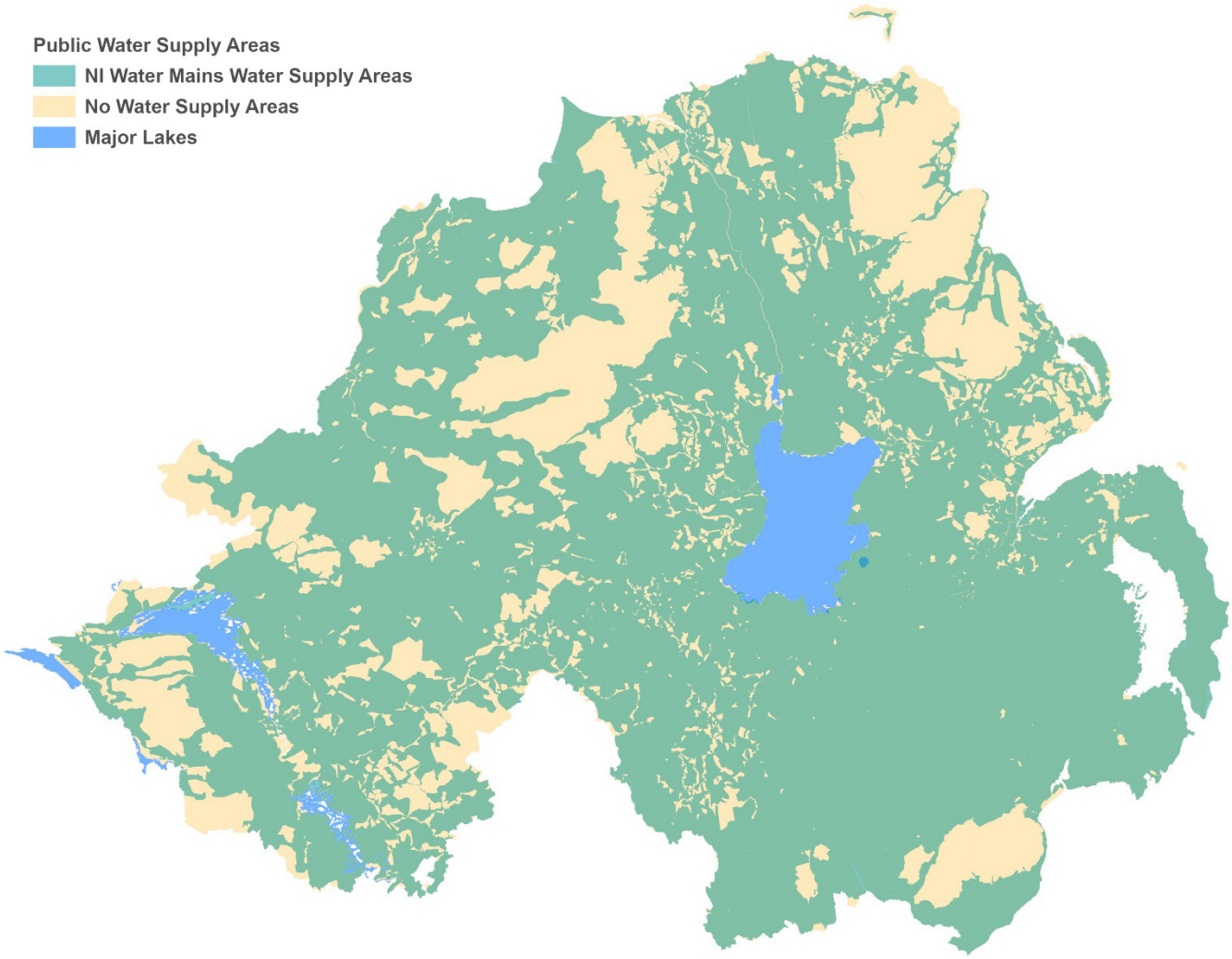
Restrictions	Training	Risk Assessments	Sampling	Advice
Applied at **15** sites Removed at **3** sites	**29** local Environmental Health staff trained	**22** site risk assessments completed / progressed	**99.77%** of scheduled samples collected	Provided on **463** queries

Section 2

Private Drinking Water Supplies

Northern Ireland Water Ltd (NI Water) supplies drinking water to over 99% of the Northern Ireland population; the remainder are deemed to be served by private water supplies. The spatial distribution of the NI Water mains water network supply zones is shown in Figure 1.1. The premises in areas beyond the extent of these zones are almost certainly served by private water supplies and are typically domestic properties.

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



Consumers often assume the water they are drinking is from 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. Despite a public water supply being available, some businesses utilise groundwater as a sustainable and more economically viable option.

Private water supplies are often used as an alternative to, or in conjunction with, the public water supply depending on the nature of the site. In some circumstances, a particular composition of water is required as an ingredient for a food product or perhaps a significant volume is required which is beyond the capacity of the existing mains water network. Private

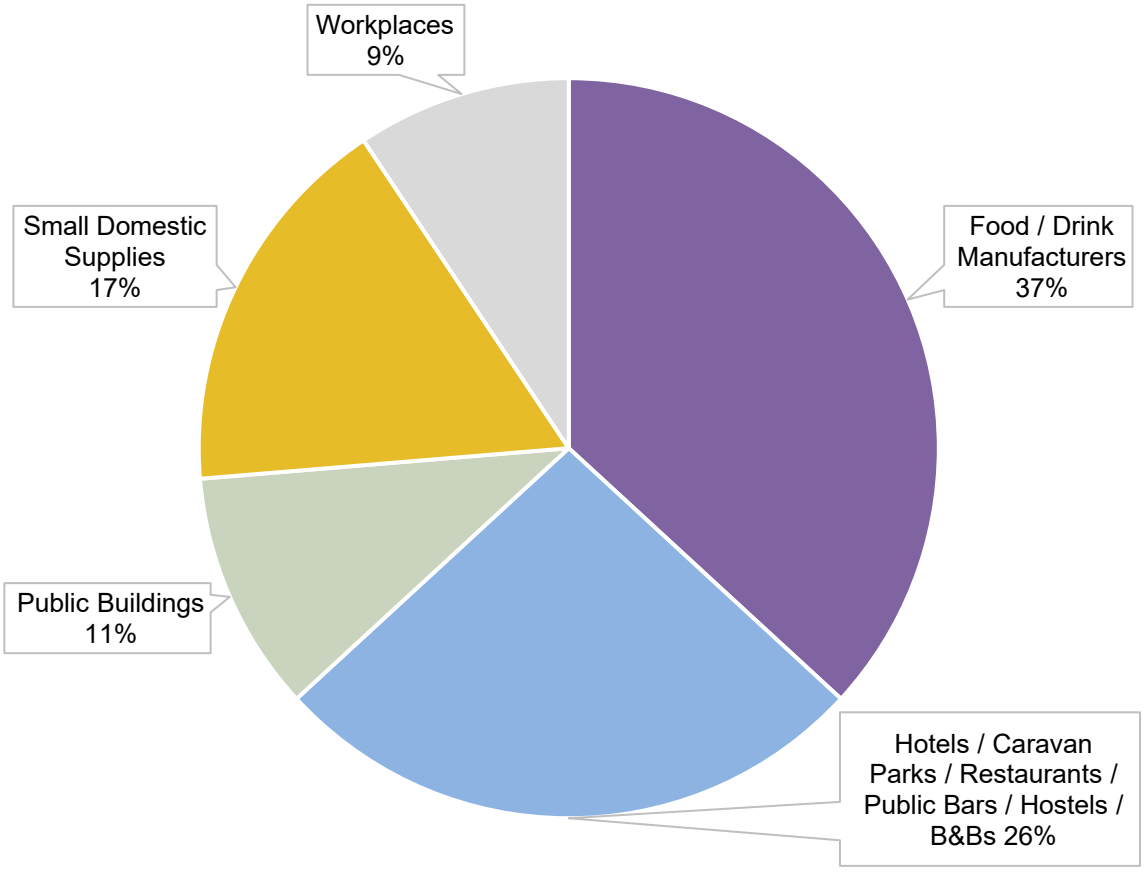
water supplies are found at a range of sites such as:

- food and drink manufacturers;
- public buildings including hospitals, workplaces and universities; and,
- within the hospitality industry such as hotels, restaurants and tourist accommodation.

Register of Supplies

There was a total of 171 private water supplies on our register in 2022 which required monitoring under The Private Water Supplies Regulations (Northern Ireland) 2017. The categories of these supplies are presented in Figure 1.2. In addition to those summarised below, it is estimated there are at least a further 1,200 supplies to single domestic dwellings which are not required to be monitored under the Regulations. These supplies are sampled by the Environmental Health Departments of local councils on request.

Figure 1.2: Categories of Private Water Supplies in Northern Ireland in 2022



Private water supplies may be drawn from either surface or groundwater sources. Surface sources can include streams, rivers and reservoirs while groundwater sources can include boreholes, springs and wells. In 2022, 99.4% of registered private supplies in Northern Ireland were from groundwater sources, most commonly, boreholes. A properly installed and tested borehole which has been appropriately sited can provide a sustainable yield of groundwater.

Monitoring of Supplies

An annual sampling programme is in place for all registered supplies. The frequency of the sampling and the range of parameters analysed are determined by the volume of water used and the type of the supply, i.e., commercial, public or domestic. Samples at all forms of private water supplies are collected by Environmental Health Departments of local councils, acting on our behalf. Each sampling officer can only collect samples once they have completed the relevant training by the DWI. The 2022 sampling programme included premises using private water supplies in all 11 council areas.

Of the 171 private water supplies on our monitoring schedule for 2022, 83% were commercial or public supplies and 17% were small domestic supplies (groupings of two or more houses). A breakdown of the numbers and sizes of private water supplies in 2022 is shown in Table 1.1.

Table 1.1: Numbers and Types of Private Water Supplies in 2022

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	21	4
>10 ≤100	49	2
≤10	70	1
(ii) Small Domestic Supplies (two or more dwellings)		
≤10	29	1
Total	**171**	

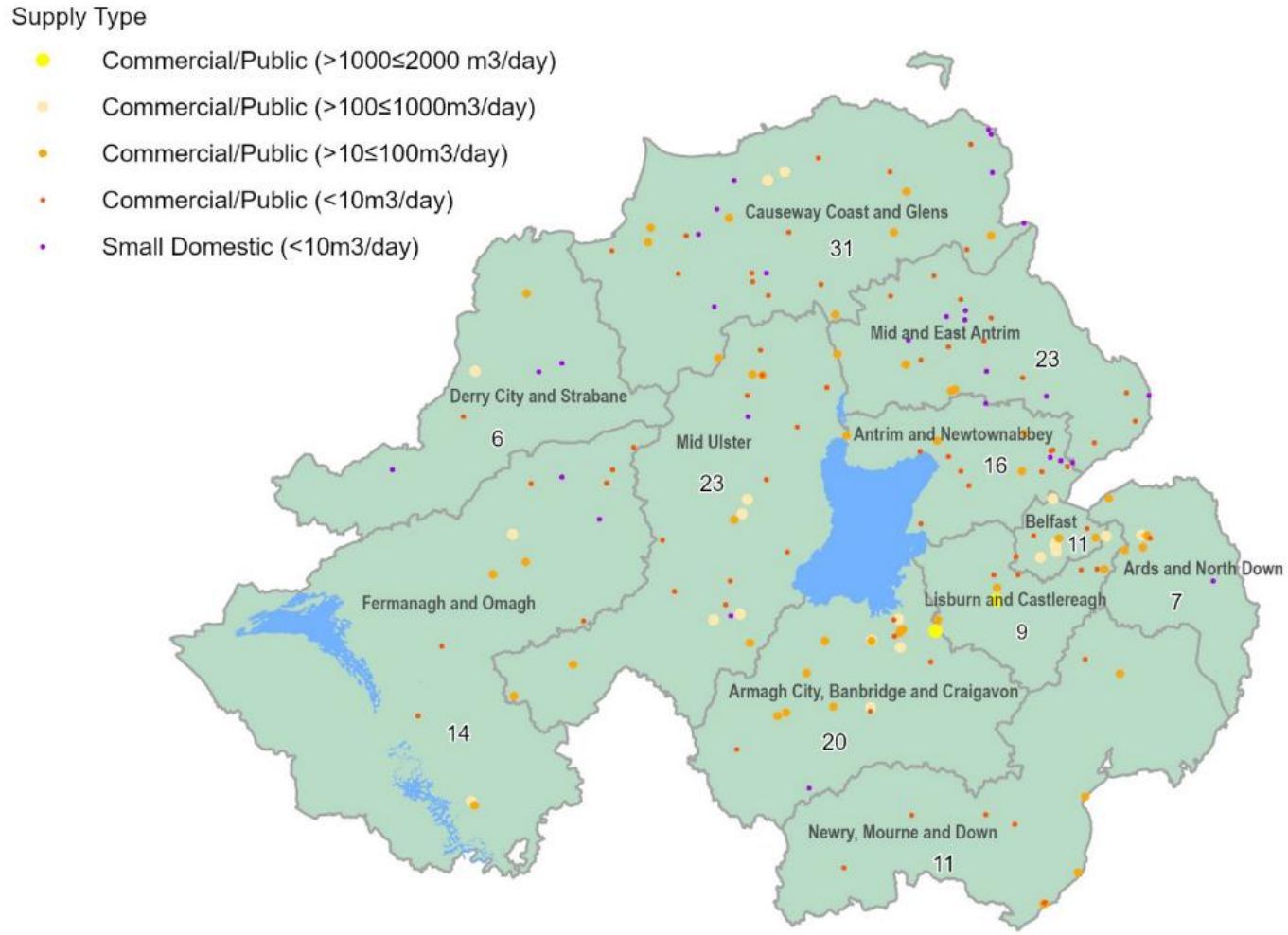
During 2022, four sites were removed from the sampling programme as they no longer met the criteria to be registered (i.e., no longer used for human consumption or supply no longer used in production). Sites were reclassified as necessary throughout the year if the use, volume, or distribution was altered (and subsequently the analytical requirements and sampling frequency were altered as required). In addition, a total of three new supplies were registered with us, these were:

- two food / drink manufacturers; and
- one tourist accommodation.

Although the sampling frequency for compliance sampling is set within the Regulations, many supplementary samples are taken throughout the year during follow-up investigations. If the circumstances warrant additional sampling, the DWI assist site owners through additional testing to either help in identifying the location of a water quality issue or to confirm the water quality issue has been remediated. 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 2022, a total of 35 such 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 2022, categorised by size, is shown in Figure 1.3. All registered supplies can be found on the DAERA iHub viewer.

Figure 1.3: Distribution of Registered Private Water Supplies by Council Area in 2022



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 registered supply to identify areas where there may be potential risks to the water quality. This assessment includes the whole private water supply system, from its source to the most representative point where the water is used, including any storage or treatment systems. These assessments are required to follow the same standard (BS:EN 15975-2:2013[1]) as is used for the risk assessment of the public water supply.

The risk assessments of private water supplies are undertaken by Environmental Health Departments of local councils, acting on our behalf. Environmental Health Officers (EHOs) continue to complete risk assessments of private water supplies using a web-based application developed by DAERA. This ensures consistency of approach by all EHOs across all categories and sizes of sites. Each EHO can only risk assess a private water supply once they have completed the relevant training by the DWI. Annual formal training sessions and ad hoc

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

guidance is provided to councils. In 2022, a total of 22 risk assessments were progressed or completed on the web application.

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 programme for each site as it can identify additional analysis required.

Overall Drinking Water Quality

Comparable water quality standards are applied to both private and public water supplies in Northern Ireland through appropriate drinking water regulations. The Regulations provide flexibility and enable reduced monitoring of some parameters where certain criteria are met and a risk assessment confirms there is no risk to human health. This flexibility was introduced in 2021, with a large set of parameters being placed on a reduced frequency monitoring schedule and this continued into the 2022 monitoring schedule.

Table 1.2: Overall Water Quality in Private Water Supplies in 2022

Parameters	Determinations in 2022		
	Total Number of Tests	Number of Tests not Meeting the Standards	% Compliance
Coliform bacteria	301	32	89.37
Enterococci	173	15	91.33
E. coli	301	12	96.01
Clostridium perfringens	138	5	96.38
Microbiological Total	**913**	**64**	**92.99**
Manganese	265	17	93.58
Sodium*	57	3	94.74
Copper*	25	1	96.00
Hydrogen ion (pH)	301	11	96.35
Sulphate*	33	1	96.97
Iron	266	8	96.99
Lead*	67	2	97.01
Bromate*	43	1	97.67
Nitrate	137	2	98.54
Colour	265	1	99.62
Aluminium	265	1	99.62
Turbidity	301	1	99.67
Individual pesticides	7379	1	99.99
Other parameters	1484	0	100.00
Chemical Total	**10888**	**50**	**99.54**
Radon*	96	3	96.88
Radioactivity*	67	0	100.00
Radiochemical	**163**	**3**	**98.16**
Overall Total	**11964**	**117**	**99.02**

* Parameters on reduced monitoring frequency

The results in Table 1.2 show that, out of a total of 11,964 tests carried out in 2022, 99.02% met the regulatory standards. The regulatory requirements were not met on 117 occasions for 18 parameters, namely: Coliform bacteria, Enterococci, *E. coli*, *Clostridium perfringens*,

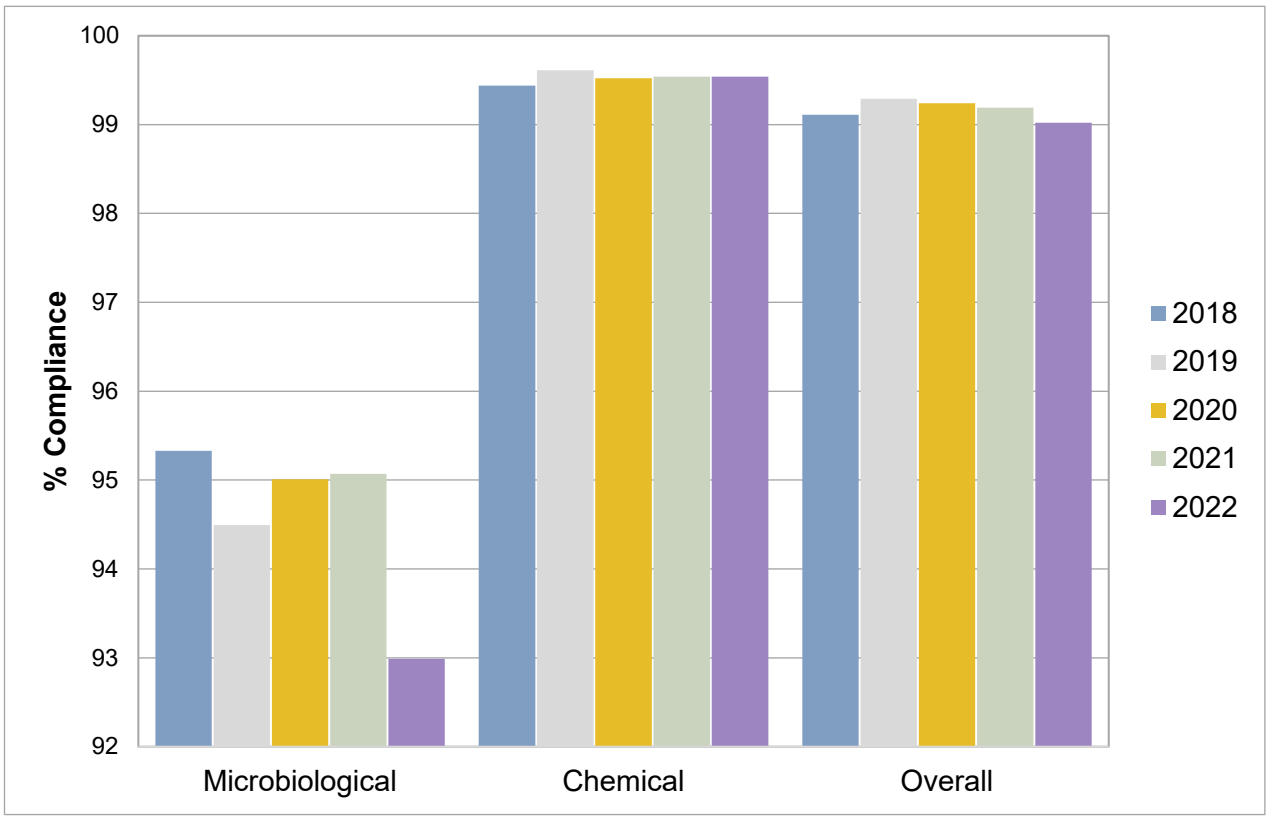
Manganese, Sodium, Copper, Hydrogen ion (pH), Sulphate, Iron, Lead, Bromate, Nitrate, Colour, Aluminium, Turbidity, Individual pesticides (Clopyralid) and Radon.

Under the 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. Consequently, many commercial / public supplies were analysed for a reduced suite of chemical parameters from 2012 to 2017. A review was implemented in 2018 to justify the reduced analysis and all supplies were returned to their full monitoring requirements for a three-year period, to re-evaluate the potential risk. Following a review of the monitoring data, a reduction in parameters was reintroduced for 2021 using a risk-based approach to determine the required analysis on a site-by-site basis. Where a parameter has historically failed or is greater than 30% of the parametric concentration value, it is retained and its inclusion in the monitoring programme will be reviewed again on an annual basis. In 2022, a total of 45 sites were subject to a reduction in parameters requiring monitoring. This reduction is set for a period of up to five years at which point all parameters will be analysed again to re-evaluate the potential risk.

A different approach was adopted for radon as its risk has been determined independently using Public Health England and British Geological Survey data in support of our monitoring results. Where no risk was identified and results were historically stable, monitoring for radon was removed with a review to be conducted through a check sample after five years. The Notice of Decision not to monitor radioactivity parameters is published on the DAERA website.[1]

Microbiological contraventions account for 64 (54.7%) of the 117 contraventions at private water supplies in 2022. There has been a marked decrease in the level of overall microbiological compliance which is reported as 92.99% in 2022 compared to 95.07% in 2021, as illustrated in Figure 1.4.

Figure 1.4: Comparison of Compliance in Private Water Supplies, 2018 – 2022



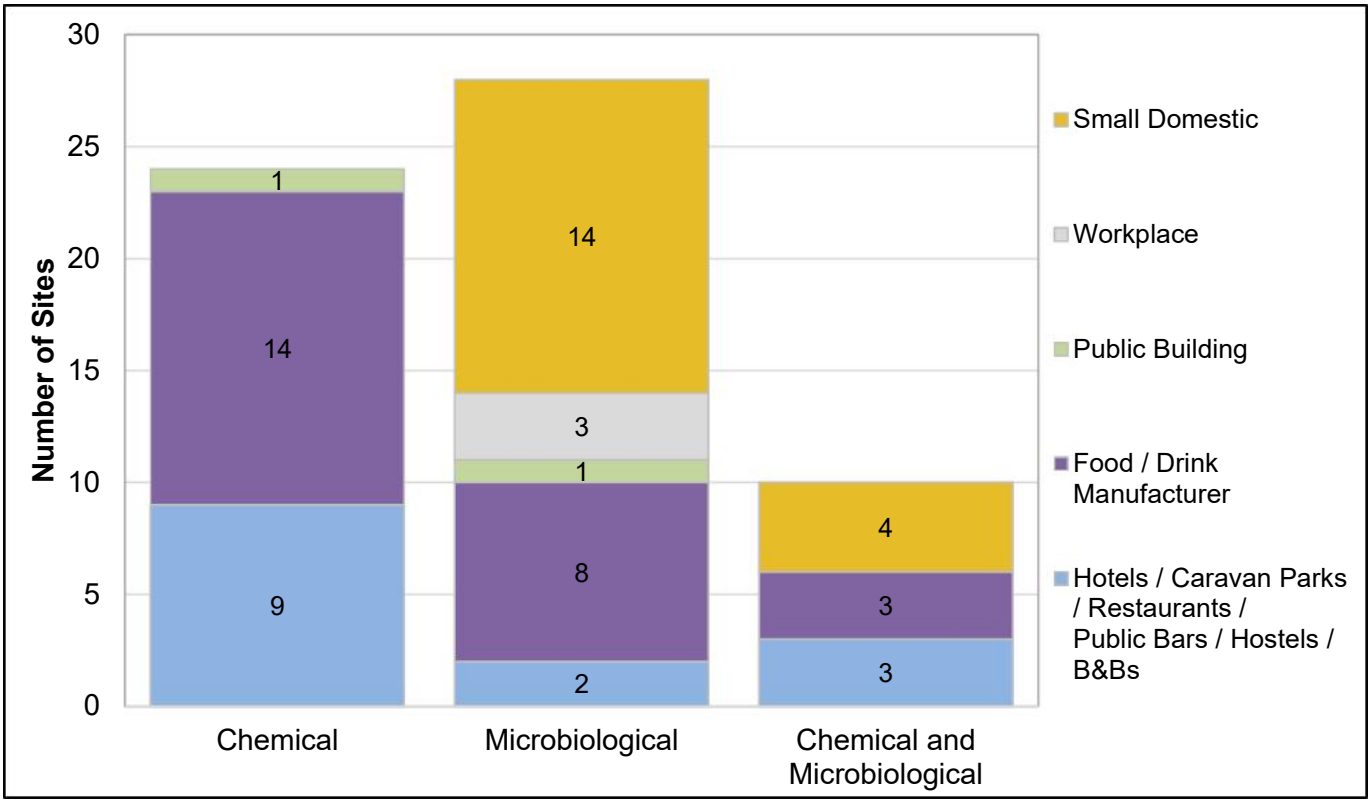
[1] Notice of Decision Not to Monitor Radioactivity Parameters 2018-2022 (daera-ni.gov.uk)

Contraventions of the chemical standards have been reported for a range of parameters listed in Table 1.2. Overall, the number of chemical contraventions remained stable at 50 in 2022, which is the same as 2021. Consequently, given the comparable number of total parameters analysed, there was the same value of chemical compliance for 2022, 99.54%, 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 (pH), Iron, Manganese and Sodium.

Full compliance was achieved for 64% (109 sites) of the private water supplies tested in 2022. Of the 62 sites which did not comply with the regulatory standards, 45% (28 sites) contravened microbiological standards; 39% (24 sites) chemical standards; and 16% (10 sites) failed to comply with both microbiological and chemical standards.

The categories of these non-compliant sites, presented in Figure 1.5, show that 100% of chemical only contraventions occurred at commercial / public sites such as food / drink manufacturers, hotels, or holiday lets whereas for the microbiological only contraventions, 50% were at small shared domestic supplies and 50% were at commercial / public sites.

Figure 1.5: Categories of Non-Compliant Private Water Supply Sites in 2022



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 62 sites which did not comply with all the drinking water quality standards in 2022:

- 50 use the private water supply as the primary source of drinking water;
- six use the private water supply as an ingredient in food or drink;
- five use the private water supply for the washing of equipment and surfaces in contact with food or drink; and,
- one uses the private water supply for personal hygiene.

Factors Affecting Drinking Water Quality

Different aspects of the water supply chain contributed to the microbiological and chemical water quality contraventions reported in 2022 such as: catchment (including source protection); treatment; distribution; and sampling point (tap) issues.

Monitoring of private water supplies was kept constantly under review and adapted to account for any operational changes within businesses or access restrictions at domestic dwellings. Communication with supply owners focused on risk management and ensuring effective controls were in place, especially with a change in the turnover of supplies.

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 38 supplies during 2022: 18 small shared domestic supplies, three of which had disinfection treatment in place at the time of sampling and 20 commercial / public supplies, 13 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

Although some brackish groundwaters contain sodium, elevated levels in water supplies are usually related to water softening processes. The regulatory standard is set for aesthetic reasons as elevated levels may give rise to taste problems. In 2022, three sites reported contraventions for sodium, all of which had water softening treatment processes.

Some groundwaters may contain elevated 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. 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 advised to routinely 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 2022, 14 sites reported contraventions for one or both of these metals.

Lead, and other heavy metals such as nickel and copper, are usually detected at elevated levels due to corrosion of pipe work or fittings, especially if the source water is naturally acidic,

and / or 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. The Drinking Water Inspectorate for England and Wales has published a list of approved products which are suitable for use within a private water supply system.

There were two lead contraventions in 2022, one site had a copper contravention and there were no nickel contraventions.

Pesticides

There was one pesticide contravention in 2022: Clopyralid, a herbicide used for controlling broad-leaved weeds such as docks and creeping thistle in grassland. This contravention could have been due to the inappropriate storage or use of pesticides in the vicinity of the source, although the exact cause has not been determined. In addition to this contravention, trace levels of a range of individual pesticides, below the regulatory limit of 0.10 µg/l, were also detected at 30 sites.

Actions in the Event of Failure

Contraventions are investigated through site visits conducted by EHOs and the collection of follow up samples. Depending on the nature and significance of the contraventions, it may also be necessary for us to conduct a site inspection.

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 human 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 62 sites with contraventions identified in 2022, 60 were notified to PHA for advice: 41 microbiological and 19 chemical. As a consequence, restrictions on the use of the private water supply were put in place at 15 sites to protect public health.

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’ and ‘Do Not Use’ advisory notes.

Removal of these restrictions requires investigation into the cause of the water quality contravention, completion of work to remedy any issues identified and two consecutive satisfactory resamples. Accordingly, the restrictions were removed at five sites.

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 Drinking Water Safety Plans (DWSP) 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.

Single Private Well Web Application

The DWI routinely provides advice and guidance to the owners / users of all private water supplies across Northern Ireland. However, currently limited information is available on the 1,200 plus single dwellings in Northern Ireland, mainly in rural and remote areas, served by a private water supply. The Single Well Application which was launched in 2021, continues to be a valuable resource for these owners by identifying potential risks and identifying measures to improve their quality of water.

Annexes

Annex 1

Glossary and Definition of Terms

Abstraction Point	The point at which water is abstracted from a lake, reservoir, river, or groundwater source for the purposes of drinking water production.
Aesthetic	Associated with the senses of taste, smell and sight.
Animalcule	A tiny or microscopic life form.
Catchment	The area of land that drains into a watercourse.
Clarification	A process employed during drinking water treatment to assist in the removal of suspended solids and particulate matter.
Clopyralid	A herbicide used for controlling broad-leaved weeds such as docks and creeping thistle in grassland.
Clostridium perfringens	A spore-forming bacterium which is exceptionally resistant to unfavourable conditions in the water environment.
Coagulation	A process employed during drinking water treatment to assist in the removal of particulate matter.
Coliform bacteria	A group of bacteria which may be faecal or environmental in origin.
Contravention	A breach of the regulatory requirement.
Cryptosporidium oocyst	A protozoan parasite.
Determination	An analysis for a specific parameter.
Distribution Network	The system of mains water pipes bringing water from a water treatment works to service reservoirs and onwards to the consumer.
Drinking Water Quality Standards	The prescribed concentrations or values listed in the Regulations.
Drinking Water Safety Plan (DWSP)	A comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer.
Enterococci	A sub-group of faecal streptococci commonly found in the faeces of humans and warm-blooded animals.
Escherichia coli (*E. coli*)	A type of faecal coliform bacteria commonly found in the intestines of animals and humans. The presence of *E. coli* in water is a strong indication of recent sewage or animal waste contamination.

Event	A situation affecting, or with the potential to affect, drinking water quality.
Faecal Coliform	A sub-group of coliforms, almost exclusively faecal in origin.
Faecal Indicators	A group of organisms that indicate the presence of faecal contamination of a water supply e.g. *E. coli*.
Filtration	The separation of suspended particulate matter from a fluid.
Flocculation	A process where colloids come out of suspension in the form of a floc.
Granular Activated Carbon (GAC)	An absorbent filtration media used to remove trace organic compounds from water.
Groundwater	Water from aquifers or other underground sources.
Hydrogen ion (pH)	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.
Impounding reservoir	A raw water source from which water is abstracted for the purposes of drinking water production.
Incident	An event where there has been a demonstrable deterioration in the quality of drinking water.
Indicator Parameter	Something that is measured to check that the control measures, such as water treatment, are working effectively.
Leaching	To lose, or cause to lose, soluble substances by the action of a percolating liquid.
MCPA	A herbicide used for controlling broad-leaved weeds in grass or cereal crops.
Mecoprop (MCPP)	A herbicide used for controlling broad-leaved weeds in grass or cereal crops.
Microbiological	Associated with the study of microbes.
m^3/d	Cubic metres per day.
µg/l	Micrograms per litre (one millionth of a gram per litre).
Parameters	The substances, organisms and properties listed in Schedules 1 and 2, and regulation 2 of the Regulations.
Pathogen	An organism which causes disease.

PC15	The third price control process whereby funding was allocated to NI Water by the Utility Regulator for the 2015 to 2021 period.
PC21	The fourth price control process whereby funding was allocated to NI Water by the Utility Regulator for the 2021 to 2027 period.
PC27	The fifth price control process whereby funding will be allocated to NI Water by the Utility Regulator for the 2027 to 2033 period.
Pesticides	Any fungicide, herbicide, insecticide or related product (excluding medicines) used for the control of pests or diseases.
Powder Activated Carbon (PAC)	An adsorbent media typically used to remove taste and odour compounds during a water treatment process.
Price Control Process (PC)	The process for the funding of NI Water by the Utility Regulator for a set period.
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.
Raw Water	Water prior to receiving treatment abstracted for the purpose of drinking water provision.
Remedial Action	The action taken to improve a situation.
Residence Time	The period of time treated water spends in clear water tank, service reservoir or other storage facility.
Service Reservoir	A water tower, tank or other reservoir used for the storage of treated water within the distribution system.
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.
Turbidity	Turbidity is the measure of relative clarity of a liquid.
Water Catchment Partnership	The Water Catchment Partnership (WCP) was established in 2013 to help address significant water quality issues in Northern Ireland related to pesticides.
Water Supply Zone	A pre-defined area of supply used for establishing sampling frequencies, compliance with standards and information to be made publicly available.

Water Treatment Works	A facility that produces drinking water from a raw water source.
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

Serious Drinking Water Quality Events in 2022

Date of Serious Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Serious Event	Associated Council Area(s)
03/03/22 – 07/03/22	Kilrea / Garvagh area (6,731 population)	A short-lived period of high flow in the trunk main caused by an unknown third party. This led to a high number of consumer contacts regarding discoloration of their mains water supply. The affected Service Reservoir was temporarily by-passed and targeted flushing was carried out in the area.	Causeway Coast & Glens Borough
04/07/22 – 08/07/22	Sligo Road, Enniskillen (297 population)	Damage to a water main, and two sewers, caused by a third-party contractor. Due to the contamination risk, a 'Boil Water Notice' was issued to the affected properties. Subsequent isolation of the water main caused a loss of supply to consumers. Bottled water provisions were made available. Following repair work and satisfactory samples, "Safe to Drink" letters were issued.	Fermanagh & Omagh District
04/07/22 – 11/07/22	Forked Bridge WTW (91,365 population)	Elevated levels of turbidity occurred in the works final water following planned repair work on the Castor Bay to Forked Bridge pumping main. Subsequent aluminium and turbidity contraventions, both at the works and in the distribution system, were reported. Asset-to-asset tankering and re-zoning was used to maintain a supply of water while scouring and flushing was undertaken.	Armagh City, Banbridge and Craigavon Borough; Belfast City; Lisburn & Castlereagh City; Mid-Ulster District; and Newry, Mourne & Down District
16/12/22 – 23/12/22	Northern Ireland (1.9 million)	Interruption to water supply due to a prolonged period of freeze conditions followed by a rapid thaw. The resultant bursts throughout the system caused an increase in water demand. NI Water declared a Category 1 Incident. While the repair of bursts was prioritised, output from the works were increased to meet the demand. Where required, re-zoning and asset-to-asset tankering was used to restore water levels.	All

Significant Drinking Water Quality Events in 2022

Date of Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Significant Event	Associated Council Area(s)
03/02/22 – 05/02/22	Baranailt Road, Claudy (10 properties)	Contamination of the mains water supply caused by ingress through an open hydrant during operational work to connect a new main. Bottled water was provided to affected consumers and the main was chlorinated and flushed as a precaution.	Derry City & Strabane District
21/02/22 – Present	Ardowen, Craigavon (6 properties)	Samples taken in response to consumer complaints contravened the taste and odour parameters (above the Health Notification Values). The samples also contravened the standard for iron due to the condition of the iron mains. Extensive flushing resulted in satisfactory taste and odour samples. The investigation is ongoing in relation to the iron contraventions.	Armagh City, Banbridge and Craigavon Borough
31/03/22 – 01/04/22	Castor Bay WTW (367,219 population)	Contraventions of the turbidity and iron standards in the final water following an unplanned power outage, causing a plant shutdown.	Armagh City, Banbridge and Craigavon Borough; Belfast City; Lisburn & Castlereagh City; Mid-Ulster District; and Newry, Mourne & Down District
06/04/22 – 25/04/22	Belleek WTW (5,022 population)	Contravention of the Individual pesticide standard for MCPA (2-methyl-4-chlorophenoxyacetic acid) in the final water from the works. The pesticide removal treatment was not fully operational at the time of this event.	Fermanagh & Omagh District
10/05/22 – 18/05/22	Derg WTW (41,681 population)	Contraventions of the individual pesticide standard for MCPA occurred in the works final water due to insufficient treatment. A Regulation 31(4) Notice has been issued by DWI in respect of pesticide contraventions. NI Water have undertaken a major upgrade of this works in response to this Notice.	Derry City & Strabane District and Fermanagh & Omagh District.

Significant Drinking Water Quality Events in 2022

Date of Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Significant Event	Associated Council Area(s)
17/05/22 – 18/05/22	Drumaroad WTW (427,051 population)	A contravention of the Hydrogen ion (pH) parameter in the final water from the works. This was caused by inadequate pH adjustment through the treatment due to an online monitor reading incorrectly.	Belfast City; Lisburn & Castlereagh City; Newry, Mourne & Down District; and Ards & North Down Borough
08/06/22 – 09/06/22	Fofanny WTW (156,923 population)	Oil contamination of a filter used for pesticide reduction within the treatment works during planned refurbishment work on the filters. The filter was taken out of service pending removal of the oil.	Newry, Mourne & Down District
08/06/22 – 05/07/22	Killyhevlin WTW (79,584 population)	A Cryptosporidium oocyst was detected in the works final water on two occasions. All subsequent samples were satisfactory.	Fermanagh & Omagh District
22/06/22 – 27/07/22	College Campus, Lisburn (1,200 population)	Samples taken in response to a consumer complaint contravened the *E. coli* and coliform bacteria parameters. 'Do not use for drinking or cooking' advice was issued and bottled water provided. Further sampling and investigation identified storage tanks as the most probable cause. The storage tanks were by-passed and satisfactory samples obtained.	Lisburn & Castlereagh City
27/06/22 – 05/07/22	Glenhordial WTW (12,030 population)	A contravention of the individual pesticide standard for MCPA occurred in the works final water. The pesticide removal treatment was not fully operational at the time of this event.	Fermanagh & Omagh District.
03/07/22 – 05/07/22	Whiteabbey SR Pumping Main (14,259 population)	A burst occurred on the pumping main between Whiteabbey Lower and Whiteabbey Upper SR. During operational work to facilitate re-zoning, a number of consumers experienced discoloured water. Tankering and further re-zoning was used to maintain supply pending repair of burst and return to normal operation.	Antrim & Newtownabbey

Significant Drinking Water Quality Events in 2022

Date of Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Significant Event	Associated Council Area(s)
05/07/22 – 06/07/22	Drumaroad WTW (446,519 population)	A contravention of the Hydrogen ion (pH) parameter in the final water from the works. Following an investigation, NI Water was unable to identify the cause of the contravention.	Belfast City; Lisburn & Castlereagh City; Newry, Mourne & Down District; and Ards & North Down Borough
09/08/22 – 15/08/22	Forked Bridge WTW (91,365 population)	A contravention of the aluminium parameter occurred in the works final water following a communications failure, which led to unstable flows within the pumping main from Castor Bay WTW.	Armagh City, Banbridge and Craigavon Borough; Belfast City; Lisburn & Castlereagh City; Mid-Ulster District; and Newry, Mourne & Down District
16/08/22 – 10/11/22	Derg WTW (41,681 population)	A contravention of the Total Trihalomethanes (THMs) parameter occurred in the works supply area due to sub-optimal treatment. NI Water have undertaken a major upgrade of this works.	Derry City & Strabane District and Fermanagh & Omagh District.
04/09/22 – 05/10/22	Ballinrees WTW (119,178 population)	Contraventions of the taste and odour parameters occurred in the works final water and related distribution due to insufficient treatment. Consumer complaints regarding Taste & Odour in the Ballinrees WTW supply area were received by NI Water. A Regulation 31(4) Notice has been issued by DWI in relation to taste and odour contraventions at Ballinrees WTW.	Causeway Coast & Glens Borough & Derry City & Strabane District
11/09/22 – 14/10/22	Moneymore WTW (4,634 population)	Loss of chlorination of works final water, due to a faulty pump, and failure of works to automatically shut down, due to inappropriate alarm settings. There was no impact on the microbiological water quality with all samples taken bacteriologically satisfactory.	Mid-Ulster District
26/09/22 – 11/10/22	Dungonnell WTW (28,355 population)	Contraventions of the Total Trihalomethanes (THMs) parameter occurred in the works supply area due to insufficient water treatment. Improvement work in relation to THMs at Dungonnell WTW is included in the PC21 work plan.	Mid & East Antrim Borough

Significant Drinking Water Quality Events in 2022

Date of Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Significant Event	Associated Council Area(s)
07/10/22 – 08/10/22	Fofanny WTW (156,923 population)	A contravention of the aluminium parameter occurred in the works final water following an unplanned power outage which caused treatment difficulties.	Newry, Mourne & Down District
05/11/22 – 06/11/22	Ballinrees WTW (180,817 population)	Elevated levels of turbidity and aluminium occurred in the works final water following loss of effective treatment caused by a dosing pump failure.	Causeway Coast & Glens Borough & Derry City & Strabane District
08/11/22 – Present	Ardmore Road, Londonderry (80 properties)	Samples taken in response to consumer complaints contravened the iron and turbidity standards (including results above the Health Notification Values) due to the condition of the iron mains. Mains replacement is scheduled for 2023. NI Water put in place a mains flushing programme to reduce the risk for discoloured water as an interim measure until the mains replacement is completed.	Derry City & Strabane District
15/11/22 – 16/11/22	Killylane WTW (49,846 population)	Elevated levels of aluminium and turbidity occurred in the works final water due to treatment difficulties caused by a chemical dosing failure.	Mid & East Antrim Borough
18/11/22 – Present	Meadowbrook, Ballybogey (14 properties)	Samples taken in response to a consumer complaint contravened the aluminium, iron, manganese, and turbidity standards (including results above the Health Notification Values). This is most likely due to the condition of a short section of iron mains. Mains replacement is scheduled for 2023. NI Water put in place a mains flushing programme to reduce the risk for discoloured water as an interim measure until the mains replacement is completed.	Causeway Coast & Glens Borough

Significant Drinking Water Quality Events in 2022

Date of Significant Event	Area and Estimate of Population/ Properties Potentially Affected	Nature and Cause of Significant Event	Associated Council Area(s)
21/11/22 – 25/11/22	Caugh Hill WTW (79,501 population)	A contravention of the hydrogen ion (pH) parameter occurred in the works final water. Following an investigation, NI Water was unable to identify the cause of the contravention.	Causeway Coast & Glens Borough & Derry City & Strabane District
15/12/22 – 17/12/22	Dungonnell WTW (28,355 population)	Contraventions of the aluminium, hydrogen ion (pH) and turbidity parameters occurred in the water supplied from the works. This was due to treatment issues caused by cold weather conditions.	Mid & East Antrim Borough

Annex 3

Technical Audit Programme

In 2022, following the removal of COVID-19 restrictions, the on-site technical audit inspection programme was resumed. We acknowledge NI Water's co-operation during the completion of the audits as detailed in Table 3.1. NI Water has implemented or provided comment on, the recommendations and suggestions we raised in our audit reports.

The following table provides a summary of our 2022 Inspection Programme:

Table 3.1: Summary of the 2022 Inspection Programme

Date of Audit	Location	Audit Activity	Number of Recommendations[1]	Number of Suggestions[2]
11/03/2022	Ballinrees WTW	To check that good operational practice is used in the water treatment process.	3	5
16/03/2022	Sampling Procedures	To check the sampling technique and ensure sample points are fully compliant.	6	11
13/09/2022	Clay Lake WTW	To check that good operational practice is used in the water treatment process.	6	9
18/10/2022	Laboratory Information Management System	To check that data is adequately managed by the 'Laboratory Information Management System'.	6	5
01/12/2022	Sampling Procedures	To check the sampling technique and ensure sample points are fully compliant.	8	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 Action

The DWI Section of the DAERA website publishes details of all Enforcement actions.

Table 4.1: Summary of Enforcement Actions 2022

Type of Enforcement	Water Treatment Works (WTW)	Reason for Notice	Summary
Regulation 31(4) Notice 2020/001	Derg WTW	Contravention of the regulatory standard for the herbicide, MCPA	Requires NI Water to install and have operational, a treatment system at Derg WTW that is effective in the removal or reduction of MCPA to achieve a final water result that meets the maximum regulatory limit of MCPA of 0.10µg/l by 31 March 2022. An amendment was issued in February 2022 to provide NI Water with an additional 12 months to complete the required treatment upgrade by 31 March 2023.
Regulation 31(4) Notice 2020/002	Ballinrees WTW	Contravention of the regulatory standard for the herbicide, MCPA	Requires NI Water to install and have operational, a treatment system at Ballinrees WTW that is effective in the removal or reduction of MCPA to achieve a final water result that meets the maximum regulatory limit of MCPA of 0.10µg/l 2020 by 22 December 2023. This was issued on 17 December 2020 following the revocation of Regulation 31(4) Notice 03/19 on the same date.
Regulation 31(4) Notice 2020/003	Ballinrees WTW	Contravention of the regulatory standards for Taste and Odour	Requires NI Water to install and have operational, a treatment system at Ballinrees WTW that is proven to be effective in the treatment of taste and odour parameters to achieve a final water and consumer tap result that is acceptable to the consumer and there is no abnormal change by 22 December 2023. This was issued on 17 December 2020.
Regulation 31(4) Notice 2021/001	Drumaroad WTW	Contravention of the regulatory standard for Aluminium	Requires NI Water to install and have operational, a treatment system at Drumaroad WTW that is proven to be effective in the removal or reduction of Aluminium to achieve a final water result that meets the maximum regulatory limit of Aluminium of 200 µg/l by 30 April 2025. This was issued on 8 July 2021.

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 – provide details of drinking water compliance within individual water supply zones and council areas for Public and Private Supplies.

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 which can be provided by either:

Online Feedback Form:

To access a short online feedback form follow the QR code or link below (closes 31st December 2023):

https://consultations2.nidirect.gov.uk/daera/45b6b0d8

or

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

Northern Ireland Environment Agency
www.daera-ni.gov.uk

Drinking Water Inspectorate for Northern Ireland
Resource Efficiency Division
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