Drinking Water Quality in Public Supplies 2019

Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

ENVIRONMENTAL PROTECTION AGENCY

The Environmental Protection Agency (EPA) is responsible for protecting and improving the environment as a valuable asset for the people of Ireland. We are committed to protecting people and the environment from the harmful effects of radiation and pollution.

The work of the EPA can be divided into three main areas:

Regulation: *We implement effective regulation and environmental compliance systems to deliver good environmental outcomes and target those who don't comply.*

Knowledge: *We provide high quality, targeted and timely environmental data, information and assessment to inform decision making at all levels.*

Advocacy: *We work with others to advocate for a clean, productive and well protected environment and for sustainable environmental behaviour.*

Our Responsibilities

Licensing

We regulate the following activities so that they do not endanger human health or harm the environment:

- waste facilities *(e.g. landfills, incinerators, waste transfer stations)*;
- large scale industrial activities (*e.g. pharmaceutical, cement manufacturing, power plants)*;
- intensive agriculture *(e.g. pigs, poultry)*;
- the contained use and controlled release of Genetically Modified Organisms *(GMOs)*;
- sources of ionising radiation *(e.g. x-ray and radiotherapy equipment, industrial sources)*;
- large petrol storage facilities;
- waste water discharges;
- dumping at sea activities.

National Environmental Enforcement

- Conducting an annual programme of audits and inspections of EPA licensed facilities.
- Overseeing local authorities' environmental protection responsibilities.
- Supervising the supply of drinking water by public water suppliers.
- Working with local authorities and other agencies to tackle environmental crime by co-ordinating a national enforcement network, targeting offenders and overseeing remediation.
- Enforcing Regulations such as Waste Electrical and Electronic Equipment (WEEE), Restriction of Hazardous Substances (RoHS) and substances that deplete the ozone layer.
- Prosecuting those who flout environmental law and damage the environment.

Water Management

- Monitoring and reporting on the quality of rivers, lakes, transitional and coastal waters of Ireland and groundwaters; measuring water levels and river flows.
- National coordination and oversight of the Water Framework Directive.
- Monitoring and reporting on Bathing Water Quality.

Monitoring, Analysing and Reporting on the Environment

- Monitoring air quality and implementing the EU Clean Air for Europe (CAFÉ) Directive.
- Independent reporting to inform decision making by national and local government *(e.g. periodic reporting on the State of Ireland's Environment and Indicator Reports)*.

Regulating Ireland's Greenhouse Gas Emissions

- Preparing Ireland's greenhouse gas inventories and projections.
- Implementing the Emissions Trading Directive, for over 100 of the largest producers of carbon dioxide in Ireland.

Environmental Research and Development

- Funding environmental research to identify pressures, inform policy and provide solutions in the areas of climate, water and sustainability.

Strategic Environmental Assessment

- Assessing the impact of proposed plans and programmes on the Irish environment *(e.g. major development plans)*.

Radiological Protection

- Monitoring radiation levels, assessing exposure of people in Ireland to ionising radiation.
- Assisting in developing national plans for emergencies arising from nuclear accidents.
- Monitoring developments abroad relating to nuclear installations and radiological safety.
- Providing, or overseeing the provision of, specialist radiation protection services.

Guidance, Accessible Information and Education

- Providing advice and guidance to industry and the public on environmental and radiological protection topics.
- Providing timely and easily accessible environmental information to encourage public participation in environmental decision-making *(e.g. My Local Environment, Radon Maps)*.
- Advising Government on matters relating to radiological safety and emergency response.
- Developing a National Hazardous Waste Management Plan to prevent and manage hazardous waste.

Awareness Raising and Behavioural Change

- Generating greater environmental awareness and influencing positive behavioural change by supporting businesses, communities and householders to become more resource efficient.
- Promoting radon testing in homes and workplaces and encouraging remediation where necessary.

Management and structure of the EPA

The EPA is managed by a full time Board, consisting of a Director General and five Directors. The work is carried out across five Offices:

- Office of Environmental Sustainability
- Office of Environmental Enforcement
- Office of Evidence and Assessment
- Office of Radiation Protection and Environmental Monitoring
- Office of Communications and Corporate Services

The EPA is assisted by an Advisory Committee of twelve members who meet regularly to discuss issues of concern and provide advice to the Board.

Drinking Water Quality in Public Supplies 2019

Environmental Protection Agency

An Ghníomhaireacht um Chaomhnú Comhshaoil

P.O. Box 3000, Johnstown Castle Estate, County Wexford, Ireland, Y35 W821

Telephone: +353 53 916 0600

Email: info@epa.ie

Website: www.epa.ie

LoCall: 1890 33 55 99

Cover photo: Goldrum water treatment plant, Donegal. Photo courtesy of Glan Agua Ltd

Published by the Environmental Protection Agency, Ireland

ISBN: 978-1-84095-899-7

Contents

Appendix 1 Monitoring and Compliance Summary for public water supplies 2019.

Appendix 2 Monitoring and Compliance Summary for public group water supplies 2019.

Appendix 3 Boil and Water Restriction Notices in place on public water supplies in 2019.

Appendix 4 Quality and Enforcement Summary Statistics by county or area in 2019.

Appendix 5 Status of Directions at end of 2019.

Appendix 6 Remedial Action List Summary by county or area in 2019.

DRINKING WATER QUALITY PUBLIC SUPPLIES

Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

99.9% of samples are free of *E.coli*

Drinking water quality public supplies 2019

If there's a problem

EPA oversees > Irish Water takes action < HSE advises

National priorities

- **Disinfection** keeping water free of bacteria
- **Trihalomethanes** minimising disinfection by-products
- **Lead** eliminating lead from our networks
- **Pesticides** preventing them from entering our waters
- **Water Safety Plans** managing the risks to our supplies

Irish Water to take action to address these priorities

What you can do

- Replace any lead fittings in your home
- Don't waste water
- Use pesticides responsibly

For more information:
www.epa.ie and www.water.ie

http://www.epa.ie/water/dw/quality

Key findings for public supplies 2019

Quality of Public Water Supplies

- The quality of drinking water in public supplies remains high
- Of 67 Boil Water Notices issued in 2019, 59 were long-term, requiring consumers to boil their water for more than 30 days

Main Issues for Irish Water

- Delays in fixing significant problems at supplies
- Increasing risk of failure to replace lead pipe connections
- High levels of disinfection by-products and persistent pesticide failures in supplies
- Two boil water notices for over 600,000 consumers highlights the vulnerability of our water supplies

Progress in 2019

- Reduction from 63 to 52 supplies on EPA Remedial Action List
- Identification of significant *Cryptosporidium* risks in water sources using structured Water Safety Planning approach

Action Required by Irish Water

- Set concrete completion dates for all Remedial Action List supplies
- Ensure disinfection at all supplies while minimising disinfection by-products
- Increase rate of replacement of lead connections
- Assess risks to drinking water from source to tap and prioritise action to address greatest risks

1 Introduction

This report is about the quality of drinking water in public water supplies during 2019. The information in the report is based on the assessment of monitoring results reported to the EPA by Irish Water, and on the EPA's enforcement activities. The report also covers monitoring results from local authorities relating to Public Group Water Schemes.

A drinking water supply includes the abstraction, treatment, storage and distribution of water from the water source to the consumer's tap (Figure 1). In 2019, Irish Water monitored 787 public water supplies serving approximately 1.3 million households[1].

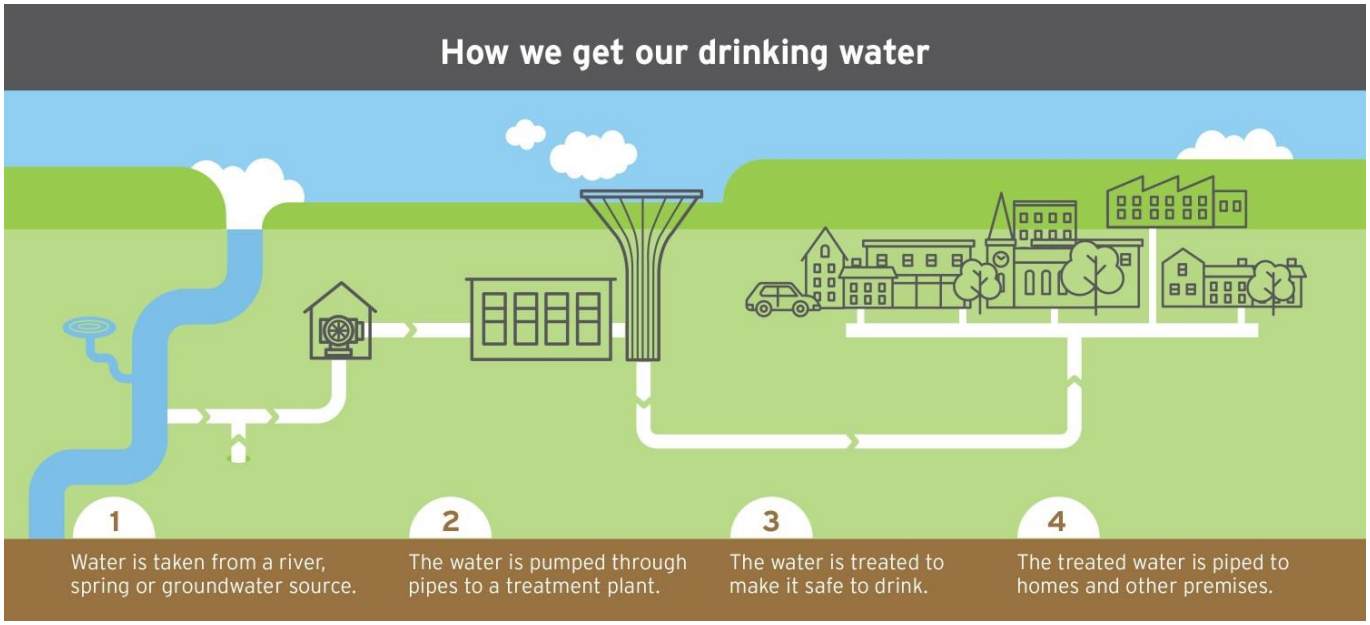

Figure 1: How do we get our drinking water?

Who does what?

Irish Water is responsible for providing public water services and ensuring drinking water quality meets the standards in the Drinking Water Regulations. Irish Water also provides water from its treatment plants to public group schemes. Consumers who get their drinking water from a public water supply can find out more about their drinking water quality from the Irish Water website, www.water.ie[2].

The **Environmental Protection Agency** (EPA) is the drinking water quality regulator, responsible for enforcing the Drinking Water Regulations.

The **Health Service Executive** is responsible for public health and must be consulted by Irish Water where there is a failure to meet the standards in the Drinking Water Regulations, or where there is a public health risk.

[1] CSO, Census 2016
[2] https://www.water.ie/water-supply/water-quality/

The **Commission for Regulation of Utilities** is the economic regulator for public water services, responsible for ensuring that Irish Water operates in an economical and efficient manner.

Priorities for drinking water

The EPA has identified the most important issues, which should be addressed on a national level, to protect and improve public drinking water supplies. Table 1 lists these priority issues and the actions required to improve water supplies. While most actions are the responsibility of Irish Water, other stakeholders also have a role to play. This will be discussed further in the relevant sections of this report.

Table 1: National priorities for drinking water supplies

Issue	Required Actions
Keeping water free of harmful bacteria (Disinfection)	• Irish Water must put in place robust disinfection systems via the National Disinfection Programme to prevent long-term Boil Water Notices.
Minimising harmful disinfection by-products	• Irish Water must put in place treatment that adequately removes organic matter from source water before it is chlorinated, to prevent chronic Trihalomethanes issues.
Eliminating lead from pipework	• Irish Water should increase rate of lead connection replacement to ensure removal of all public side lead. • Public buildings must be assessed for lead plumbing and addressed where it is found. • Homeowners should be strongly encouraged to replace private side lead under the National Lead Strategy.
Preventing pesticides from entering our waters	• All stakeholders should promote responsible use of pesticides with a focus on drinking water source catchments. • Irish Water must treat water where catchment action is ineffective.
Managing risks to our supplies	• Irish Water must progress Drinking Water Safety Plans for all public supplies so that the largest risks are known and can be addressed as a priority.
Ensuring all water treatment plants are effective	• Irish Water must deliver works for all Remedial Action List schemes on time and set concrete dates for supplies on the list without completion dates.

2 Drinking water quality in public supplies

This section of the report presents the EPA's findings on drinking water quality in 2019.

Drinking water quality assessment

Irish Water carries out drinking water quality monitoring on public supplies. It prepares **annual monitoring programmes** to ensure that samples are taken at planned times throughout the year and at planned locations in the distribution network. These samples are taken from taps in homes and businesses. The EPA audits Irish Water's monitoring programmes to ensure that the monitoring is satisfactory. Monitoring results submitted to the EPA by Irish Water must be from accredited laboratories, which means the laboratories analysing the samples must meet certain standards in their analysis methods, quality control, and assurance processes.

Irish Water submitted over 120,000 test results for 2019 to the EPA. The EPA refers to these results as the '**annual monitoring returns'**. Each test result gives information on the quality of the drinking water at the point in time at which it was taken. Test results must comply with the standards set out in the Drinking Water Regulations[3]. The samples are tested for a wide range of substances, known as 'parameters'. Three categories of parameters are monitored:

- Microbiological parameters, which include the bacteria *E. coli* and *Enterococci*;
- Chemical parameters including lead, pesticides and disinfection by-products; and
- Indicator parameters, which give information on the management of the treatment process, as well as the look, taste and smell of the water.

Compliance rates with the Drinking Water Regulations are based solely on an assessment of the **annual monitoring returns**. An explanation of each of the parameters described in the report can be found on the EPA's website[4].

Since 2017, Irish Water has also been required under the Radioactive Substances in Drinking Water Regulations[5] to monitor radioactivity parameters in public water supplies. This monitoring is carried out by the EPA, is separate from the annual monitoring returns and is part of a six-year surveillance programme. The purpose of the programme is to determine whether monitoring of the supplies is required at the frequencies outlined in Part 2 of the Schedule of the Regulations. At the end of the surveillance programme, an assessment will be made as to which supplies need ongoing monitoring.

[3] European Union (Drinking Water) Regulations 2014, S.I. No. 122 of 2014, as amended
[4] http://www.epa.ie/pubs/advice/drinkingwater/parameterappendix.html
[5] European Union (Radioactive Substances in Drinking Water) Regulations 2016, S.I. 160 of 2016

Water quality in public supplies

Water quality across each of the three parameter categories has remained consistently high since Irish Water became responsible for public water supplies in 2014 (Table 2).

Table 2: Overall compliance of samples taken for public water supplies

Parameter Categories	2014	2015	2016	2017	2018	2019
Microbiological	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Chemical	99.4%	99.4%	99.5%	99.6%	99.6%	99.6%
Indicator	99.3%	99.1%	98.8%	98.9%	98.8%	99.1%

Microbiological parameters are the most important health indicators of drinking water quality, particularly ***E. coli***. If bacteria are found in drinking water, it can mean that the disinfection treatment process is not working properly or that contamination has entered either the water reservoir or distribution pipes, after treatment. During 2019, seven samples (one in each of seven supplies) failed to meet the standard for *E. coli* in the annual monitoring returns. This is a slight increase compared to six in 2018. Since 2014, the overall number of supplies with *E. coli* failures has remained relatively stable (Figure 2). Two samples (one in each of two supplies) failed to meet the standard for *Enterococci* in the annual monitoring returns. This is a decrease from six in 2018.

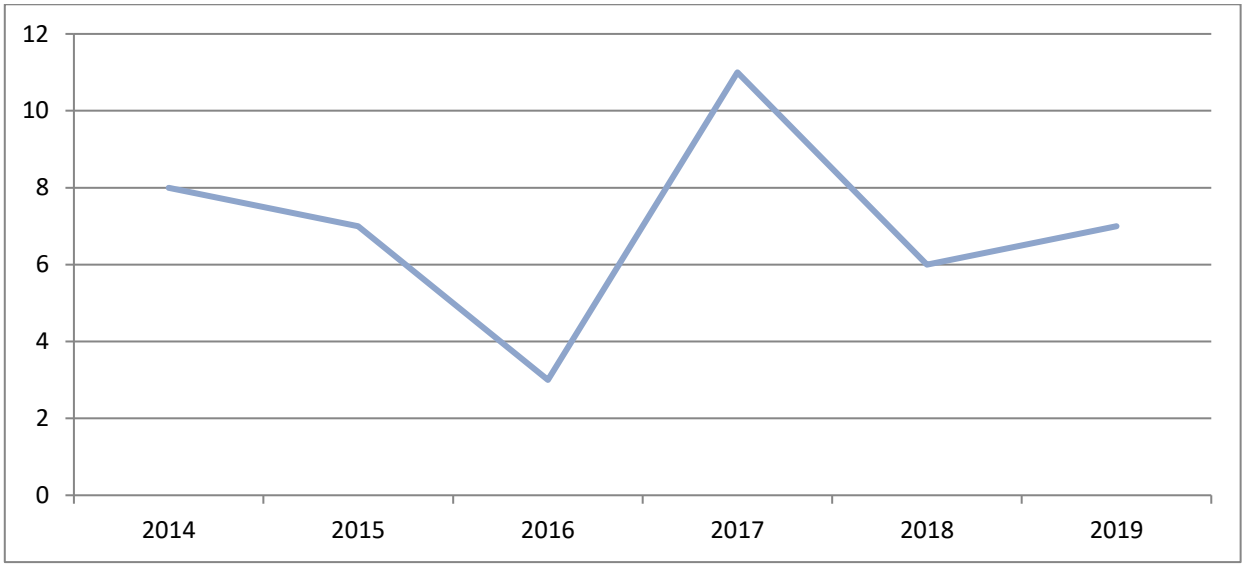

Figure 2: Trend in the number of public water supplies where *E. coli* was detected

Lead, trihalomethanes and pesticides continue to be the main chemical parameters of concern. Appendix 1 lists the number of samples analysed and the number failing to meet the standards. The EPA's website contains all monitoring results from 2000-2019 and information on water supplies for each county[6].

[6] http://erc.epa.ie/safer/resourcelisting.jsp?oID=10206&username=EPA%20Drinking%20Water

Water quality in public group schemes

Public group schemes are supplies where a group water scheme, set up by the local community, manages the distribution of water to their members that has been abstracted and treated by Irish Water (Figure 3). These supplies provide water to about 2% of the population. The group scheme is legally responsible for ensuring the water it supplies is safe to drink. While the EPA regulates Irish Water, these schemes are regulated by the local authorities.

The microbiological quality of the water in these supplies tends to be very good as it has been treated at an Irish Water treatment plant but issues with disinfection by-products can arise. Water quality issues can also arise in the network of pipes, controlled by the group scheme, that is used to distribute the treated water to homes and premises. The Drinking Water Regulations require that monitoring is carried out at locations that are part of the scheme, to check that the quality of the water meets the required standards. It is the responsibility of the local authority to ensure that this monitoring is carried out; any issues are investigated and fixed; and the results are submitted to the EPA.

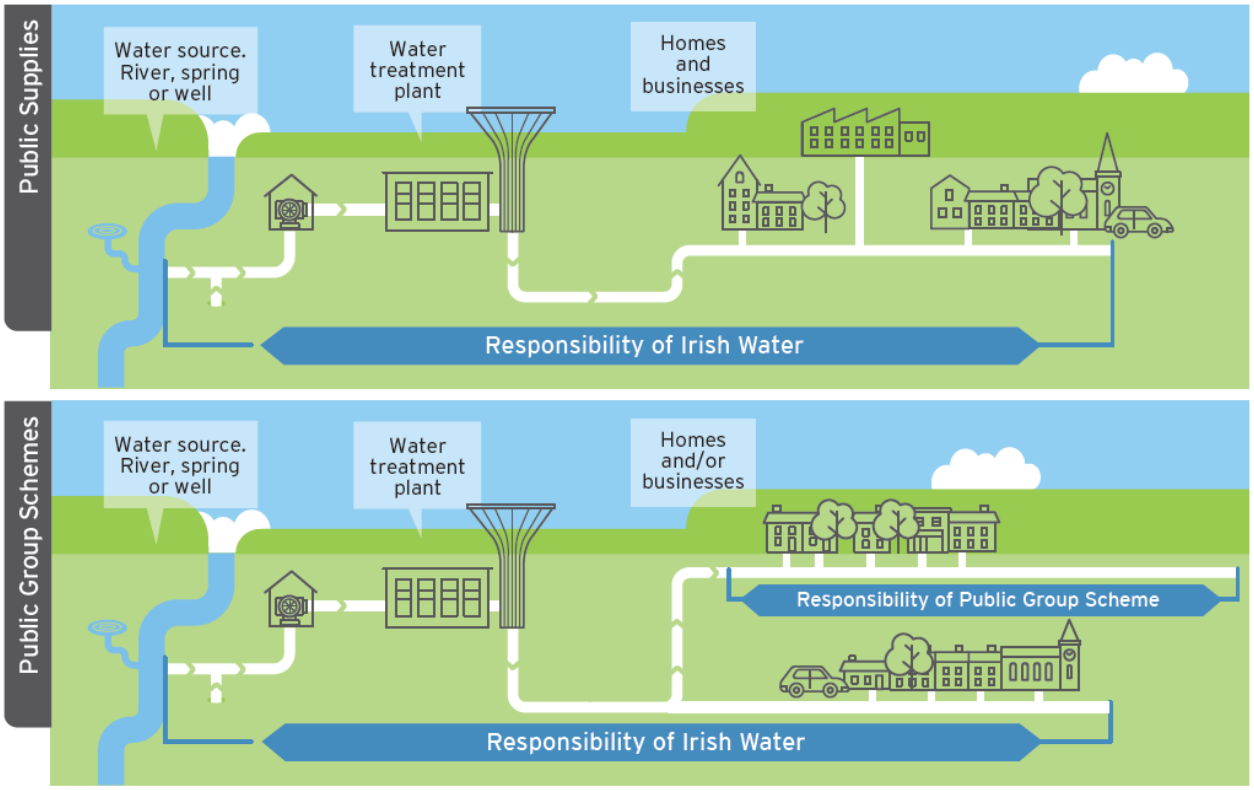

Figure 3: Water supply types and responsible supplier

In 2019, the EPA received monitoring results for 377 public group schemes. 100% of *E. coli* samples complied with the regulations. Seven schemes had trihalomethanes failures[7].

[7] Killimer, Seafield, Querrin, Clohanes, Leitrim/Shyan, all in Clare, and fed by West Clare supply. Ougham, Sligo, fed by Lough Talt public supply. Tuogh, Limerick, fed by Adare public supply.

Six of these schemes are fed by public schemes where action is due to be taken at the Irish Water treatment plant to address this issue. The final scheme (Tuogh in Limerick) has been dealt with by Limerick City and County Council. Appendix 2 lists the number of samples analysed and the number failing to meet the standards for all parameters.

Water quality failures in 2019

When Irish Water finds a microbiological or chemical failure, it must notify the EPA and investigate why the failure happened. As part of the investigation, Irish Water will consult with the Health Service Executive, to check if the failure might impact on consumers' health (Figure 4). The EPA will oversee the investigation to ensure that a satisfactory solution is found, and Irish Water must keep the EPA informed throughout. The actions taken by the EPA are described further in Section 3.

Figure 4: What happens when there is a water quality failure

Irish Water notifies the EPA

Irish Water must notify the EPA as soon as a microbiological or chemical water quality failure is found when they are carrying out the monitoring for the '**annual monitoring returns'**. In addition to the annual monitoring returns, Irish Water also carries out '**operational monitoring**' to make sure a treatment plant is operating correctly, and '**investigative monitoring**' when investigating a problem or complaint. This monitoring is **not** part of the annual monitoring returns. This means that more failures can be notified to the EPA than are reported in the annual monitoring returns.

Topic Box 1: An example of how the total number of supplies with failures reported to the EPA is calculated

During 2019, Irish Water found *E. coli* failures in seven supplies when they were carrying out monitoring for the annual monitoring returns. Irish Water also carried out operational monitoring and investigative monitoring in 2019 and found *E. coli* failures at one additional supply during this monitoring. All failures had to be reported to the EPA, and in total Irish Water reported *E. coli* failures at eight supplies (seven plus one) to the EPA in 2019.

The important points to note are that:

- Compliance with the Drinking Water Regulations is based on an assessment of the annual monitoring returns only; and
- If a failure is found during additional operational or investigative monitoring, it must also be notified to the EPA and investigated by Irish Water, but it is not taken into account in the assessment of compliance with the Regulations.

During 2019, Irish Water notified the EPA of 836 individual drinking water quality failures, an increase from 811 in 2018. Table 3 shows the number of public supplies where failures to meet the microbiological or chemical standards were notified to the EPA in 2019, and which parameters failed.

Table 3: Number of public water supplies where failures to meet the microbiological or chemical standards were notified to the EPA in 2019

Parameter	No. of supplies with failures in the annual monitoring returns	No. of additional supplies with operational or investigative failures	Total number of supplies with failures notified
E. coli	7	1	8
Enterococci	2	5	7
Antimony	1	0	1
Bromate	3	0	3
Copper	1	0	1
Fluoride[8]	17	0	0
Lead	Not notified individually, see Section 4 for more details		
Nickel	4	1	5
Nitrate	1	1	2
PAH	1	0	1
Pesticides (individual)	15	12	27
Pesticides (Total)	2	4	6
Tetrachloroethene & Trichloroethene	1	0	1
Trihalomethanes (Total)	30	16	46

Irish Water reported no failures for 1,2-dichloroethane, arsenic, benzene, benzo(a)pyrene, boron, cadmium, chromium, cyanide, mercury, nitrite and selenium in 2019.

[8] For fluoride, one-off failures do not need to be notified to the EPA if the water supply is fluoridated, unless the failures are persistent. They do need to be reported as part of the annual monitoring returns. This is why the number of failures reported in the annual monitoring returns is higher than the number of failures notified to the EPA.

Irish Water consults with Health Service Executive

Irish Water consults with the Health Service Executive early in the investigation into a water quality failure, and the Health Service Executive advises if the failure could impact on consumers' health. The Health Service Executive may advise Irish Water to issue a **boil water notice** or **water restriction notice** on a supply, if it considers that drinking or using the water might endanger consumers' health. If this is the case, Irish Water must inform consumers as quickly as possible. When the cause of the failure is fixed, Irish Water consults the Health Service Executive again and the notice is removed, letting the public know that the water is safe to drink or use again. Notices can apply to all or part of a supply and how long they last will depend on how long it takes to fix the problem. Sometimes, Irish Water will issue a 'precautionary' notice even when no water quality failure has been found, if they are concerned that a problem in the supply *might* cause a failure.

Boil water notices

Placing a boil water notice on a water supply is a measure that is sometimes necessary in order to ensure protection of public health. **During 2019**, 67 boil notices were in place in 16 counties affecting 695,364 consumers (Appendix 3). This is a significant increase compared to 2018, during which 44 boil notices were in place in 14 counties affecting 97,204 consumers. The main reasons for the increase are:

- Two boil notices were placed on the supplies served by Leixlip water treatment plant in October and November 2019, affecting a total of 657,395[9] people; and
- 38 notices were placed on 37 supplies (two on the South Regional supply in Wexford) throughout 2019, following checks by Irish Water which found that these supplies were not being fully disinfected. These notices affected 1,341 people in small areas across the 37 supplies. This issue is discussed further in Section 4.

At the end of 2019, 21 boil notices were in place affecting 14,632 people. This is in comparison to the 10 boil notices affecting 897 people at the end of 2018. The main reason for the increase in the number of people affected is that the Lough Talt supply in Sligo went back on a boil notice in January 2019, having had a previous notice lifted at the end of 2018.

The EPA monitors the progress Irish Water makes to fix the problems at supplies with boil notices and makes sure that the notices are in place for the minimum amount of time. Of the 67 boil notices in 2019 (see Figure 5 and Table 4):

- Eight were short-term notices (less than 30 days' duration), compared with 26 in 2018. These include two notices placed on the supplies served by Leixlip water treatment plant;
- The remaining 59 were in place for longer than 30 days (long term Boil Water Notices);

[9] The first notice in October 2019 affected 615,539 people. For the second notice in November 2019, Irish Water widened the area covered by the notice, and 657,395 people were affected.

- Of the 38 notices placed on supplies which were not being fully disinfected, 23 were in place for more than three months but less than six months;
- Six notices were in place for longer than one year. Of these six:
    - Two notices were lifted in 2019 (Kilconnell, Galway and Kilsellagh, Sligo);
    - One from October 2018 remained in place (Clonmel-Poulavanogue, Tipperary); and
    - The other three have been in place for more than five years. One supply (Scrothea, Waterford) has since had works completed and the notice lifted. Irish Water dispute that they are responsible for the other two supplies. The EPA is pursuing this matter with Irish Water and the relevant local authorities.

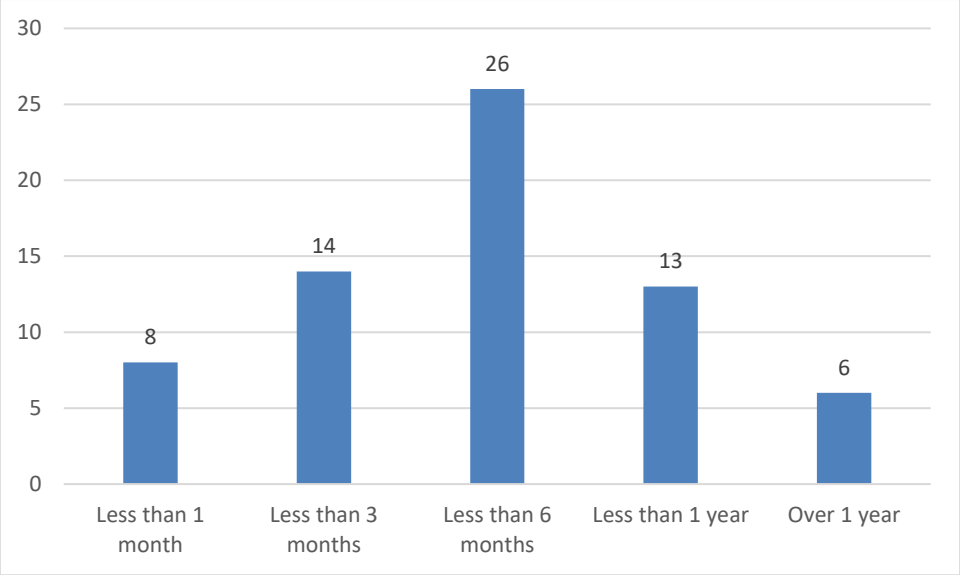

Figure 5: Number of boil notices in place during 2019 and their duration

While there has been a reduction in the number of short-term notices, Irish Water did address the issue of inadequate disinfection at most of the affected supplies in 2019. However, the EPA is concerned at the overall trends shown in Table 4.

Table 4: Trends in Boil Water Notices from 2017 to 2019

Year	Number of notices	Number of long-term notices	Total population affected during year
2017	42	19	21,657
2018	44	18	97,204
2019	67	59	695,364

The main reason for the increase in population affected in 2019 is the boil notices on the Leixlip supply, and the main reason for the increase in the number of notices is the issue around supplies not being fully disinfected. However, the length of time notices are in place has increased. This increase indicates that the measures required to fix the problem are not straightforward or that the infrastructure may have deteriorated over some time.

Preventative maintenance is critically important to ensure that infrastructural issues can be identified and addressed at the earliest possible opportunity to prevent Boil Water Notices becoming necessary to ensure protection of public health.

Water restrictions

A water restriction means that people are advised not to use the water for drinking and are advised to use an alternative source of water, such as bottled water, or tankered water which must be boiled to make it safe before consuming. During 2019, eight water restriction notices were in place in seven counties affecting 9,186 people. This is a decrease from 15 water restrictions affecting 14,613 people during 2018. For example, in Bailieborough, Cavan, elevated levels of manganese in the raw water source and issues at the water treatment plant resulted in 7,785 residents being advised not to consume the water for 11 days.

At the end of 2019, one water restriction notice was in place affecting two people. The supply affected is Ballydermody, Waterford, which has been on a water restriction since 2013 due to high levels of nitrate. Irish Water disputes that it has responsibility for this supply and the EPA is engaging with Irish Water and the Local Authority on this matter.

Whilst the number of water restrictions imposed during 2019 was lower than in 2018, the EPA is concerned to see incidents, such as that at Bailieborough, resulting in water restrictions for consumers on these supplies. An EPA audit at Bailieborough identified significant issues and many contributory factors which led to the need to place a restriction on the supply.

Cryptosporidium and Giardia detections

Cryptosporidium and *Giardia* are parasites that are found in human or animal waste and, if they are present in drinking water, can cause persistent diarrhoea. The Drinking Water Regulations do not explicitly require *Cryptosporidium* or *Giardia* monitoring to be carried out; but because of the risk to health from these parasites, the EPA has requested Irish Water to test for them.

Irish Water is required to assess all water supply sources across the country and determine if there is a risk that the raw water could have *Cryptosporidium* or *Giardia* present. If either parasite might be present in a supply, then appropriate treatment processes (referred to as a 'barrier') must be put in place. C*ryptosporidium* and *Giardia* may be detected in treated water where:

- There is no treatment barrier in place at the water treatment plant;
- The treatment barrier is not being properly operated, controlled or maintained.

When *Cryptosporidium* or *Giardia* detections are reported, the EPA ensures that Irish Water carries out investigations into the cause; takes corrective action; and consults with the Health Service Executive regarding the risk to public health. If the Health Service Executive is concerned that using the water might endanger people's health, Irish Water will issue a boil water notice for the supply.

The EPA may also carry out audits of treatment plants to see if further action is necessary. If the EPA is concerned about a supply not having a treatment barrier or a treatment barrier not performing adequately, it will add that supply to the EPA Remedial Action List. Once a supply is added to the Remedial Action List, Irish Water must provide the EPA with an action plan and prioritise that supply for improvement.

2019 monitoring results

Irish Water detected *Cryptosporidium* or *Giardia* in 23 supplies during the year. *Cryptosporidium* was found in 22 public water supplies in 2019; a decrease from 25 supplies in 2018. *Giardia* was also detected in four of these 22 supplies, plus one other. There has been, however, an overall increase in the number of supplies with *Cryptosporidium* detections since 2015 (Figure 6).

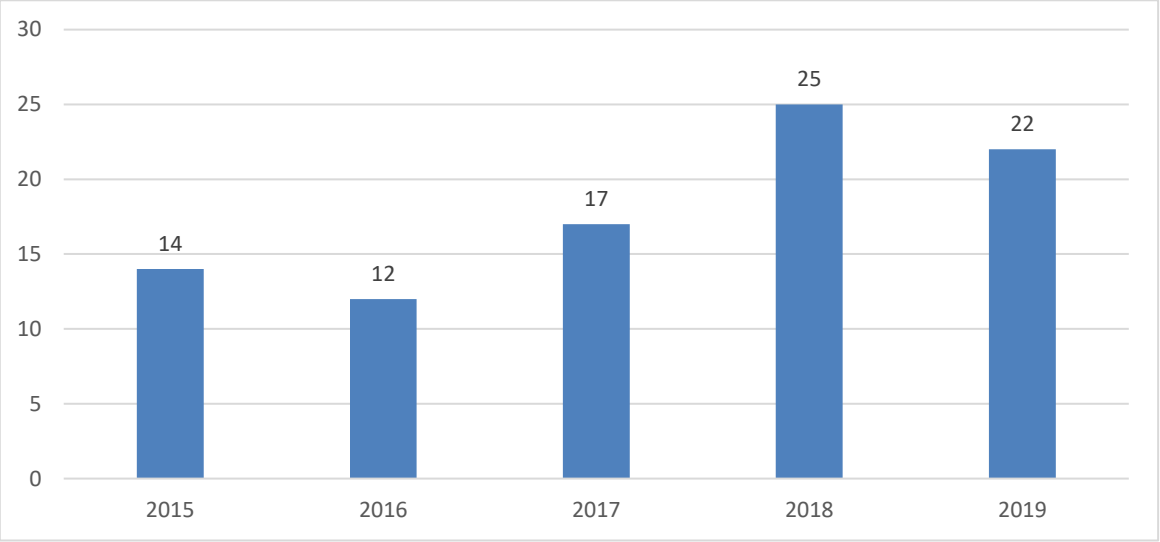

Figure 6: Number of supplies with *Cryptosporidium* detections

At the end of 2019 there were 12 supplies on the Remedial Action List for inadequate treatment for *Cryptosporidium* compared to 15 supplies in 2018, with four water supplies (Leixlip, Lough Talt, Knock Airport, Avoca Ballinaclash) having Boil Water Notices in place during 2019 because of *Cryptosporidium* or *Giardia* detections.

Supplies with no treatment barrier in place

There was no treatment barrier in place at 10 out of the 22 supplies that had *Cryptosporidium* detections in 2019. An adequate treatment barrier has now been installed in seven of the 10 supplies. Three supplies remain without a treatment barrier and are on the EPA's Remedial Action List as a priority for Irish Water to install adequate *Cryptosporidium* treatment as soon as possible.

Table 5 describes Irish Water's progress to install adequate treatment barriers on the three remaining supplies.

Table 5: Supplies on Remedial Action List due to requirement for *Cryptosporidium* barrier

Supply Name	Population affected	Action plan submitted to EPA	Completion date for action plan
Lough Talt, Sligo	12,576	Yes	December 2020
Ballyheigue, Kerry	2,466	No	Irish Water has not provided a date
Clonmel Poulavanogue, Tipperary	2,566	Yes	Irish Water has not provided a date

Irish Water has submitted action plans for all but two supplies on the Remedial Action List for inadequate treatment for *Cryptosporidium*. Ballyheigue in Kerry was added to the Remedial Action List at the end of 2019 and a completion date has not yet been proposed by Irish Water. However, it is not acceptable that Irish Water has not provided a completion date for the Clonmel Poulavanogue supply, given that the supply has been on the Remedial Action List since 2008. Irish Water has failed to prioritise a solution for the consumers on this supply for several years; and has advised the EPA that actions to address the risk from *Cryptosporidium* in this supply will not happen until after 2024. It is unacceptable that Irish Water would continue to delay identifying a solution for this supply.

Supplies where treatment barriers were not being operated, controlled or maintained adequately

Poor operation, control and maintenance of the barrier was the reason for *Cryptosporidium and Giardia* detections on 13 supplies in 2019. The EPA is very concerned to see that a lack of proper management on these supplies is continuing to put consumers' health at risk because of possible breakthrough of these parasites into the treated water.

Operational issues at Leixlip Water Treatment plant meant that the treatment barrier for *Cryptosporidium* was compromised and this led to two boil notices on the supply in 2019.

3 Water quality investigations and enforcement actions

The EPA is the drinking water quality regulator for public water supplies and works to ensure that drinking water supplied by Irish Water meets the standards of the Drinking Water Regulations. Irish Water must notify the EPA of any water quality failures and the EPA then oversees Irish Water's investigation and solution or 'remedial action' in response to the failure. As part of the EPA's role in water quality investigations, any, or all, of the following actions may be taken:

- Audit drinking water supplies;
- Issue legal Directions;
- Take prosecutions in line with the EPA's enforcement policy; and/or
- Put a supply on the EPA Remedial Action List.

Audits

During an audit, the inspector may look at some or all aspects of a supply including protection of the water source; treatment capacity; treatment process; storage; and distribution network. The EPA issues audit reports to Irish Water following each audit, setting out its recommendations, and then publishes the reports on the EPA website[10]. A failure to address audit recommendations means that plants will ultimately fail to operate properly or effectively and may require a boil water notice or water restriction to be imposed. Audit recommendations must be addressed in a timely manner before a serious failure at a plant results in consumers having to boil their water or restrict their use.

In 2019, the EPA carried out 57 audits of public water supplies across 21 local authority areas (Appendix 4). These were a mixture of 24 scheduled (planned) audits, nine campaign audits and 24 reactive audits. The EPA also carried out audits of Irish Water's monitoring programmes in three counties (Galway, Kerry and Limerick).

Scheduled audits are mainly used to check that remedial actions have been carried out, or as spot checks on supplies that have not had any water quality failures. A campaign audit is where an audit is carried out for a particular reason. In 2019, a campaign of audits was carried out to check for progress on works being carried out at supplies on the EPA's Remedial Action List.

Reactive audits are carried out to follow up on water quality failures or incidents notified to the EPA. In cases where a boil water notice or water restriction is in place, the EPA may invite the Health Service Executive to attend a reactive audit to see why the treatment process or infrastructure failed to operate and what technical recommendations are to be met in order to ensure Irish Water can return a safe and secure supply of drinking water to the affected consumers. Some examples of reactive audits are given in the box below.

[10] Available at http://www.epa.ie/water/dw/dwaudits/

Topic Box 2: Examples of Reactive Audits

The EPA carried out an audit at Tallanstown water treatment plant in Co. Louth in August 2019, where water quality issues led to a boil water notice being placed on the supply. The audit found that there was a lack of control over the treatment processes, which meant that the treated water supply was not of satisfactory quality. The EPA issued Directions (legally binding instructions) to Irish Water to prepare and implement an action programme to make sure that consumers were being provided with a safe and secure supply. Irish Water carried out some remedial actions at the treatment plant, and plans to ultimately supply Tallanstown Public Water Supply from the upgraded Cavanhill water treatment plant.

The EPA carried out an audit of the Whitegate Public Water Supply in Cork in December 2019 to investigate operational issues at the water treatment plant which led to a boil water notice being placed on the supply. The treatment process could not deal with prolonged periods of elevated raw water turbidity in the spring source which supplies the treatment plant. This put consumers at risk of receiving inadequately disinfected water. The EPA audit report recommended that Irish Water should take actions to ensure that the treatment processes can deal with the variations in raw water quality. Following the audit, the EPA issued a Direction to Irish Water requiring the installation and commissioning of a suitable coagulation dosing system prior to the filtration stage.

Directions

The EPA may issue a Direction (a legally binding instruction) to Irish Water under the Drinking Water Regulations where there is a risk to human health or where action is required to fix an issue with a supply. Examples of situations where the EPA has issued Directions include the following:

- There is no chlorine monitor or alarm in place;
- There have been persistent water quality failures and Irish Water has not acted or not acted quickly enough to improve water quality;
- Irish Water has not provided information to the EPA when asked for it.

The EPA issued 20 Directions to Irish Water during 2019, compared to six in 2018 (Appendix 5). One reason for the increase in the number of Directions was a series of six Directions covering 40 supplies, due to issues with supplies not being fully disinfected:

- One Direction covering 34 supplies across Kilkenny, Tipperary, Waterford, Wexford (see Appendix 5 Table 3).
- One Direction covering two supplies (Ballindaggin and South Regional (Horeswood)[12], Wexford);
- One Direction covering three supplies (Longwood and Slane, Meath; South Regional (Taylorstown), Wexford[12]); and

- Three Directions covering one supply each (Ballivor and Enfield, Meath; South Regional (Taylorstown), Wexford[11]).

This issue is dealt with in more detail in Section 4 and Appendix 5.

Fourteen Directions were issued for other reasons (Appendix 5):

- For three supplies (Swanlinbar, Cavan; Tallanstown, Louth; Avoca Ballinaclash, Wicklow), a Direction was issued first requiring Irish Water to provide an action programme, with a subsequent Direction requiring implementation of that action programme. This resulted in the issue of six Directions for the three supplies. In each case, issues at the treatment plant gave rise to the need for a boil notice or water restriction. The EPA then audited the supply and issued Directions to ensure that the issues were addressed by Irish Water;
- Two Directions were issued for persistent trihalomethane failures (West Clare and Kilkenny City (Radestown)) where the timeframe in which Irish Water proposes to deal with the failures continues to be delayed;
- One direction was issued for persistent pesticide failures (Newport, Co. Mayo).

The other five Directions were issued for a variety of reasons, for example, Whitegate supply in Cork was placed on a boil water notice in November 2019, audited in early December 2019 and subsequently had a Direction issued.

Excluding the Directions dealing with inadequate disinfection, there was an increase from six Directions issued in 2018 to 14 in 2019. The increase in the number of Directions issued during 2019 reflects an escalation in enforcement action by the EPA. This is in response to the number of water quality incidents that occurred during 2019 and also to ensure that action is taken in a timely manner to address issues identified in supplies. Some issues need to be addressed quickly in order to protect public health.

The EPA also monitored progress on fourteen Directions issued prior to 2019 (see Appendix 5 Table 4). The status of these Directions at the end of 2019 were as follows:

- In two cases, Irish Water fully complied with the Direction;
- In two cases, Irish Water was prosecuted for failure to comply with the Direction;
- In five cases, Irish Water had not complied with the deadline; but the EPA did not take enforcement action as it was confirmed that the necessary works were either progressing or were completed at a later date;
- In four cases, the date specified in the direction had not yet been reached;
- In one case (Longford Central), the compliance date was 31/12/2019. There is no evidence of non-compliance in the Longford Central supply to date in 2020.

[11] South Regional (Taylorstown) received two Directions: the first requiring Irish Water to provide an action programme, the subsequent Direction requiring implementation of that action programme. Horeswood and Taylorstown are both part of the South Regional supply. A total of three Directions required action at this supply.

Prosecutions

The EPA may take a prosecution against Irish Water where it is considered that a Direction has not been complied with. During 2019, the EPA initiated proceedings against Irish Water for failure to comply with a Direction to ensure that the drinking water supplied to consumers complied with the trihalomethanes standard in the Kealkill and Drimoleague public water supplies in Cork. Irish Water pleaded guilty and was convicted. Fines of €1,000 for each supply were imposed, and costs were also awarded to the EPA.

Remedial Action List

The Remedial Action List is a register of public water supplies in need of significant corrective action, usually at the treatment plant. The EPA has identified the preparation and completion of action programmes for listed supplies as one of the priority actions required to protect our drinking water. The EPA updates the Remedial Action List every three months. When Irish Water has shown that the issue has been fixed, a supply can be removed from the Remedial Action List.

Public water supplies are added to the list for one or more of the following reasons:

- Persistent failure to comply with the standards for priority parameters: *E. coli*, trihalomethanes, pesticides, aluminium or turbidity;
- Inadequate treatment, for example, where there is no treatment other than chlorination for a surface water supply;
- Monitoring results or compliance checks by the EPA indicate a lack of operational control at the supply's treatment plant;
- The Health Service Executive identifies a supply where improvements are required.

Progress with Remedial Action List

The first Remedial Action List in 2008 identified 339 public water supplies (representing 36% of public water supplies at that time) that required remedial action. The number of supplies on the list is steadily decreasing every year. The situation at the end of 2019 is summarised as follows:

- 52 supplies (supplying water to 1,128,847 consumers) were on the Remedial Action List at the end of 2019 (Table 6)[12];
- 15 supplies supplying water to 701,966 people, were added to the list in 2019 (Table 7). These supplies were added for persistent pesticide problems, inadequate treatment for *Cryptosporidium,* failure to meet the trihalomethane standard, or persistent nitrate;
- Of the 15 supplies added, Leixlip accounted for over 650,000 of the people affected;

[12] Leixlip water treatment plant supplies the following 8 water supply zones: Fingal Zone 1, Fingal Zone 3, Leixlip Regional (Kildare), DCC Zone 3, DCC Zone 4, DCC Zone 5, SDCC Zone 4 and Dunboyne (Meath). These have been treated as one supply for the purposes of Remedial Action List reporting.

- 26 supplies serving 134,434 people had remedial works completed in 2019 and were removed from the Remedial Action List;
- 312 (92%) of the original 339 supplies had been removed from the Remedial Action List by the end of 2019 (Figure 7). 27 remained on the list;
- Over the period 2008 to 2019, 167 supplies were added to the original list. Of these, 142 had been removed, and 25 remained on the list at the end of 2019.

Table 6: The reasons why supplies were on the Remedial Action List at the end of 2019

Reasons why supplies were on the Remedial Action List at the end of 2019			
12 for microbiological issues (*E. coli* or *Cryptosporidium*)	**31** for chemical issues (trihalomethanes or pesticides)	**6** for indicator issues (aluminium or turbidity)	**18** for other reasons (such as management issues at the plant)
Some supplies are on the **Remedial Action List** for more than one reason.			

Table 7: The reasons why supplies were added to the Remedial Action List in 2019

Reasons why supplies were added to the Remedial Action List in 2019			
3 for microbiological issues (*E. coli* or Cryptosporidium)	**3** for chemical issues (trihalomethanes or pesticides)	**5** for indicator issues (aluminium or turbidity)	**8** for other reasons (such as management issues at the plant)
Some supplies are on the **Remedial Action List** for more than one reason.			

While 26 supplies were removed, issues continue to be identified which need to be addressed by Irish Water and this has resulted in 15 supplies being added (Table 7). 27 of the original 339 supplies remained on the list at the end of 2019.

Figure 8 shows the expected completion progress for the supplies which were on the Remedial Action List at the end of 2019. Appendix 6 lists the supplies on the Remedial Action List along with anticipated completion dates provided by Irish Water in December 2019.

Irish Water submits progress reports to the EPA every three months and the EPA publishes a Remedial Action List update on the EPA website[13].

[13] http://www.epa.ie/pubs/reports/water/drinking/.

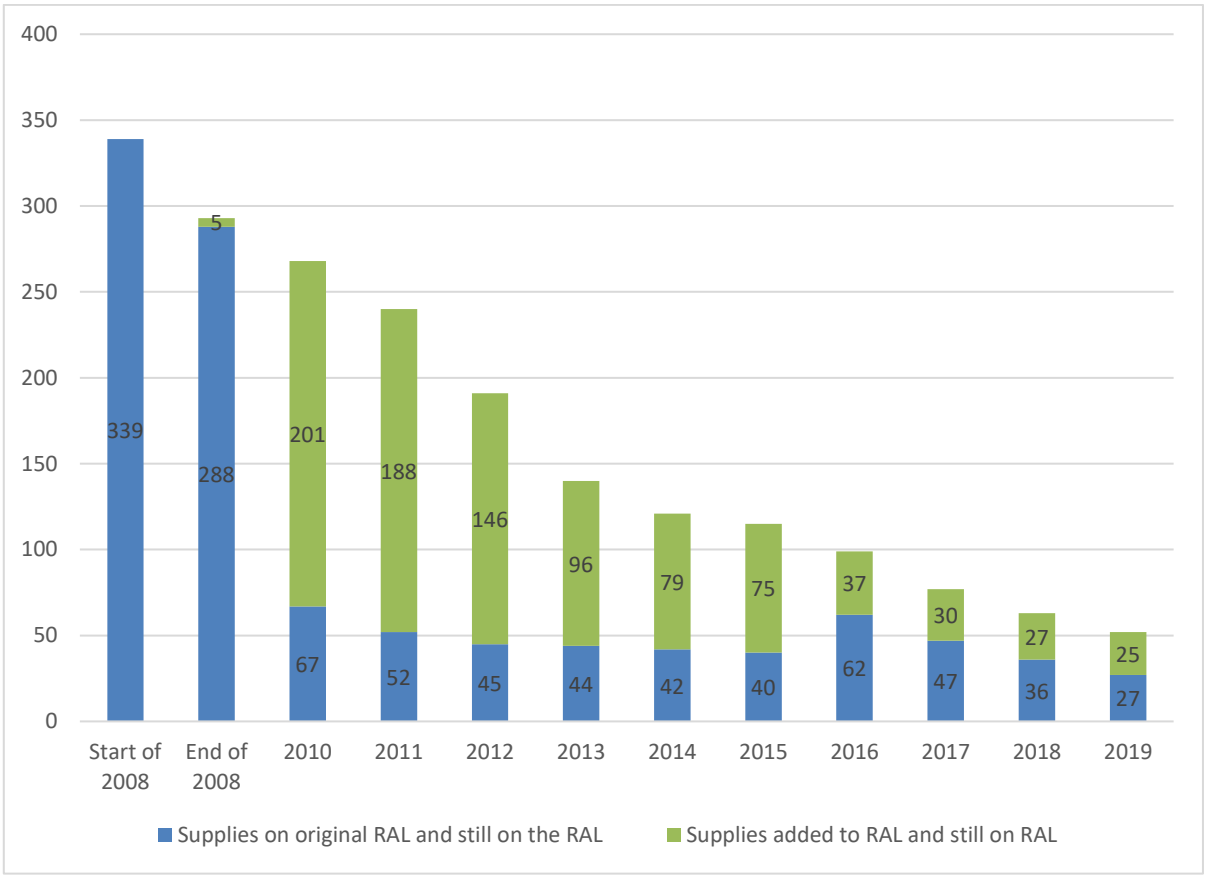

Figure 7: Number of supplies on the Remedial Action List at the end of each year

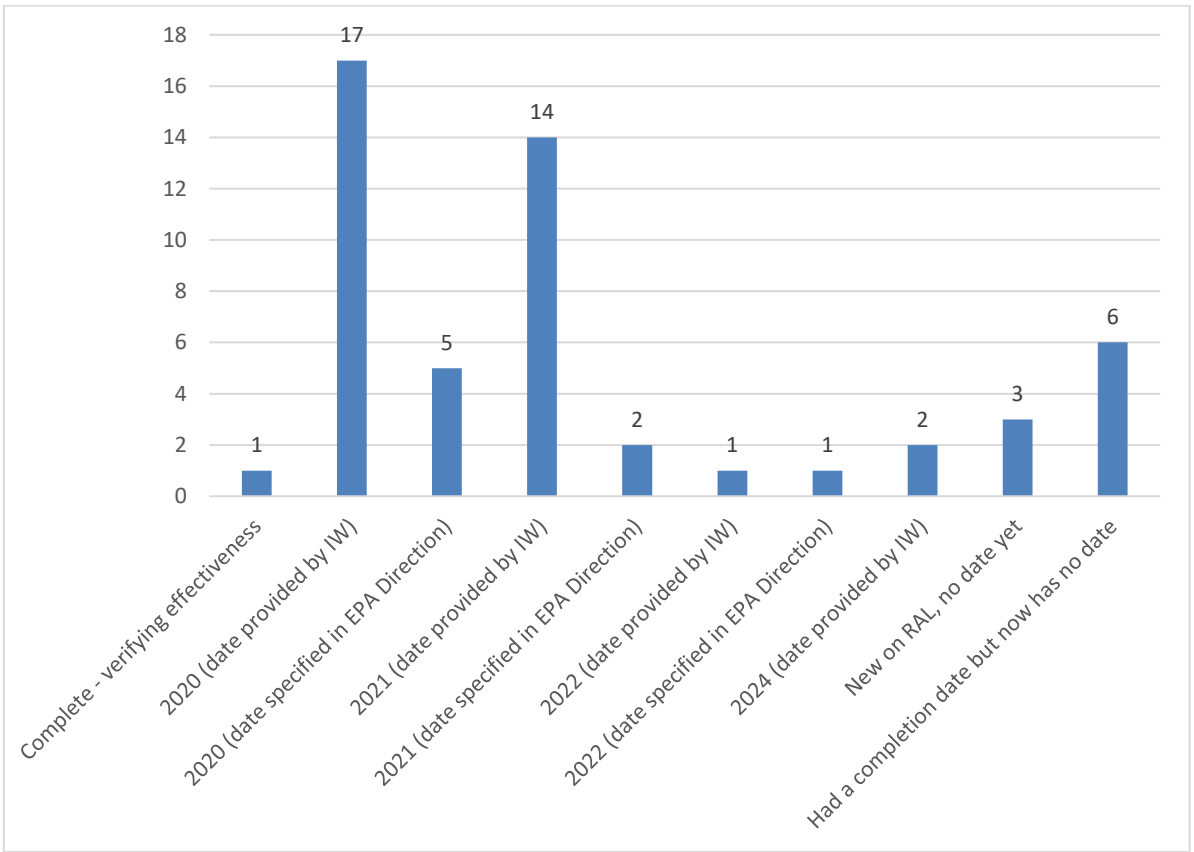

Figure 8: Completion progress for supplies on Remedial Action List at end of 2019

Discussion

In 2019, 26 supplies were removed from the Remedial Action List, but 15 were added. In addition, the population affected has increased from 555,689 at the end of 2018 to 1,128,847 at the end of 2019. While the overall trend in the number of supplies on the Remedial Action List is moving in the right direction, the need for significant corrective action continues to be identified at supplies, year after year.

The EPA is seriously concerned at the delays in the completion of works. At the end of 2018, all supplies had completion dates no later than 2021. At the end of 2019, this situation had changed significantly with completion dates in 2024 and beyond (Figure 8). Irish Water also state they cannot commit to completion dates for some of these supplies, due to funding to deliver the required action programmes not being available before the end of 2024. The EPA is assessing Irish Water's revised timeframes, and in certain circumstances is directing Irish Water to complete works in shorter timeframes.

The EPA is also concerned with Irish Water's failure to put in place an action programme with a defined timeframe for all supplies on the Remedial Action List. Some of the supplies on this list have had multiple solutions proposed by Irish Water, which ultimately do not work or get delayed. The EPA will continue to regulate Irish Water to ensure those supplies are addressed in a timely manner, which may include enforcement action and prosecution.

Topic Box 3: Audits and enforcement actions at Leixlip Water Treatment Plant

Leixlip water treatment plant is the second largest plant in Ireland, supplying drinking water to over 600,000 consumers in Dublin, Kildare & Meath[14]. Fingal County Council operates Leixlip plant under an agreement with Irish Water. Water is abstracted from the River Liffey and treated in three production zones before being combined and supplied to consumers via the distribution network.

There were three separate incidents at Leixlip water treatment plant in 2019. In March, a treatment chemical dosing pump failed. In October, a blockage occurred in a chemical dosing line. In November, very heavy rain led to a significant deterioration in quality of the water coming from the Liffey, and the treatment plant was unable to cope. For four days in October and nine in November, consumers were asked to boil their water because it could not be guaranteed that the water was being fully treated.

The EPA audited Leixlip water treatment plant in response to each incident, accompanied by staff from the Health Service Executive. During the October audit, the EPA was informed that some of the March audit recommendations had not been completed. This meant that the plant did not automatically shut down when the October incident occurred.

These incidents highlighted serious issues at Leixlip water treatment plant. While corrective actions were taken to deal with the incidents, the EPA added Leixlip water treatment plant to the Remedial Action List in November 2019 to ensure that further actions are taken to prevent the recurrence of such incidents and ensure that the supply is secure.

The main actions required are: installation of a pH correction system to optimise the treatment process; upgrade of filters; installation of ultraviolet disinfection as an additional treatment process; and replacement of lamella plates in the clarifiers. Since the incidents, Irish Water has reduced water production at the plant to allow for timely delivery of the filter upgrade works.

The EPA and Health Service Executive continue to closely monitor the performance of Leixlip water treatment plant, and the progress of actions being undertaken to improve the safety and security of the supply. The filter upgrade works on the older parts of the plant were due to be complete by the end of June 2020 with UV disinfection due to be operational by the end of September 2020 on the older plant. The EPA expects some delays will have occurred due to COVID-19 restrictions and will be engaging with Irish Water to ensure these are resolved in a timely manner.

[14] Leixlip water treatment plant supplies the following eight water supply zones: Fingal Zone 1, Fingal Zone 3, Leixlip Regional (Kildare), DCC Zone 3, DCC Zone 4, DCC Zone 5, SDCC Zone 4 and Dunboyne (Meath). These have been treated as one supply for the purposes of reporting and enforcement.

4 Priority Issues

The EPA's primary focus is on overseeing Irish Water's actions following water quality failures, but Irish Water also need to take actions to prevent water quality failures from happening in the first place. The EPA has identified priority issues affecting drinking water quality; and has recommended that Irish Water takes a strategic approach to these issues with the aim of preventing water quality failures. Irish Water, as a national utility, can implement programmes to take consistent action on these issues on a national level. The priority issues for drinking water are:

- Disinfection;
- Disinfection by-products (trihalomethanes);
- Lead;
- Pesticides;
- Drinking Water Safety Plans.

While the Remedial Action List addresses a number of these issues this section provides an overview of them individually.

Disinfection

Disinfection is the most important step of the water treatment process. It makes our water supplies safe from bacteria, viruses and parasites, such as *E. coli* and *Cryptosporidium*, which can cause illness. Disinfection is carried out using ultra-violet (UV) light and/or chlorine to kill or inactivate disease-causing microbes. Chlorine in the form of chlorine gas or hypochlorite is dosed into the water at the treatment plant or booster station. It then needs time (known as contact time) in the water to fully kill any bacteria or viruses, before it reaches the first consumer on the distribution network. Where UV disinfection is not in place, the effective chlorine contact time required to ensure adequate disinfection is 15 mg.min/l. If the contact time is inadequate, there is a risk that the water is not fully disinfected.

National Disinfection Strategy and Programme

In 2016, Irish Water prepared a National Disinfection Strategy to address deficiencies in the disinfection of public water supplies. The Strategy outlines the standard specifications for disinfection systems that should be in place in all sites, that is, at water treatment plants or other locations such as chlorine booster stations. The Strategy was accompanied by a National Disinfection Programme[15]. The Programme is split over two phases:

- **Phase 1 - Site Assessment:** Irish Water assesses the condition and performance of the existing disinfection systems at sites across the country. This determines the improvements needed, such as chemical storage and dosing; UV disinfection systems (Figure 9); and monitoring and alarm systems to ensure that the site disinfection process meets the requirements.
- **Phase 2 – Site Upgrade Works:** Irish Water carries out the works identified in Phase 1.

[15] Available at https://www.water.ie/projects-plans/national-projects/national-disinfection-programme/

Figure 9: UV disinfection system

There are 864 sites in the programme. At the end of 2019, Irish Water had assessed 811 sites and the progress on completing the site surveys means Irish Water now has enough information to allow them to identify which sites are the greatest priority.

Upgrade works were completed at 230 sites, with work begun on an additional 35 sites. Irish Water has advised that it has prioritised other high-risk sites and an additional 17 sites will be completed in 2020.

Irish Water has stated however that the forecasted completion date of the programme has been extended from June 2020 to 2022. There have also been delays in completion dates for some sites. Irish Water states that reasons for those delays include:

- Priority given to addressing inadequate contact time issues;
- Scope of works increased;
- Delays with contractor mobilisation and lack of experienced personnel;
- Delays in accessing key equipment.

The EPA is monitoring Irish Water's progress in delivering this programme, including how those high-risk sites will be identified and prioritised during 2020 and how remaining sites will be identified and scheduled for works from 2020 to 2022 (Figure 10). It is critical that Irish Water ensures the delivery of the disinfection programme is not delayed further. It is also important, where works have been undertaken, that Irish Water ensures these works are fully commissioned without delay.

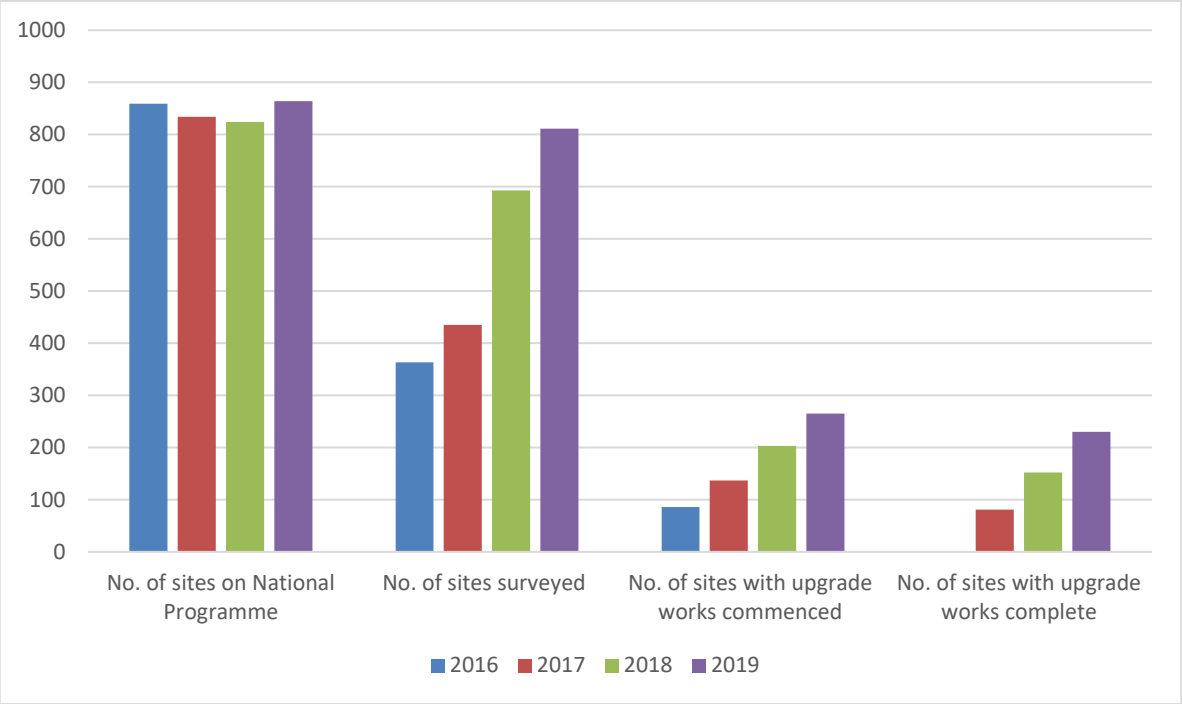

Figure 10: Progress made at sites under the National Disinfection Programme by the end of 2016, 2017, 2018 and 2019.

Irish Water provides updates to the EPA every three months on progress with the implementation of the National Disinfection Programme. National Disinfection Programme updates for 2019 provided by Irish Water state that:

- Site assessments were concentrated in counties Tipperary, Cork, Laois, Offaly, Louth and Meath;
- Upgrade works were concentrated in Carlow, Kilkenny, Wexford, Kildare, Longford, Louth, Meath, Mayo, Sligo, Tipperary and Limerick;
- The remaining sites requiring assessments and upgrade works are concentrated in counties Cavan, Monaghan, Leitrim, Dublin, Laois, Offaly, Louth, Meath, Tipperary, Limerick, and Cork.

Assessment of 2019 monitoring results

If disinfection is not adequate, it can lead to bacteria or parasites being present in a water supply. The EPA reviewed the monitoring results submitted by Irish Water in 2019 and found:

- The number of supplies with *E. coli* failures reported to the EPA decreased to eight, compared with 12 in 2018. The eight supplies consist of seven supplies with failures under the annual monitoring returns, two of which also had subsequent failures during investigation of the issue, and one supply with a failure under investigative monitoring;
- Irish Water reported that disinfection was not working correctly at one of the seven supplies with *E. coli* failures in 2019, a decrease from four in 2018;

- There were seven supplies with *Enterococci* failures in 2019, up from six in 2018. One was due to disinfection not working correctly, and the cause for the rest was either unknown or due to tap contamination;
- Irish Water reported detecting *Cryptosporidium* in 22 public water supplies. This is a decrease from 25 supplies in 2019. *Giardia* was detected in five public supplies (four of which are also included in the list of 22 supplies with *Cryptosporidium* failures), down from 10 in 2018.

Whilst these monitoring results indicate a slight improvement for *E.coli*, *Cryptosporidium* and *Giardia* failures, there is little room for complacency. The pace of investment by Irish Water to address supplies which are vulnerable to risk of breakthrough of parasites such as *Cryptosporidium* has been too slow.

Inadequate disinfection issue

In earlier sections on Boil Water Notices and Directions, the issue of sites where inadequate disinfection was in place was discussed. This issue first arose during 2018, following an EPA audit in Co. Waterford, after which Irish Water undertook a further assessment of chlorine contact times at a number of water treatment plants in Co. Waterford and found that there was a significant number of supplies where the chlorine contact time was inadequate, that is, less than 15 mg.min/l. This meant that the water was not fully disinfected. These supplies had already been assessed under the Disinfection Programme using a standardised approach to calculating contact time, but it was found that a more robust assessment was required.

Irish Water expanded the assessment and found that there was inadequate chlorine contact time in parts of 41 supplies across counties Kilkenny, Meath, Tipperary, Waterford, Wexford and Cork. Following consultation with the Health Service Executive by Irish Water, 37 of the 41 supplies were issued with a **boil water notice or a dual advisory notice** in 2019. A boil notice instructs a consumer to boil and cool their water before consuming it. A dual advisory notice also gives the consumer the option to draw water from a tap and leave it stand (for example, in a jug) for 30 minutes to allow the chlorine to have sufficient time to complete the disinfection process. Of the 39 supplies issued with notices before 2020 (two more had been issued in 2018), 30 notices had been lifted by the end of 2019 following completion of works on these supplies and consultation with the Health Service Executive to ensure the risk to public health had been addressed. Ten notices (including two on the South Regional supply in Wexford) were still in place at the end of the year.

The EPA issued six **Directions** to Irish Water on 40 supplies in 2019, requiring works at the supplies to ensure that the contact time was adequate (Appendix 5 Tables 2 and 3):

- One Direction covering 34 supplies across Kilkenny, Tipperary, Waterford, Wexford (Appendix 5 Table 3) – of these, 32 were completed in 2019 and remaining two were completed in early 2020 [16];

[16] Kilgobnet, Waterford and Kilmyshall, Wexford.

- Of the other six supplies:
    - One supply had works completed (Ballindaggin in Wexford);
    - Four supplies in Meath did not have works completed, but were underway or plans were in place to commence (Ballivor, Enfield, Longwood, Slane);
    - One supply (South Regional, Wexford) had two locations affected:
        - Taylorstown – deadline had not yet been reached;
        - Horeswood – works were underway;

More detail on the notices and Directions can be found in Sections 2 and 3, and Appendix 3 and 5.

Conclusion

The National Disinfection Programme is of fundamental importance in identifying and addressing issues with disinfection in water supplies.

Irish Water need to review all counties previously assessed under the Disinfection Programme and identify any remaining sites that have not undergone robust technical assessment of contact time. This further assessment is necessary to ensure that there is no risk to public health due to inadequately disinfected water.

The disinfection programme assesses the risk for hazards that could affect disinfection during the treatment process. It is very important that Irish Water continues to undertake improvements to disinfection systems across the country to ensure that the quality of drinking water is safeguarded. At sites where disinfection upgrades are completed, Irish Water should ensure those works are commissioned as quickly as possible.

Disinfection by-products (Trihalomethanes)

Trihalomethanes form when natural organic matter in the water source, such as rotting vegetation, reacts with chlorine used in the disinfection treatment process. The standard for trihalomethanes in drinking water is 100 µg/l. This is a problem in Ireland because we get most of our drinking water from surface water (see Figure 11), that is rivers and lakes, which have more natural organic matter than in groundwater. The challenge for Irish Water is to minimise the amount of trihalomethanes in drinking water, while still ensuring that disinfection is effective.

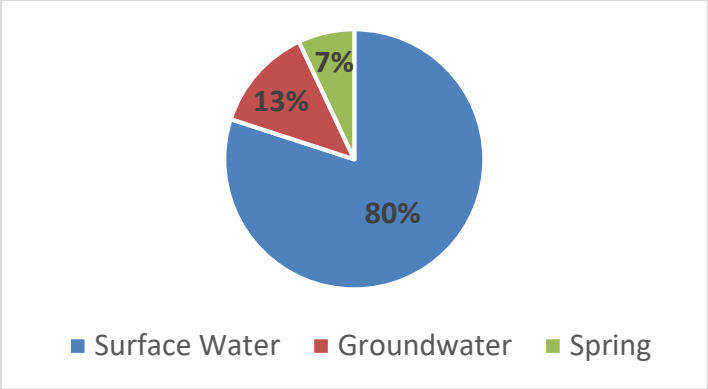

Figure 11: Breakdown of drinking water sources in Ireland

The European Commission started infringement proceedings against Ireland in 2015 for failure to comply with the trihalomethanes (THM) standard in the Drinking Water Directive[17]. In 2018, the European Commission progressed its action and issued a letter of formal notice to Ireland for failing to comply with the THM standard in 73 public water supplies and 24 group water schemes. The Department of Housing, Planning and Local Government responded to the letter advising on Ireland's actions to achieve THM compliance. In May 2020, the Commission progressed its action further and issued a Reasoned Opinion that it considers that Ireland has failed to take the measures necessary to ensure THM compliance in 31 public water supplies and 13 private group water schemes (listed in the Annex to the Reasoned Opinion). The Department of Housing, Planning and Local Government will be responding to the Commission later in 2020.

Progress in 2019

In 2019, 46 supplies across 20 counties failed to meet the standard for THM at one or more times during the year. This compares to 73 supplies in 2017 and 54 supplies in 2018, with the number of supplies affected steadily decreasing. There have been significant reductions in some counties in the number of supplies with THM failures in the last few years; the greatest improvements have been seen in:

- Donegal, which had two supplies affected in 2019, down from 14 in 2017; and
- Kerry, which had four supplies affected in 2019 compared with 19 in 2016.

[17] Reference 7554/2015/ENVI

Of these 46 supplies, 30 had failures during annual monitoring and an additional 16 supplies had failures under operational or investigative monitoring. The county with the greatest number of supplies affected in 2019 is Cork, with 10 supplies. One supply in Kerry, Cahirciveen, had THM failures for the first time as a result of the breakdown of ozonation equipment at the treatment plant.

25 supplies serving 271,238 people were on the EPA Remedial Action List for persistent THM issues at the end of 2019, compared with 42 supplies serving 309,884 people at the end of 2018. This reduction in supplies with persistent THM issues reflects the investment by Irish Water in upgrading water treatment plants. The positive outcome of those works means that THM levels were reduced in 17 supplies serving 38,646 people during 2019 and these supplies are now in compliance with the requirements of the Drinking Water regulations.

The EPA requires Irish Water to develop an action programme for all supplies on the Remedial Action List for persistent THM issues. The action programme outlines any measures or treatment process upgrades that Irish Water is putting in place to achieve compliance with the THM standard, without compromising disinfection. At the end of 2019, Irish Water provided timeframes for action programmes for the 25 supplies on the Remedial Action List for THM issues as follows (Figure 12):

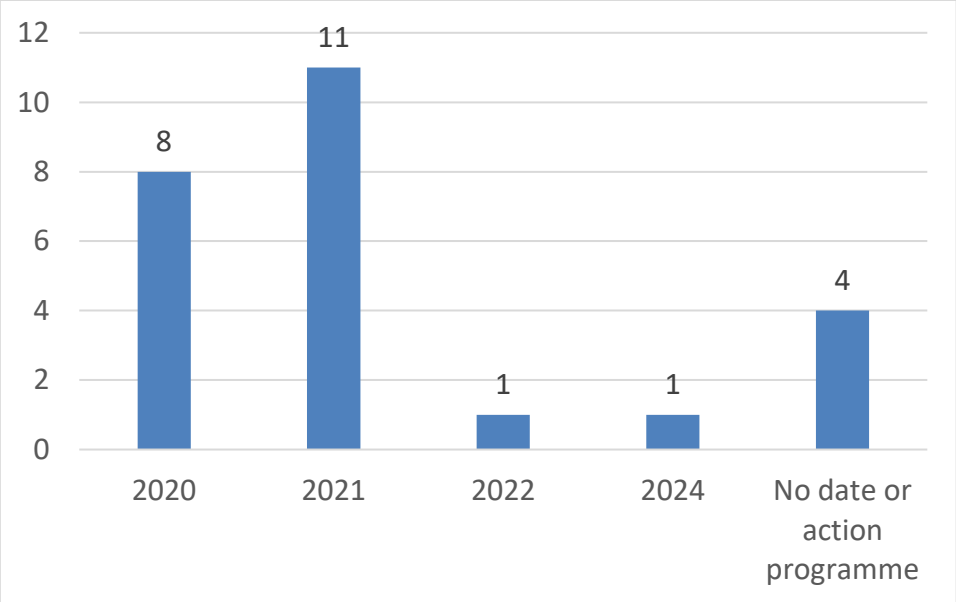

Figure 12: Trihalomethanes supplies on Remedial Action List – completion dates at end of 2019

Four supplies had no completion date at the end of 2019. These are Glengarrif in Cork, Glenties-Ardara in Donegal, Cahirciveen in Kerry, and Drumcondrath in Meath.

In other cases, there have been significant delays in delivering solutions for supplies on the Remedial Action List for persistent THM issues. One example is the Kilkenny City (Radestown) public water supply which has been on the Remedial Action List since 2008 due to elevated trihalomethanes. Interim works were completed to optimise disinfection but were unsuccessful in achieving THM compliance. Irish Water's long-term action programme is to abandon the source of the Radestown supply and replace it with Kilkenny City (Troyswood) public water supply

instead. However, there have been significant delays in the planned completion date for this action programme. Meanwhile there are ongoing persistent THM failures in this supply. As a result, the EPA issued a Direction to Irish Water in November 2019, which requires compliance with the THM standard in this supply by 30th June 2022.

Another example is West Clare (New Water Treatment Plant) public supply. This supply was added to the Remedial Action List in October 2017 as a result of persistent THM issues. There have been continual delays to the planned completion date for upgrade works to the existing plant. Meanwhile there are ongoing and widespread THMs failures in this supply. As a result, the EPA issued a Direction to Irish Water in November 2019, which requires compliance with the THMs standard in this supply by 31st December 2021.

As stated in the Remedial Action List section, it is critical that Irish Water identify and undertake the remedial works necessary within a concrete timeframe. It is unacceptable that Irish Water continues to report that works on these sites have slipped from previously committed dates, or that no completion date is specified. These supplies must be prioritised by Irish Water for investment.

Lead

Lead is found in drinking water when it dissolves from lead pipework, mains connections and plumbing fittings. Lead is very harmful to the development of the nervous system and can cause long-term health damage. Although a limit of 10 ug/l is placed on drinking water supplies, the health advice from the Health Service Executive and from the World Health Organisation is that there is no safe level of lead. Even a short length of lead pipework within a house, or plumbing fittings containing lead, may affect the health of people drinking the water.

The water leaving a water treatment plant does not contain levels of lead in excess of the limit, so a failure to meet the standard is linked to the lead pipework in the distribution network or in the plumbing of a particular building and not to the water supply. Lead plumbing is predominantly found in buildings constructed up to or during the 1970s, so these are at most risk of having high levels of lead, unless the plumbing has been replaced.

The Irish Government published a National Lead Strategy[18] in June 2015. The strategy sets out actions to reduce people's exposure to lead from drinking water, and these actions are reported on by the Department of Housing, Planning and Local Government. The strategy reflects the fact that Lead in drinking water is both the responsibility of water suppliers and property owners (Figure 13). Irish Water is responsible for lead pipework in the public water distribution network. This is known as public-side lead. Property owners are responsible for the removal of lead plumbing in their buildings and inside their property boundary. This is known as private-side lead.

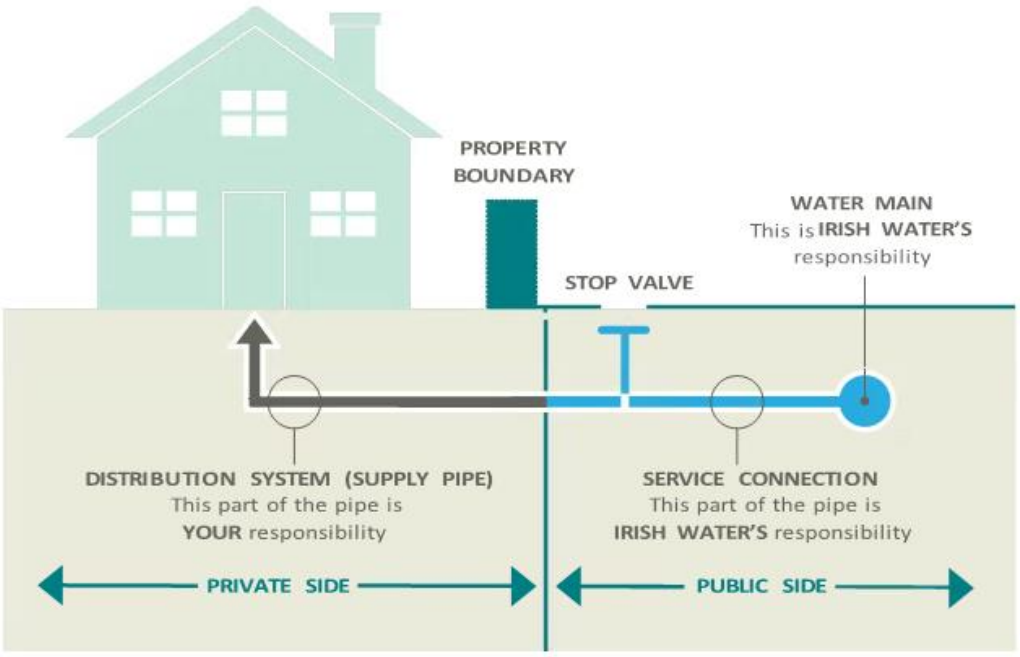

Figure 13: Responsibility for water distribution systems

[18]Available at http://www.housing.gov.ie/sites/default/files/migrated-files/en/Publications/Environment/Water/FileDownLoad%2C41733%2Cen.pdf

In May 2017 Irish Water published its Lead in Drinking Water Mitigation Plan[19] which sets out what Irish Water is going to do to achieve the removal of all public side lead pipework by 2026. Irish Water estimated that there were 180,000 lead service connections:

- 140,000 are service connections from water mains which run under the roads; and
- 40,000 are backyard service connections, where lead pipes serve several houses.

Actions carried out in 2019

- Monitoring of public supplies was carried out by Irish Water and failures to meet the lead standard were found in 21 public water supplies;
- Over 15,000 lead connections were replaced by Irish Water, exceeding its target of 9,000;
- Irish Water continued to send information leaflets to consumers when lead issues were identified through sampling. This includes advice on actions that can be taken by the property owner to reduce their exposure to lead;
- Irish Water has reported on a collaborative approach with Dublin City Council on the refurbishment of Council-owned housing stock. 125 houses due for refurbishment had lead plumbing lined with a pipe-lining system to prevent the lead from dissolving into drinking water. This approach could be replicated by other local authorities;
- Irish Water continued to assess supplies with high levels of lead to see if ortho-phosphate[20] dosing could be used, without creating a risk to the environment. Some of these supplies have had facilities installed to allow dosing, however, no new dosing was commenced during 2019. Irish Water had previously committed to introducing ortho-phosphate dosing at 10 sites by the end of 2019, and whilst the dosing facilities were installed in these sites during 2019, the orthophosphate dosing was not switched on.

Assessment of progress in reduction of risk from lead

National Lead Strategy

The Department of Housing, Planning and Local Government oversees the progress of the National Lead Strategy. This strategy is focused on the many public buildings such as schools and hospitals, and State-owned buildings such as local authority housing, that may have lead pipework. The full extent of this is still unknown and there are no comprehensive plans to carry out replacement works. The Department of Housing, Planning and Local Government has not yet published a report on progress with the National Lead Strategy, so the number and location of buildings affected; the number of people exposed; and plans to remove lead from buildings are not yet known. The Department needs to take a more active role in ensuring that the strategy is implemented as people continue to be exposed to lead in their drinking water in their homes or workplaces.

[19] Available at https://www.water.ie/projects-plans/our-plans/lead-mitigation-plan/
[20] Ortho-phosphate dosing can create a lining that limits the amount of lead solubilising off the pipe surface.

Irish Water Lead in Drinking Water Mitigation Plan

Irish Water increased the lead connection replacement rate in 2018 and 2019 and progress to date on mains and backyard connection lead pipework replacement is shown in Figure 14a and 14b.

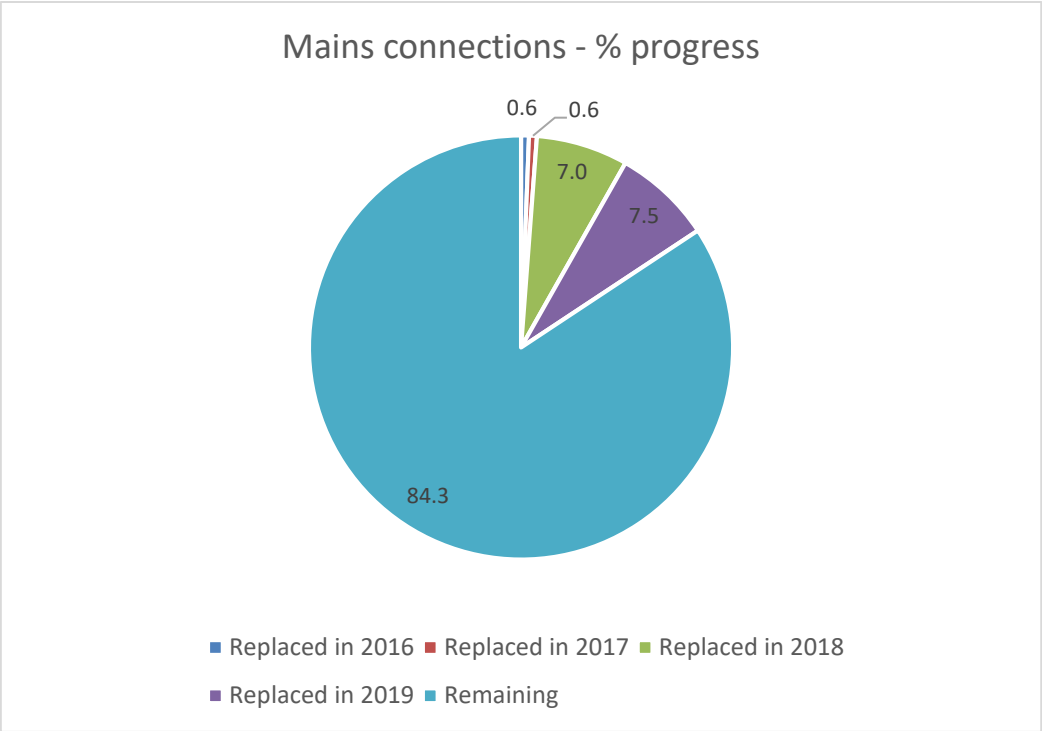

Figure 14a: Number of mains lead connections replaced in 2016, 2017, 2018 and 2019 as a percentage of the total to be replaced

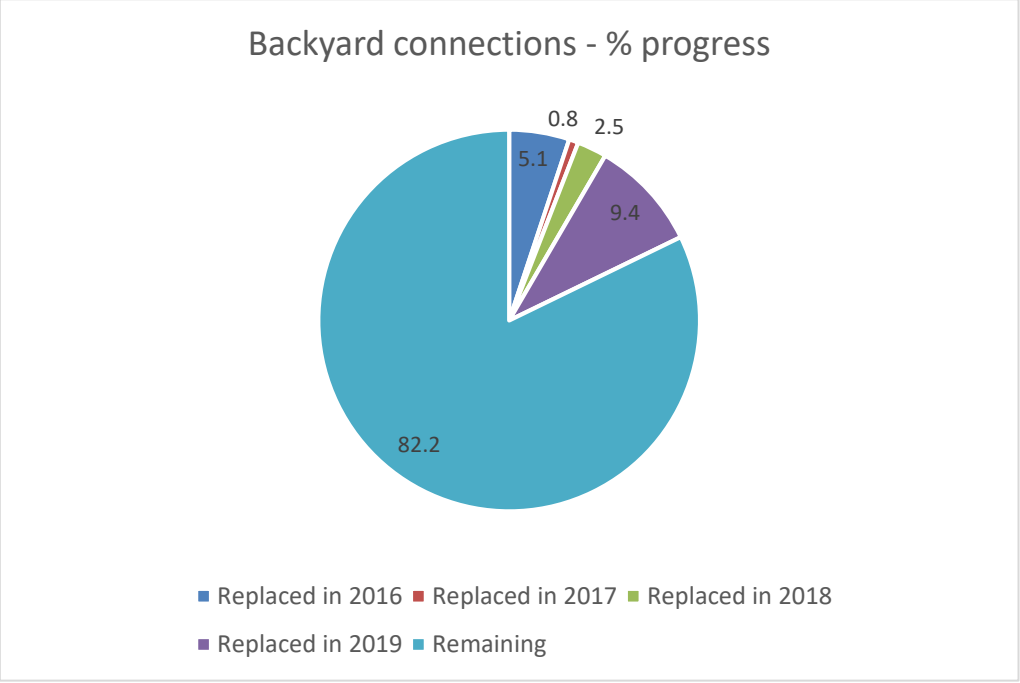

Figure 14b: Number of backyard lead connections replaced in 2016, 2017, 2018 and 2019 as a percentage of the total to be replaced

By the end of 2019, 17% of all public side lead connections had been replaced. Irish Water has now substantially reduced the previously set targets for the period 2020-2024 with a 90% reduction in its target for replacements in 2020 compared with 2019. For the five-year period 2020-2024, Irish Water now plans to replace only 7% of remaining public side lead connections[21]. This indicates that Irish Water is highly unlikely to be able to meet its previous commitment in the Lead in Drinking Water Mitigation Plan to remove all public side lead pipework by 2026.

Actions required

The EPA is very concerned that the yearly target for public side lead replaced by Irish Water is decreasing. It is not acceptable that these works, which would reduce people's exposure to lead in drinking water and deliver such an important public health outcome, are being delayed, and that the level of replacement of lead connections has been reduced for the next five years. Irish Water needs to intensify its actions to replace lead connections and accelerate delivery to ensure that all public side lead connections are replaced by 2026 in line with its commitments under its own plan.

Progress is also needed on the National Lead Strategy to reduce the risk to the health of residents and users of public buildings such as schools and hospitals, and State-owned buildings such as local authority housing, that may have lead pipework. Active engagement between the Department and operators of public buildings and housing is needed.

When a lead failure is discovered, Irish Water writes to the premises owner to advise them what to do to reduce their exposure to lead. If a homeowner is informed by Irish Water that they have lead in their water, it is extremely important that the home owner act to remove any lead pipes or fittings. Home owners can make use of the Lead Remediation Grant Scheme which is available through local authorities to assist with the costs of replacing lead plumbing.

Where several houses share a backyard connection that contains lead, Irish Water will carry out the work to remove these pipes and replace them with lead-free pipes. Consent to do this work is required from each of the households served, because the pipes pass through their back gardens. In some areas, Irish Water is encountering difficulties getting that consent from all the homeowners. The EPA encourages homeowners to allow such works to take place as removing lead pipework is the best way to protect consumers from the health risks associated with lead.

[21] https://www.cru.ie/wp-content/uploads/2019/07/CRU19148-Irish-Water-Revenue-Control-3-Decision-Paper.pdf

Pesticides

The term 'Pesticides' includes a wide range of products, but in Ireland, it is herbicides that pose the greatest threat to drinking water. The most commonly found pesticide is MCPA[22] which is used for rush control in grassland. Pesticide products should not be present in drinking water and the Drinking Water Regulations set the following limits (Table 8):

Table 8: Pesticide limits

Parameter	Standard
Pesticides (individual)	0.100 µg/l
Aldrin, dieldrin, heptachlor, heptachlor epoxide	0.030 µg/l
Pesticides – Total	0.500 µg/l

The standards are set considerably below levels which would impact on people's health. It requires great care when using pesticide products in the environment, particularly near drinking water sources, to make sure that water is not contaminated with pesticides.

Irish Water has a standardised pesticide monitoring programme for all public supplies. It monitors for 21 pesticides most likely to be found in Irish waters. The programme highlighted an issue of widespread and, in a small number of supplies, persistent failures to meet the pesticide standards.

The following is a summary of the findings for 2019:

- 63% of all failures detected were of the herbicide MCPA;
- At the end of 2019, the EPA was investigating 31 supplies serving just under 294,300 people, due to failures to meet the pesticide standard. The number of supplies is down from 42 supplies affecting 283,500 people at the end of 2018;
- Of the 31 supplies being investigated by the EPA, 27 supplies had failures during 2019 (see Figure 15). The remaining four supplies had failures during 2018 or 2017 but none in 2019. This improvement in pesticide compliance across 2019 resulted in all four files being closed in January and February 2020;
- Eight supplies were under investigation for persistent pesticide failures during 2019. Persistent failures were identified in the Newport, Mayo supply during 2019 and the remaining seven supplies had been under investigation from 2017 and 2018. These supplies were all subject to increased monitoring during 2019;
- Irish Water is also carrying out increased sampling in the remaining 23 supplies which were found to have either once-off failures or non-persistent failures in 2018 or 2019. This is to investigate the extent of the pesticide problem or to confirm that the issue is resolved.

[22] 2-methyl-4-chlorophenoxyacetic acid

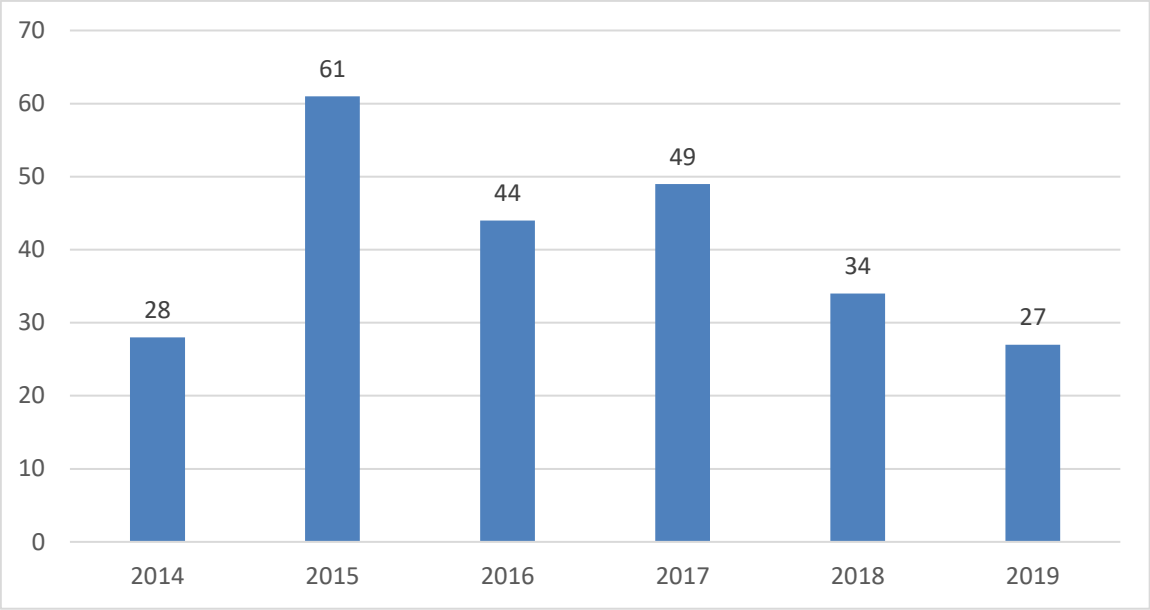

Figure 15: Number of public water supplies with reported pesticide failures

What happens when a supply is contaminated with pesticides

A catchment is an area of land around a river, lake or other body of water. Any activities that take place in a catchment have the potential to affect the water quality of the river, lake or other body of water. The reason that we find pesticides in drinking water is because products containing pesticides are being used in a catchment in such a way that the pesticides end up in rivers and lakes. For example, a landowner spraying rushes with MCPA may come too close to a river and some of the spray drifts into the river. Water abstracted from that river is now contaminated with MCPA.

Drinking water treatment plants in Ireland are not equipped with the technology to remove these pesticides from the water. So, the current approach being taken is to focus on how to prevent behaviours that may result in the contamination of a supply. A National Pesticide and Drinking Water Action Group was set up in 2016 and is led by the Department of Agriculture, Food and the Marine. The group meets every three months and includes representatives from Irish Water, local authorities, the farming community, pesticide manufacturers and suppliers, and the EPA. The aim of this group is to support actions in catchments where the use of pesticides has contaminated a water supply. This means working together, and with different interest groups, to take steps to respond to the issue of pesticides in drinking water. This includes investigating where the problem might be arising and raising awareness, for example through local media, of the importance of responsible use of pesticides.

EPA actions on pesticides in drinking water

Where pesticides failures are detected, the EPA requires:

- An inspection of the area around the treatment plant or abstraction point for any obvious, nearby source of contamination;
- A programme of sampling to investigate the incident;
- Catchment-based investigations and awareness raising activities, if the problem persists.

In 2017, the EPA started to prioritise supplies for enforcement action. The EPA started to add supplies with persistent pesticide failures to the Remedial Action List and to issue Directions to Irish Water. The Directions require Irish Water to complete actions by the Direction deadline to ensure there are no further failures of the pesticide standards in these supplies. The EPA issued a Direction to Irish Water in relation to pesticide failures in one supply, Newport in Mayo, in 2019 (Table 9).

Table 9: Supplies with persistent pesticide issues at end of 2019

County	Supply	Supply placed on the Remedial Action List	Date Direction was issued	Direction deadline
Kilkenny	Kilkenny City (Troyswood)	2017	14/11/2017	31/12/2019
Limerick	Abbeyfeale	2017	14/11/2017	31/12/2019
Longford	Longford Central	2017	14/11/2017	31/12/2019
Limerick	Newcastle West	2018	18/06/2018	30/06/2020
Cavan	Cavan Rural Water Supply	2018	23/11/2018	31/12/2020
Cavan	Belturbet	2018	23/11/2018	31/12/2020
Wexford	Clonroche	2018	21/12/2018	31/01/2021
Mayo	Newport	2019	27/08/2019	31/12/2021

Irish Water is using a consistent approach in its response to pesticide failures in all parts of the country. Catchment activities promoted by Irish Water and supported and carried out by other members of the National Pesticide and Drinking Water Action Group have proved successful in eliminating pesticide failures in the Kilkenny City (Troyswood) and Abbeyfeale supplies in 2019. No pesticide failures were detected in these supplies during 2019 and, based on this evidence, the EPA determined that Irish Water had complied with those Directions.

The Direction deadline for the Longford Central supply was December 2019. To date, no monitoring results have been received by the EPA for 2020

In the situation where catchment activities are not enough to resolve the pesticide issues at a supply, Irish Water must consider other options, such as installing treatment processes for the removal of pesticides.

Drinking Water Safety Plans

Drinking water should be **safe**. This means it should meet the relevant water quality standards at the tap. But it should also be **secure**, that is, there should be a system in place to identify all the things that could go wrong in a supply and take action to prevent these things from happening.

When something goes wrong in a water supply, it can have an impact on the quality of water being supplied to the consumer, for example, it could result in the need for a consumer to boil their water before it is safe to drink. Drinking Water Safety Plans are a proactive approach to ensuring that a water supply is both safe and secure. A Drinking Water Safety Plan identifies:

- all the things that could go wrong (hazards);
- how serious it would be if it did go wrong (severity); and
- how likely it is that it could go wrong (likelihood);

at each step in the water supply process, from the water source to the consumer's tap.

An example of a hazard is the risk of running out of disinfection chemicals at the water treatment plant. If undisinfected water reaches the consumer's tap and there are bacteria in the water, the severity of the hazard could be high for the consumer as they may get very ill. So, there must be a system in place to ensure there are adequate stocks of disinfection chemicals at the water treatment plant to prevent such an incident occurring.

Figure 16 below shows the steps involved in the drinking water supply process.

Figure 16: Steps in the drinking water supply process

Once the severity and likelihood of each hazard has been determined, it is possible to calculate the risk. Risks can be low, medium, high or very high. The next step is to take actions to reduce the risks at each water supply and make the supply as secure as possible.

Irish Water is carrying out assessments of all public water supplies, by assessing and calculating the risk of any hazards occurring, using the severity and likelihood information. Irish Water has identified 173 different hazards which need to be assessed at each public water supply. These cover all aspects of the supply, such as the catchment, raw water, treatment and distribution network.

Progress in 2019

By the end of 2019, Irish Water had assessed around a third of approximately 140,000 hazards to be assessed across all public supplies through existing programmes and processes.

In 2019, Irish Water's main focus was on assessing the risk from the presence of *Cryptosporidium* in raw water. *Cryptosporidium*, where present, must be removed or de-activated by the treatment process. The appropriate level of treatment depends on several factors including the location of the abstraction point within the catchment and whether it is a groundwater or surface water source.

Irish Water is at an advanced stage of developing a *Cryptosporidium* Source Risk Assessment Model to determine the *Cryptosporidium* load (and therefore the risk) in source waters. The model is based on the source-pathway-receptor concept and it aims to provide an objective and science-based evaluation of the risk. It produces a modelled *Cryptosporidium* oocyst concentration in source waters using site-specific data:

- Potential sources of human and animal faecal contamination in the catchment;
- Potential transport pathways and events by which *Cryptosporidium* can enter the source water and affect water quality; and
- Conditions likely to lead to peak concentrations.

Once the concentration has been calculated, the appropriate level of treatment can be determined. Installing the correct treatment mitigates the risk posed by the presence of *Cryptosporidium* in the raw water. Maintaining the treatment infrastructure reduces the likelihood of *Cryptosporidium* breaking through and causing illness, or requiring a boil water notice to be put in place.

Actions required

While the work on the *Cryptosporidium* risk assessment is very welcome, progress on assessment of other hazards, and on actions to reduce the high or very high risks at water supplies, has been slow.

Irish Water needs to progress the assessment of the remaining hazards (approximately 93,000) across all public water supplies. Over 10,000 high and very high-risk hazards have been identified so far through assessments as part of existing programmes and processes. The EPA is concerned at the slow rate of progress by Irish Water in taking action to reduce the most significant risks at public water supplies.

Identification of the risks associated with each hazard is a critical step in the development of Drinking Water Safety Plans. It is only by doing these assessments that Irish Water can move to a stage where it is proactively addressing hazards and associated risks before they become critical and impact on the safety and security of water supplies. As importantly, the EPA has yet to see evidence of how the risks identified are prioritised for investment so that they can be addressed in a timely manner. Irish Water must ensure that this risk identification is matched with investment to address the risks, starting with those that pose the greatest risk to public health, and that this is done without delay.

5 Priority Actions

Priority Issue: Ensure all water treatment plants are effective

Actions in 2019

The number of supplies on the Remedial Action List at the end of 2019 was 52. This number was 63 at the end of 2018; and continues to reduce each year. However, the population affected has more than doubled; many action programmes have been delayed repeatedly; and Irish Water has not provided information about when some will be carried out. This means uncertainty for a significant part of the population as to when their water supply will be safe and secure.

Recommended Actions

Irish Water is required to progress action programmes for supplies on the Remedial Action List to meet the completion dates and provide dates for supplies currently without them. Investment needs to be prioritised to ensure the risks identified on those supplies can be addressed. At the end of 2019, six supplies did not have completion dates. This means that Irish Water is failing to provide infrastructure or treatment for some of the most "at risk" supplies in the country and posing a potential risk to public health.

The effective planning of measures to address the issues identified for those supplies on the Remedial Action List needs to be undertaken in a timely manner. This will mean that the treatment option or solution identified can progress swiftly through the planning steps necessary to deliver that treatment in the quickest time. It is also critical that the investment to support the delivery of that infrastructure or treatment is provided to those projects as soon as possible.

Priority Issue: Keep water free of harmful bacteria (Disinfection)

Actions in 2019

Irish Water continued to carry out work under the National Disinfection Programme. They have now completed upgrades at 230 sites. However, 41 supplies, which had previously been assessed under the Programme, were found to have inadequate chlorine contact time after a further assessment was carried out. The delivery of the disinfection programme continues to be delayed.

At the end of 2019, three supplies supplying over 17,000 people remain without a treatment barrier to remove *Cryptosporidium*. All three supplies are on the EPA's Remedial Action List and so should be a priority for Irish Water to install adequate *Cryptosporidium* treatment as soon as possible. While this is a significant improvement on 2018, Irish Water has yet to provide a completion date for the Clonmel Poulavanogue supply, which has been on the Remedial Action List since 2008. Poor operation, control and maintenance of the barrier was the reason for *Cryptosporidium and Giardia* detections on 13 supplies in 2019.

The population affected by Boil Water Notices in 2019 increased significantly from 2018. This was mostly due to operational issues at Leixlip water treatment plant, which serves over 600,000 people, and resulted in two boil notices. The number of notices issued also increased significantly, due to issues with inadequate chlorine contact time requiring notices at 37 supplies, for a small number of consumers.

Recommended Actions

Irish Water should continue to upgrade disinfection systems under the National Disinfection Programme. Where urgent issues are identified, for example where chlorine contact time is inadequate or there is no disinfection alarm in place, they must be dealt with immediately.

Irish Water must address the underlying reasons for the delays with the programme and complete the works at 17 sites which have been prioritised for 2020. Where the disinfection programme identifies issues which may pose a risk to health, Irish Water must take action immediately to protect public health and ensure the water supply is safe for people to drink.

Water treatment plants must be operated, maintained and managed correctly to prevent incidents occurring that lead to water that is not properly disinfected entering a network.

It is crucial that Irish Water ensures that all necessary barriers to prevent *Cryptosporidium* and *Giardia* are installed, maintained, and operated correctly and effectively.

Priority Issue: Minimise harmful disinfection by-products (Trihalomethanes)

Actions in 2019

The number of supplies reporting trihalomethane failures has decreased and there were 25 supplies on the Remedial Action List for persistent failures in 2019. However, Irish Water has indicated that there will be delays up to 2024 in implementing action programmes for supplies on the 2019 Remedial Action List for trihalomethanes. Four supplies had no completion date.

The EPA prosecuted Irish Water in relation to two supplies with persistent trihalomethanes failures where Irish Water had failed to complete works to address the issue within the specified timeframe.

Recommended Actions

Irish Water should continue to progress the work they are carrying out on supplies on the Remedial Action List with trihalomethanes problems. These works must be carried out within the agreed timeframe and without further delay.

Priority Issue: Eliminate lead from our pipes

Actions in 2019

There is no safe level of lead in drinking water, yet there continues to be a lack of urgency in addressing the removal of lead from our networks and buildings. While there was an increase in lead connection replacements in 2018 and 2019, compared to 2016 and 2017, during the four-year period from 2016 to 2019, Irish Water has replaced only 17% of service connections and backyard connections.

The Department of Housing, Planning and Local Government oversees progress of the National Lead Strategy. Many public buildings such as schools and hospitals, and State-owned buildings such as local authority housing, may have lead pipework. The full extent of this is still unknown and there are no reported plans to carry out replacement works. This is placing many vulnerable people at risk.

Recommended Actions

Irish Water needs to restore investment in lead connection replacements and accelerate delivery to ensure that all public side lead connections are replaced by 2026, as previously set out in the published Lead in Drinking Water Mitigation Plan[23] and publicly communicated to consumers.

Householders need to replace private side lead plumbing and to allow the replacement of backyard connections. Greater urgency is required from public bodies to complete the assessment and action plans for removing lead pipework from public buildings such as hospitals and schools, and from local authority housing.

Priority Issue: Prevent pesticides from entering our waters

Actions in 2019

The EPA has now placed another supply on the Remedial Action List and issued a Direction to Irish Water to address persistent failures to meet the pesticides limit in the Drinking Water Regulations.

The National Pesticide and Drinking Water Action Group, in which Irish Water actively participates, continues to support a catchment-based approach to the reduction of pesticides in drinking water.

Recommended Actions

The goal with pesticides is to prevent them getting into water in the first place and, to this end, Irish Water should continue to work with other stakeholders in the National Pesticides and Drinking Water Action Group. However, further options, such as treatment, will have to be considered where catchment-based activities prove unsuccessful.

[23] Available at https://www.water.ie/projects-plans/our-plans/lead-mitigation-plan/

Priority Issue: Manage risks to our public water supplies

Actions in 2019

Irish Water has committed to the Drinking Water Safety Plan approach to protecting drinking water supplies; and has continued to carry out hazard assessments in 2019. However, action to reduce identified risks to supplies is slow. Irish Water has undertaken considerable work on developing a methodology to objectively identify the source treatment requirement for *Cryptosporidium* and *Giardia*. This will allow Irish Water to determine whether additional treatment or infrastructure is required to address the risk from these parasites and ensure the protection of public health.

Recommended Actions

Irish Water should continue to carry out assessments to establish where risks to supplies are the greatest; and progress quickly with an assessment of the remaining hazards (around 93,000) across all public water supplies.

These assessments will allow Irish Water to focus investment on reducing the greatest risks to those supplies. It is only by doing these assessments that Irish Water can move to a stage where it is proactively addressing hazards and associated risks before they become critical and impact on the safety and security of our water supplies.

Concluding Remarks

Over the 12 years of the EPA's Remedial Action List, the number of supplies on the List has decreased from year to year. At the end of 2018, Irish Water's plans were that the final supplies would be removed from the List by 2021. The situation at the end of 2019 is very different with some listed supplies without action programmes and others that do have action programmes but do not have completion dates. With over a million people receiving water from supplies needing significant corrective action and 27 remaining supplies on the List since 2008, it is clear that continuing delay is not acceptable.

Effective disinfection is the most fundamental part of the water treatment process and the part with the greatest potential to impact on public health. In 2019, the completion date for the National Disinfection Programme has been delayed until 2022, three years later than the original date originally specified by Irish Water. This again highlights an issue of delay in delivering secure drinking water for consumers.

Based on current replacement rates for lead connections, the target date of 2026 for complete removal of public-side lead will not be met. The planned rate of replacement of 7% over the next five years indicates a lack of urgency in dealing with this risk. At this rate, it could take up to 60 years to remove all lead connections. The delay in addressing this issue is again unacceptable.

Based on monitoring results, the quality of the water in our public supplies is very good. However, regardless of how **safe** our water is, EPA currently cannot say that it is **secure**. Progress on the assessment of risk using the Drinking Water Safety Plan approach is limited, and the EPA has yet to see evidence of how the risks identified are being prioritised for investment.

The issues at Leixlip water treatment plant during 2019 and the Boil Water Notices put in place during October and November affected more than 600,000 people. The vulnerabilities in the second largest water treatment plant in the country highlight a lack of resilience in our water supplies. At a time when drought and other extreme weather events become more frequent and threaten water supplies, it is ever more important that action is taken to ensure the resilience of supplies.

Irish Water needs to urgently examine and remedy the underlying causes for the delays and shortcomings highlighted in this report, and prioritise investment to ensure that public supplies are safe and secure, and that public health is protected.

Appendices

Appendix 1 Monitoring and Compliance Summary for public water supplies in 2019.

Appendix 2 Monitoring and Compliance Summary for public group water supplies in 2019.

Appendix 3 Boil Notices and Water Restriction Notices in place on public water supplies in 2019.

Appendix 4 Quality and Enforcement Summary Statistics by county or area in 2019.

Appendix 5 Status of Directions at end of 2019.

Appendix 6 Remedial Action List Summary by county or area for 2019.

Appendix 1: Monitoring and Compliance Summary for public water supplies in 2019

Parameter	No. of Zones Monitored	No of Zones with Exceedances	% of Zones Complying	No. of Samples Analysed	No. of Samples Exceeding	% of Samples Complying
Microbiological						
E. coli	787	7	**99.1**	8228	7	**99.9**
Enterococci	632	2	**99.7**	1035	2	**99.8**
Chemical						
1,2-dichloroethane	644	0	**100.0**	1049	0	**100.0**
Antimony	644	1	**99.8**	1050	1	**99.9**
Arsenic	644	0	**100.0**	1051	0	**100.0**
Benzene	644	0	**100.0**	1050	0	**100.0**
Benzo(a)pyrene	643	0	**100.0**	1046	0	**100.0**
Boron	644	0	**100.0**	1050	0	**100.0**
Bromate	644	3	**99.5**	1049	3	**99.7**
Cadmium	644	0	**100.0**	1050	0	**100.0**
Chromium	644	0	**100.0**	1050	0	**100.0**
Copper	633	1	**99.8**	1035	1	**99.9**
Cyanide	644	0	**100.0**	1050	0	**100.0**
Fluoride	635	17	**97.3**	1042	19	**98.2**
Lead	644	21	**96.7**	1055	23	**97.8**
Mercury	644	0	**100.0**	1041	0	**100.0**
Nickel	644	4	**99.4**	1055	4	**99.6**
Nitrate	648	1	**99.8**	1393	1	**99.9**
Nitrite (at tap)	635	0	**100.0**	1367	0	**100.0**
PAH	643	1	**99.8**	1046	1	**99.9**
Pesticides - Total	644	2	**99.7**	1058	3	**99.7**
Selenium	644	0	**100.0**	1050	0	**100.0**
Tetrachloroethene & Trichloroethene	644	1	**99.8**	1051	1	**99.9**
Total Trihalomethanes	644	30	**95.3**	1056	41	**96.1**
Indicator						
Aluminium	652	38	**94.2**	6050	57	**99.1**
Ammonium	635	2	**99.7**	1369	5	**99.6**
Chloride	635	0	**100.0**	1038	0	**100.0**
Clostridium perfringens	628	2	**99.7**	1034	2	**99.8**
Coliform Bacteria	787	60	**92.4**	8230	68	**99.2**
Colony Count @ 22°C	787	117	**85.1**	8068	196	**97.6**
Colour	787	44	**94.4**	8208	65	**99.2**
Conductivity	787	0	**100.0**	8228	0	**100.0**
Iron	787	52	**93.4**	8253	94	**98.9**
Manganese	657	11	**98.3**	1438	11	**99.2**
Odour	787	42	**94.7**	8244	156	**98.1**
pH	787	123	**84.4**	8228	225	**97.3**
Sodium	644	5	**99.2**	1050	5	**99.5**
Sulphate	633	0	**100.0**	1037	0	**100.0**
Taste	787	22	**97.2**	8196	188	**97.7**
Total Organic Carbon	634	33	**94.8**	1034	37	**96.4**
Turbidity (at tap)	787	10	**98.7**	8194	11	**99.9**

Appendix 2: Monitoring and Compliance Summary for public group water supplies in 2019

Parameter	No. of Zones Monitored	No of Zones with Exceedances	% of Zones Complying	No. of Samples Analysed	No. of Samples Exceeding	% of Samples Complying
Microbiological						
E. coli	377	0	**100.0**	893	0	**100.0**
Enterococci	64	0	**100.0**	66	0	**100.0**
Chemical						
1,2-dichloroethane	63	0	**100.0**	65	0	**100.0**
Antimony	63	0	**100.0**	65	0	**100.0**
Arsenic	63	0	**100.0**	65	0	**100.0**
Benzene	63	0	**100.0**	65	0	**100.0**
Benzo(a)pyrene	63	0	**100.0**	65	0	**100.0**
Boron	63	0	**100.0**	65	0	**100.0**
Bromate	63	0	**100.0**	65	0	**100.0**
Cadmium	63	0	**100.0**	65	0	**100.0**
Chromium	63	0	**100.0**	65	0	**100.0**
Copper	64	0	**100.0**	66	0	**100.0**
Cyanide	63	0	**100.0**	65	0	**100.0**
Fluoride	71	1	**98.6**	91	1	**98.9**
Lead	74	0	**100.0**	76	0	**100.0**
Mercury	63	0	**100.0**	65	0	**100.0**
Nickel	63	0	**100.0**	65	0	**100.0**
Nitrate	151	1	**99.3**	252	1	**99.6**
Nitrite (at tap)	157	1	**99.4**	286	1	**99.7**
PAH	63	0	**100.0**	65	0	**100.0**
Pesticides - Total	58	0	**100.0**	60	0	**100.0**
Selenium	63	0	**100.0**	65	0	**100.0**
Tetrachloroethene & Trichloroethene	63	0	**100.0**	65	0	**100.0**
Total Trihalomethanes	63	7	**88.9**	65	7	**89.2**
Indicator						
Aluminium	306	10	**96.7**	675	11	**98.4**
Ammonium	198	0	**100.0**	395	0	**100.0**
Chloride	64	0	**100.0**	69	0	**100.0**
Clostridium perfringens	118	0	**100.0**	191	0	**100.0**
Coliform Bacteria	377	13	**96.6**	893	13	**98.5**
Colony Count @ 22°C	377	19	**95.0**	889	19	**97.9**
Colour	377	9	**97.6**	890	9	**99.0**
Conductivity	377	0	**100.0**	890	0	**100.0**
Iron	324	17	**94.8**	717	18	**97.5**
Manganese	120	2	**98.3**	208	2	**99.0**
Odour	377	20	**94.7**	888	28	**96.8**
pH	377	5	**98.7**	890	5	**99.4**
Sodium	63	0	**100.0**	65	0	**100.0**
Sulphate	64	0	**100.0**	69	0	**100.0**
Taste	376	8	**97.9**	876	10	**98.9**
Total Organic Carbon	63	4	**93.7**	65	4	**93.8**
Turbidity (at tap)	377	4	**98.9**	872	4	**99.5**

Appendix 3: Boil Notices and Water Restriction Notices in place on public water supplies during 2019

Table 1: Boil/Dual Notices

County	Scheme Name	Reason	Population Affected	Affecting Full/Part Of Supply	Date Notice Issued	Date Notice Lifted
Cork	Knockadoon	Inadequate Disinfection	27	Part	31/07/2019	
Cork	Whitegate Regional	Turbidity (at WTW)	6,500	Part	27/11/2019	20/12/2019
Dun Laoghaire Rathdown	DLR Zone 4	Giardia	466	Full	21/12/2018	25/03/2019
Fingal	Leixlip WTP fed supplies	Turbidity (at WTW)	615,539	Full	22/10/2019	25/10/2019
Fingal	Leixlip WTP fed supplies	Turbidity (at WTW)	657,395	Full supply plus buffer zone	04/11/2019	12/11/2019
Galway	Kilconnell PWS	Turbidity (at WTW)	246	Full	18/06/2018	14/10/2019
Kilkenny	Kilmaganny PWS	Inadequate Disinfection	30	Part	15/01/2019	21/02/2019
Limerick	Fedamore PWS	Turbidity (at WTW)	492	Full	21/11/2019	22/11/2019
Limerick	Fedamore PWS	Turbidity (at WTW)	492	Full	02/12/2019	
Longford	Ballymahon	Treatment barrier compromised	8,247	Full	17/04/2019	01/05/2019
Longford	Granard	Turbidity (at WTW)	2,598	Full	09/11/2019	21/11/2019
Louth	Tallanstown	Turbidity (at WTW)	1,978	Full	30/07/2019	07/10/2019
Louth	Tallanstown	Free Chlorine	588	Part	07/10/2019	24/04/2020
Mayo	Knock Airport (including Cloonlyon Public Group Scheme)	Cryptosporidium	Airport use plus 50 people on group scheme	Full	17/10/2019	20/11/2019
Meath	Baltrasna	E. coli	9	Full	22/12/2014	
Meath	Longwood	Inadequate Disinfection	6	Part	05/07/2019	
Meath	Slane	Inadequate Disinfection	3	Part	05/07/2019	
Sligo	Kilsellagh Public Water Supply	Inadequate Disinfection	5	Part	12/10/2017	22/03/2019
Sligo	Lough Talt Regional Water Supply	Coliform Bacteria	12,576	Full	11/01/2019	

County	Scheme Name	Reason	Population Affected	Affecting Full/Part Of Supply	Date Notice Issued	Date Notice Lifted
Tipperary	Carrick-on-Suir- Crottys Lake	Cryptosporidium	57	Part	15/10/2018	22/03/2019
Tipperary	Clonmel Poulavanogue	Inadequate Disinfection	96	Part	11/10/2018	
Tipperary	Commons PWS	Inadequate Disinfection	5	Part	15/10/2018	10/07/2019
Tipperary	Galtee Regional	Inadequate Disinfection	402	Part	30/10/2019	
Tipperary	Glenary	Inadequate Disinfection	24	Part	18/01/2019	
Tipperary	Glenary	Inadequate chlorine level due to cast iron mains	45	Part	16/09/2019	
Tipperary	Glenary	Inadequate chlorine level due to cast iron mains	72	Part	22/10/2019	
Tipperary	Glenary	Inadequate chlorine level due to cast iron mains	1	Part	21/11/2019	
Tipperary	Horse & Jockey PWS	Inadequate chlorine level due to cast iron mains	42	Part	16/01/2019	15/05/2019
Waterford	Ardmore Grange	Inadequate Disinfection	12	Part	21/01/2019	21/06/2019
Waterford	Ballycurrane	Inadequate Disinfection	42	Part	21/01/2019	03/05/2019
Waterford	Ballyknock	Inadequate Disinfection	6	Part	21/01/2019	21/06/2019
Waterford	Ballymoate Upper	Inadequate Disinfection	12	Part	21/01/2019	18/07/2019
Waterford	Carrigeen	Inadequate Disinfection	15	Full	21/01/2019	01/04/2019
Waterford	Clonea OSullivan	Inadequate Disinfection	12	Part	21/01/2019	06/03/2019
Waterford	Crehanagh	Inadequate Disinfection	17	Full	21/01/2019	23/05/2019
Waterford	Crough	Inadequate Disinfection	17	Full	21/01/2019	21/06/2019
Waterford	Derrinular	Inadequate Disinfection	30	Full	21/01/2019	06/06/2019
Waterford	Glenagad	Inadequate Disinfection	6	Part	21/01/2019	19/03/2019
Waterford	Grallagh	Inadequate Disinfection	15	Part	21/01/2019	06/03/2019
Waterford	Kilcooney (Tinalyra)	Inadequate Disinfection	51	Part	21/01/2019	06/06/2019
Waterford	Kilgobnet	Inadequate Disinfection	99	Part	21/01/2019	27/02/2020
Waterford	Kilmore-Kilbeg	Inadequate Disinfection	19	Part	21/01/2019	21/02/2019
Waterford	Lacken	Inadequate Disinfection	39	Part	21/01/2019	09/05/2019
Waterford	Leagh Cross	Inadequate Disinfection	14	Full	21/01/2019	19/03/2019

County	Scheme Name	Reason	Population Affected	Affecting Full/Part Of Supply	Date Notice Issued	Date Notice Lifted
Waterford	Lyrenaleara	Inadequate Disinfection	24	Part	21/01/2019	08/07/2019
Waterford	Monatarrif	Inadequate Disinfection	13	Full	21/01/2019	30/04/2019
Waterford	Nire	Inadequate Disinfection	42	Part	21/01/2019	18/07/2019
Waterford	Parc an Aonaigh Kilmacthomas	Inadequate Disinfection	38	Part	21/01/2019	05/04/2019
Waterford	Portlaw	Coliform Bacteria	10	Part	28/09/2018	08/08/2019
Waterford	Poulavanogue	Inadequate Disinfection	93	Part	21/01/2019	08/07/2019
Waterford	Roberts Cross	Inadequate Disinfection	72	Part	21/01/2019	01/10/2019
Waterford	Russelstown	Inadequate Disinfection	27	Full	21/01/2019	07/03/2019
Waterford	Scrahan	Inadequate Disinfection	21	Part	21/01/2019	30/04/2019
Waterford	Scrothea [Note 1]	Coliform Bacteria	3	Part	16/10/2014	12/06/2020
Westmeath	Ballany	Precautionary - no exceedance confirmed	1,444	Part	06/12/2019	17/12/2019
Wexford	Ballinavarry	E. Coli and Coliform Bacteria	10	Full	06/03/2019	
Wexford	Ballindaggin	Inadequate Disinfection	6	Part	05/04/2019	02/08/2019
Wexford	Davidstown	Inadequate Disinfection	3	Part	18/01/2019	05/07/2019
Wexford	Fairfields Close Adamstown	Inadequate Disinfection	60	Part	18/01/2019	17/07/2019
Wexford	Kilmyshall	Inadequate Disinfection	90	Part	18/01/2019	27/02/2020
Wexford	Monageer	Inadequate Disinfection	165	Part	18/01/2019	17/07/2019
Wexford	South Regional - Horeswood	Inadequate Disinfection	12	Part	11/03/2019	23/01/2020
Wexford	South Regional - Taylorstown	Inadequate Disinfection	54	Part	26/03/2019	31/03/2020
Wexford	Woodview Drive Adamstown	Inadequate Disinfection	83	Part	18/01/2019	28/06/2019
Wicklow	Avoca Ballinaclash Public Supply	Turbidity (at Plant)	1,343	Full	25/03/2019	23/07/2019
Wicklow	Ballymorris Public Supply	Turbidity (at Plant)	17	Full	18/07/2019	
Wicklow	Johnstown South (Arklow) Public Supply [Note 1]	Coliform Bacteria	6	Full	04/06/2015	

Note 1: This is a disputed supply.

Table 2: Water Restrictions

County	Scheme Name	Reason	Population Affected	Affecting Full/Part Of Supply	Date Notice Issued	Date Notice Lifted
Cavan	Bailieboro RWSS	Manganese	7,785	Full	13/12/2019	23/12/2019
Cavan	Swanlinbar PWS	Elevated chlorine in network	301	Full	02/07/2019	30/07/2019
Cork	Tibbotstown	Iron	216	Part	16/11/2018	29/11/2019
Fingal	Fingal Zone 1	Colony Count @ 22°C	0[Note 1]	Part	24/07/2019	05/12/2019
Galway City	Galway City PWS	Precautionary - no exceedance confirmed	50	Part	25/11/2019	28/11/2019
Tipperary	Dualla Borehole	Precautionary - no exceedance confirmed	551	Full	03/04/2019	11/04/2019
Waterford	Ballydermody[Note 2]	Nitrate	2	Full	12/12/2013	
Wicklow	Kiltegan Public Supply	Nitrate	281	Full	24/12/2018	10/07/2019

Note 1: The part of the supply affected serves a sports club, so it is not possible to accurately determine the number of people affected.

Note 2: This is a disputed supply.

Appendix 4: Quality and Enforcement Statistics for public supplies by county or area for 2019

County/ Area	No. of public supplies[1]	Microbiological Compliance[2]	Chemical Compliance[2]	No. of boil notices[3]	Population affected	No. of water restrictions[3,4]	Population Affected	Supplies with Directions[5]	No. of audits by EPA[6]
Carlow	14	100	99.6						0
Cavan	16	99.3	99.3			2	8,086	3	2
Clare	17	99.6	99.5					1	1
Cork City	1	99.3	100						0
Cork County	170	100	99.7	2	6527	1	216	1	11
Donegal	33	100	99.6						3
Dublin City	6	100	99.3						1
Dun Laoghaire-Rathdown	6	100	99.4	1	466				0
Fingal	2	99.7	99.7	2	657,395	1	GAA club		3
Galway City	1	100	100			1	50		0
Galway County	36	100	99.3	1	246				3
Kerry	51	100	99.8						6
Kildare	8	100	100						0
Kilkenny	23	99.5	99.6	1	30			2	2
Laois	26	100	100						1
Leitrim	3	100	99.5						0
Limerick	36	99.8	99.8	2	492				3
Longford	6	100	99.6	2	10,845				4
Louth	11	100	99.8	2	1978			2	3
Mayo	22	100	99.6	1	Knock Airport			1	1
Meath	57	99.7	99.7	3	18			4	2
Monaghan	12	100	99.7						0
Offaly	21	99.6	99.9						0
Roscommon	12	100	98.5						0
Sligo	6	100	99.4	2	12,581				1
South Dublin	4	100	99.8						0
Tipperary	49	100	99.7	9	744	1	551	5	4
Waterford	86	100	99.6	25	698	1	2	24	2
Westmeath	3	100	99.3	1	1,444				1
Wexford	47	99.7	99.9	9	483			7	2
Wicklow	57	100	99.3	3	1,366	1	281	1	1

[1]Full list of public supplies available at http://www.epa.ie/pubs/advice/drinkingwater/publicdrinkingwatersupplies/; [2]Drinking Water Monitoring results and water supply details for each year since 2000 for each county is available at http://erc.epa.ie/safer/resourcelisting.jsp?oID=10206&username=EPA%20Drinking%20Water.[3]Boil notice and water restriction numbers included above refer to notices that were the responsibility of either Irish Water or both Irish Water and the property owner to resolve. [4]Water Restrictions excludes advice issued to consumers in respect of lead. [5]Further information on Directions issued can be found in Section 3 of this report; [6]Totals do not include monitoring programme audits. Audit reports available at http://www.epa.ie/pubs/advice/drinkingwater/audits/;

Appendix 5: Status of Directions at end of 2019

Table 1: EPA Directions issued during 2019 for reasons other than inadequate contact time.

County	Supply	Issue	Date Direction was issued	Date by which Direction is to be complied with	Status at end of 2019
Cavan	Bailieborough	No alarm on chlorine monitor, and no call-out alarm response system	20/12/2019	31/01/2020	The date in the direction has not yet been reached. Compliance status will be determined after the due date.
Cavan	Swanlinbar	Action Programme required due to concern over management and operational controls of WTP	11/07/2019	25/07/2019	Irish Water has complied with the Direction.
Cavan	Swanlinbar	Implement Action Programme required to improve management and operational controls of WTP	18/12/2019	30/09/2020	The date in the direction has not yet been reached. Compliance status will be determined after the due date.
Clare	West Clare RWS	Trihalomethane failures	28/11/2019	31/12/2021	The date in the direction has not yet been reached. Compliance status will be determined after the due date.
Cork	Whitegate	Requirement to install and commission a suitable coagulation dosing system to ensure the turbidity is reduced prior to the filtration stage.	23/12/2019	28/02/2020	The date in the direction has not yet been reached. Compliance status will be determined after the due date.
Kilkenny	Kilkenny City (Radestown)	Trihalomethane failures	28/11/2019	30/06/2022	The date in the direction has not yet been reached. Compliance status will be determined after the due date.
Louth	Greenmount	Inadequate controls over disinfection process	12/07/2019	12/08/2019	Irish Water has complied with the direction.

County	Supply	Reason for Direction	Date Direction was issued	Date by which Direction is to be complied with	Status at end of 2019
Louth	Tallanstown	Action Programme required due to inadequate treatment and risk to public health.	09/08/2019	23/08/2019	Irish Water has complied with the direction.
Louth	Tallanstown	Implement Action Programme required to improve treatment.	25/11/2019	31/12/2019	Direction not complied with. Enforcement action under consideration.
Louth	Tallanstown	Rationalisation of supply.	25/11/2019	31/12/2020	The date in the direction has not yet been reached. Compliance status will be determined after the due date.
Mayo	Newport PWS	Persistent pesticides exceedances	28/11/2019	31/12/2021	The date in the direction has not yet been reached. Compliance status will be determined after the due date.
Tipperary	Galtee Regional	Upgrade of coagulation process controls required	26/08/2019	31/12/2019	Direction deadline passed. Enforcement action not currently being considered due to verified progress with works.
Wicklow	Avoca Ballinaclash	Action Programme required to improve management & control at water treatment plant	26/02/2019	15/03/2019	Irish Water has complied with the Direction
Wicklow	Avoca Ballinaclash	Implement Action Programme to upgrade Avoca Ballinaclash water treatment plant	02/04/2019	30/09/2019	Direction deadline passed. Enforcement action not currently being considered due to verified progress with works.

Table 2: Five Directions issued due to inadequate contact time at supplies (not including the Direction of 15/02/2019 covering 34 supplies – see Table 3 for this)

County	Supply	Reason for Direction	Date Direction was issued	Date by which works are to be completed	Status at end of 2019
Wexford	South Regional Taylorstown	Action Programme required to address inadequate disinfection	08/05/2019	22/05/2019	Irish Water has complied with Direction.
Wexford	Ballindaggin	Inadequate Contact Time	14/05/2019	September 2019	Irish Water has complied with Direction.
Wexford	South Regional Horeswood	Inadequate Contact Time		December 2019	Direction deadline passed. Enforcement action not currently being considered due to verified progress with works.
Meath	Longwood	Inadequate disinfection	26/07/2019	December 2019	The date for completion of works has passed. Enforcement action not currently being considered due to proposed timeframe for completion of works.
Meath	Slane	Inadequate disinfection		December 2019	The date for completion of works has passed. Enforcement action not currently being considered due to proposed timeframe for completion of works.
Wexford	South Regional Taylorstown	Implement Action Programme to address inadequate disinfection		March 2020	The date for completion of works has not yet been reached. Compliance status will be determined after the due date.
Meath	Ballivor	Inadequate disinfection	22/11/2019	31/12/2019	Direction deadline passed. Enforcement action not currently being considered due to verified progress with works.
Meath	Enfield	Inadequate disinfection	22/11/2019	31/12/2019	

Table 3: Direction issued on 15/02/2019 due to inadequate contact time at 34 supplies

County	Supply	Date for completion	Status at end 2019
Kilkenny	Kilmaganny	Jun-19	Works completed
Tipperary	Carrick-on-Suir [Crottys Lake]	Mar-19	Works completed
Tipperary	Commons	Jun-19	Works completed
Tipperary	Glenary	Dec-19	Works completed
Tipperary	Horse & Jockey PWS	Jun-19	Works completed
Waterford	Ardmore Grange	Jun-19	Works completed
Waterford	Ballycurrane	Jun-19	Works completed
Waterford	Ballyknock	Jun-19	Works completed
Waterford	Ballymote	Jun-19	Works completed
Waterford	Carrigeen	Jun-19	Works completed
Waterford	Clonea OSullivan	Feb-19	Works completed
Waterford	Crehanagh	Jun-19	Works completed
Waterford	Crough	Jun-19	Works completed
Waterford	Derrinular	Mar-19	Works completed
Waterford	Glennagad	Jun-19	Works completed
Waterford	Grallagh	Jun-19	Works completed
Waterford	Kilgobnet	Jul-19	Supply to be rationalised by end of Feb 2020 – works completed and notice lifted.
Waterford	Kilmore-Kilbeg	Jun-19	Works completed
Waterford	Lacken	Jun-19	Works completed
Waterford	Leagh Cross	Jun-19	Works completed
Waterford	Lyranearla	Jun-19	Works completed
Waterford	Monatarrif	Jun-19	Works completed
Waterford	Nire	Jun-19	Works completed
Waterford	Parc an Aonaigh Kilmacthomas	Jun-19	Works completed
Waterford	Poulavanogue	Jun-19	Works completed
Waterford	Roberts Cross	Sep-19	Works completed
Waterford	Russelstown	Feb-19	Works completed
Waterford	Scrahan	Jun-19	Works completed

County	Supply	Date for completion	Status at end 2019
Waterford	Tinalyra (Kilcooney)	Jun-19	Works completed
Wexford	Davidstown	Jun-19	Works completed
Wexford	Fairfields Close Adamstown	Jun-19	Works completed
Wexford	Kilmyshall	Sep-19	Delays due to complications. Works completed by February 2020 and notice lifted.
Wexford	Monageer	Jun-19	Works completed
Wexford	Woodview Drive Adamstown	Jun-19	Works completed

Table 4: EPA Directions issued prior to 2019 – reason for issue and status at end of 2019.

County	Supply	Reason for Direction	Date Direction was issued	Date by which Direction is to be complied with	Status at end of 2019
Cavan	Belturbet	Persistent pesticide failures	23/11/2018	31/12/2020	The date in the direction has not yet been reached. Compliance status will be determined after the due date.
Cavan	Cavan RWSS	Persistent pesticide failures	23/11/2018	31/12/2020	The date in the direction has not yet been reached. Compliance status will be determined after the due date.
Cork	Drimoleague	Trihalomethane failures	05/06/2015	31/12/2018	Irish Water prosecuted for non-compliance with Direction[1].
Cork	Kealkill	Trihalomethane failures	05/06/2015	31/12/2018	Irish Water prosecuted for non-compliance with Direction[24].
Dublin City	DCC Zone 6	Disinfection failures at Stillorgan Reservoir	19/10/2018	19/11/2018	Direction deadline passed. Further enforcement action not currently being pursued due to verified progress with necessary works.
Dun Laoghaire/ Rathdown	DLR Zone 2	Failure to complete action programme on time	10/04/2018	15/10/2018	Direction deadline passed. Enforcement action not considered due to completion of works.
Galway	Inishmore Cregacareen	Trihalomethane failures	29/05/2015	31/12/2015	Direction deadline passed. Enforcement action not considered due to completion of works.

[24] In January 2020, the EPA prosecuted Irish Water for failure to comply with a Direction to ensure that the drinking water supplied to consumers complied with the Trihalomethanes parametric value in the Kealkill and Drimoleague Public Water Supplies. Irish Water pleaded guilty and was convicted in relation to the summonses for Kealkill and Drimoleague.

County	Supply	Reason for Direction	Date Direction was issued	Date by which Direction is to be complied with	Status at end of 2019
Kilkenny	Inistioge	Trihalomethane failures	05/06/2015	31/12/2018	Direction deadline passed. Enforcement action not currently being considered due to verified progress of works.
Kilkenny	Kilkenny City (Troyswood)	Persistent pesticide failures	14/11/2017	31/12/2019	Irish Water has complied with Direction.
Limerick	Abbeyfeale	Persistent pesticide failures	14/11/2017	31/12/2019	Irish Water has complied with Direction.
Limerick	Newcastle West	Persistent pesticide failures	18/06/2018	30/06/2020	The date in the direction has not yet been reached. Compliance status will be determined after the due date.
Longford	Longford Central	Persistent pesticide failures	14/11/2017	31/12/2019	The date for compliance has passed and EPA is awaiting monitoring data to inform its assessment of compliance.
Waterford	Ring/Helvick	Trihalomethane failures	01/03/2016	31/12/2018	Direction deadline passed. Enforcement action not considered due to completion of works.
Wexford	Clonroche	Persistent pesticide failures	21/12/2018	31/01/2021	The date in the direction has not yet been reached. Compliance status will be determined after the due date.

Appendix 6: Remedial Action List at end of 2019

County	Supply	Completion date	Reason
Cavan	Bailieborough	To be submitted by Irish Water	EPA audit observation – treatment and management issues
Cavan	Belturbet	EPA Direction requires compliance by Dec-20	Elevated Levels of Pesticides above the standard in the Drinking Water Regulations
Cavan	Cavan RWSS	EPA Direction requires compliance by Dec-20	Elevated Levels of Pesticides above the standard in the Drinking Water Regulations
Cavan	Swanlinbar	EPA Direction requires compliance by Sept 20	EPA audit observation – treatment and management issues
Cavan	Ballyhaise	Mar-20	Inadequate Treatment - Inadequate Disinfection
Cavan	Shercock	Irish Water has not confirmed a date for completion of action programme (treatment plant is operated under a private Group Water Scheme)	Excessive levels of aluminium in the treated water
Cavan	Dowra PWS	Irish Water has not confirmed a date for completion of action programme (treatment plant is operated under a private Group Water Scheme)	Excessive levels of aluminium in the treated water
Clare	Corofin	Dec-20	EPA audit observation – treatment and management issues
Clare	Ennistymon RWS	Sep-22	EPA audit observation – treatment and management issues
Clare	West Clare RWS (New WTP)	Sep-21	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations
Cork	Ballingeary	Feb-20	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations
Cork	Ballyhooly	Apr-20	Inadequate Treatment for Cryptosporidium
Cork	Glengarriff	Irish Water has not confirmed a date for completion of action programme (depends on success of current GAC trial)	Inadequate Treatment for Cryptosporidium Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations
Cork	Kealkill	Jan-20	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations
Cork	Leap	Jan-21	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations

County	Supply	Completion date	Reason
Cork	Schull	Jun-20	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations
Cork City	Cork City Water Supply	Sep-21	EPA audit observation – treatment and management issues
Donegal	Glenties-Ardara	Irish Water has not confirmed a date for completion of action programme (depends on outcome of 2nd aerator installation)	Inadequate Treatment for Cryptosporidium Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations
Dun Laoghaire Rathdown	Roundwood	Mar-21	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations EPA audit observation – treatment and management issues
Fingal	Leixlip	Jun-20 for filter upgrade works, Sep-20 for UV disinfection (duty unit), Dec-20 for UV disinfection (standby unit)	Supply identified by the Health Service Executive where further investigation or improvement may be required EPA audit observation – treatment and management issues
Kerry	Ballyheigue	To be submitted by Irish Water	Inadequate Treatment for Cryptosporidium
Kerry	Cahirciveen 017H	To be submitted by Irish Water	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations
Kerry	Caragh Lake 022A	Mar-20	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations
Kerry	Mountain Stage 062A	Feb-20	Inadequate Treatment for Cryptosporidium
Kilkenny	Glenmore	Jun-20	Inadequate Treatment for Cryptosporidium
Kilkenny	Kilkenny City (Radestown) WS	EPA Direction requires compliance by Jun-22	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations
Kilkenny	Pilltown-Fiddown	Mar-21	Inadequate Treatment for Cryptosporidium
Laois	Abbeyleix 1 PWS	Jun-21	Inadequate Treatment for Cryptosporidium
Limerick	Croom	Jun-20	Inadequate Treatment for Cryptosporidium
Limerick	Newcastle West	EPA Direction requires compliance by Jun-20	Elevated Levels of Pesticides above the standard in the Drinking Water Regulations
Longford	Gowna	Sep-20	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations

County	Supply	Completion date	Reason
Longford	Granard	Dec-20	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations
Longford	Longford Central	Mar-21 for Trihalomethanes compliance, EPA Direction requires pesticides compliance by Dec-19.	Elevated Levels of Trihalomethanes and Pesticides above the standard in the Drinking Water Regulations
Louth	Greenmount	Jun-24	EPA audit observation – treatment and management issues
Louth	South Louth East Meath	Feb-20	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations Poor turbidity removal
Louth	Tallanstown	EPA Direction requires compliance by Dec-20	Excessive levels of aluminium in the treated water EPA audit observation – treatment and management issues
Mayo	Ballycastle	Aug-20	Inadequate Treatment for Cryptosporidium
Mayo	Newport PWS	EPA Direction requires compliance by Dec-21	Elevated Levels of Pesticides above the standard in the Drinking Water Regulations
Meath	Drumcondrath	Irish Water has not confirmed a date for completion of action programme	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations
Meath	Navan & Mid-Meath PWS	Feb-20	EPA audit observation – treatment and management issues
Offaly	Clara/Ferbane RWSS	Dec-24	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations
Sligo	Lough Talt Regional Water Supply	Dec-20	Inadequate Treatment for Cryptosporidium Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations
Tipperary	Clonmel Poulavanogue	Irish Water has not confirmed a date for completion of action programme	Inadequate Treatment for Cryptosporidium
Tipperary	Galtee Regional	Complete but need verification of the effectiveness of action programme	Excessive levels of aluminium in the treated water Poor turbidity removal EPA audit observation – treatment and management issues
Wexford	Clonroche	EPA Direction requires compliance by Jan-21	Elevated Levels of Pesticides above the standard in the Drinking Water Regulations
Wicklow	Aughrim / Annacurra	Sep-21	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations

County	Supply	Completion date	Reason
Wicklow	Enniskerry Public Supply	Mar-21	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations EPA audit observation – treatment and management issues
Wicklow	Wicklow Regional Public Supply	Mar-21	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations EPA audit observation – treatment and management issues
Wicklow	Bray	Mar-21	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations EPA audit observation – treatment and management issues
Wicklow	Greystones / Windgates / Templecarraig	Mar-21	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations EPA audit observation – treatment and management issues
Wicklow	Kilmacanogue	Mar-21	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations EPA audit observation – treatment and management issues
Wicklow	Newtown Newcastle Kilcoole	Mar-21	Elevated Levels of Trihalomethanes above the standard in the Drinking Water Regulations EPA audit observation – treatment and management issues

AN GHNÍOMHAIREACHT UM CHAOMHNÚ COMHSHAOIL
Tá an Ghníomhaireacht um Chaomhnú Comhshaoil (GCC) freagrach as an gcomhshaol a chaomhnú agus a fheabhsú mar shócmhainn luachmhar do mhuintir na hÉireann. Táimid tiomanta do dhaoine agus don chomhshaol a chosaint ó éifeachtaí díobhálacha na radaíochta agus an truaillithe.

Is féidir obair na Gníomhaireachta a roinnt ina trí phríomhréimse:

Rialú: *Déanaimid córais éifeachtacha rialaithe agus comhlíonta comhshaoil a chur i bhfeidhm chun torthaí maithe comhshaoil a sholáthar agus chun díriú orthu siúd nach gcloíonn leis na córais sin.*

Eolas: *Soláthraímid sonraí, faisnéis agus measúnú comhshaoil atá ar ardchaighdeán, spriocdhírithe agus tráthúil chun bonn eolais a chur faoin gcinnteoireacht ar gach leibhéal.*

Tacaíocht: *Bímid ag saothrú i gcomhar le grúpaí eile chun tacú le comhshaol atá glan, táirgiúil agus cosanta go maith, agus le hiompar a chuirfidh le comhshaol inbhuanaithe.*

Ár bhFreagrachtaí

Ceadúnú
Déanaimid na gníomhaíochtaí seo a leanas a rialú ionas nach ndéanann siad dochar do shláinte an phobail ná don chomhshaol:
- saoráidí dramhaíola *(m.sh. láithreáin líonta talún, loisceoirí, stáisiúin aistrithe dramhaíola)*;
- gníomhaíochtaí tionsclaíocha ar scála mór *(m.sh. déantúsaíocht cógaisíochta, déantúsaíocht stroighne, stáisiúin chumhachta)*;
- an diantalmhaíocht *(m.sh. muca, éanlaith)*;
- úsáid shrianta agus scaoileadh rialaithe Orgánach Géinmhodhnaithe *(OGM)*;
- foinsí radaíochta ianúcháin *(m.sh. trealamh x-gha agus radaiteiripe, foinsí tionsclaíocha)*;
- áiseanna móra stórála peitril;
- scardadh dramhuisce;
- gníomhaíochtaí dumpála ar farraige.

Forfheidhmiú Náisiúnta i leith Cúrsaí Comhshaoil
- Clár náisiúnta iniúchtaí agus cigireachtaí a dhéanamh gach bliain ar shaoráidí a bhfuil ceadúnas ón nGníomhaireacht acu.
- Maoirseacht a dhéanamh ar fhreagrachtaí cosanta comhshaoil na n-údarás áitiúil.
- Caighdeán an uisce óil, arna sholáthar ag soláthraithe uisce phoiblí, a mhaoirsiú.
- Obair le húdaráis áitiúla agus le gníomhaireachtaí eile chun dul i ngleic le coireanna comhshaoil trí chomhordú a dhéanamh ar líonra forfheidhmiúcháin náisiúnta, trí dhíriú ar chiontóirí, agus trí mhaoirsiú a dhéanamh ar leasúchán.
- Cur i bhfeidhm rialachán ar nós na Rialachán um Dhramhthrealamh Leictreach agus Leictreonach (DTLL), um Shrian ar Shubstaintí Guaiseacha agus na Rialachán um rialú ar shubstaintí a ídíonn an ciseal ózóin.
- An dlí a chur orthu siúd a bhriseann dlí an chomhshaoil agus a dhéanann dochar don chomhshaol.

Bainistíocht Uisce
- Monatóireacht agus tuairisciú a dhéanamh ar cháilíocht aibhneacha, lochanna, uiscí idirchriosacha agus cósta na hÉireann, agus screamhuiscí; leibhéil uisce agus sruthanna aibhneacha a thomhas.
- Comhordú náisiúnta agus maoirsiú a dhéanamh ar an gCreat-Treoir Uisce.
- Monatóireacht agus tuairisciú a dhéanamh ar Cháilíocht an Uisce Snámha.

Monatóireacht, Anailís agus Tuairisciú ar an gComhshaol
- Monatóireacht a dhéanamh ar cháilíocht an aeir agus Treoir an AE maidir le hAer Glan don Eoraip (CAFÉ) a chur chun feidhme.
- Tuairisciú neamhspleách le cabhrú le cinnteoireacht an rialtais náisiúnta agus na n-údarás áitiúil *(m.sh. tuairisciú tréimhsiúil ar staid Chomhshaol na hÉireann agus Tuarascálacha ar Tháscairí)*.

Rialú Astaíochtaí na nGás Ceaptha Teasa in Éirinn
- Fardail agus réamh-mheastacháin na hÉireann maidir le gáis cheaptha teasa a ullmhú.
- An Treoir maidir le Trádáil Astaíochtaí a chur chun feidhme i gcomhair breis agus 100 de na táirgeoirí dé-ocsaíde carbóin is mó in Éirinn.

Taighde agus Forbairt Comhshaoil
- Taighde comhshaoil a chistiú chun brúnna a shainaithint, bonn eolais a chur faoi bheartais, agus réitigh a sholáthar i réimsí na haeráide, an uisce agus na hinbhuanaitheachta.

Measúnacht Straitéiseach Timpeallachta
- Measúnacht a dhéanamh ar thionchar pleananna agus clár beartaithe ar an gcomhshaol in Éirinn *(m.sh. mórphleananna forbartha)*.

Cosaint Raideolaíoch
- Monatóireacht a dhéanamh ar leibhéil radaíochta, measúnacht a dhéanamh ar nochtadh mhuintir na hÉireann don radaíocht ianúcháin.
- Cabhrú le pleananna náisiúnta a fhorbairt le haghaidh éigeandálaí ag eascairt as taismí núicléacha.
- Monatóireacht a dhéanamh ar fhorbairtí thar lear a bhaineann le saoráidí núicléacha agus leis an tsábháilteacht raideolaíochta.
- Sainseirbhísí cosanta ar an radaíocht a sholáthar, nó maoirsiú a dhéanamh ar sholáthar na seirbhísí sin.

Treoir, Faisnéis Inrochtana agus Oideachas
- Comhairle agus treoir a chur ar fáil d'earnáil na tionsclaíochta agus don phobal maidir le hábhair a bhaineann le caomhnú an chomhshaoil agus leis an gcosaint raideolaíoch.
- Faisnéis thráthúil ar an gcomhshaol ar a bhfuil fáil éasca a chur ar fáil chun rannpháirtíocht an phobail a spreagadh sa chinnteoireacht i ndáil leis an gcomhshaol *(m.sh. Timpeall an Tí, léarscáileanna radóin)*.
- Comhairle a chur ar fáil don Rialtas maidir le hábhair a bhaineann leis an tsábháilteacht raideolaíoch agus le cúrsaí práinnfhreagartha.
- Plean Náisiúnta Bainistíochta Dramhaíola Guaisí a fhorbairt chun dramhaíl ghuaiseach a chosc agus a bhainistiú.

Múscailt Feasachta agus Athrú Iompraíochta
- Feasacht chomhshaoil níos fearr a ghiniúint agus dul i bhfeidhm ar athrú iompraíochta dearfach trí thacú le gnóthais, le pobail agus le teaghlaigh a bheith níos éifeachtúla ar acmhainní.
- Tástáil le haghaidh radóin a chur chun cinn i dtithe agus in ionaid oibre, agus gníomhartha leasúcháin a spreagadh nuair is gá.

Bainistíocht agus struchtúr na Gníomhaireachta um Chaomhnú Comhshaoil
Tá an ghníomhaíocht á bainistiú ag Bord lánaimseartha, ar a bhfuil Ard-Stiúrthóir agus cúigear Stiúrthóirí. Déantar an obair ar fud cúig cinn d'Oifigí:
- An Oifig um Inmharthanacht Comhshaoil
- An Oifig Forfheidhmithe i leith cúrsaí Comhshaoil
- An Oifig um Fianaise is Measúnú
- Oifig um Chosaint Radaíochta agus Monatóireachta Comhshaoil
- An Oifig Cumarsáide agus Seirbhísí Corparáideacha

Tá Coiste Comhairleach ag an nGníomhaireacht le cabhrú léi. Tá dáréag comhaltaí air agus tagann siad le chéile go rialta le plé a dhéanamh ar ábhair imní agus le comhairle a chur ar an mBord.

Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

Headquarters
PO Box 3000, Johnstown Castle Estate
County Wexford, Y35 W821, Ireland
Bosca Poist 3000, Eastát Chaisleán Bhaile Sheáin Contae Loch Garman, Y35 W821, Éire

T: +353 53 9160600
F: +353 53 9160699
E: info@epa.ie
W: www.epa.ie
Lo Call: 1890 33 55 99

EPA Regional Inspectorate Dublin
McCumiskey House
Richview
Clonskeagh Road
Dublin 14
D14 YR62
Tel: 01-268 0100
Fax: 01-268 0199

EPA Regional Inspectorate Cork
Inniscarra
Co. Cork
P31 VX59
Tel: 021-4875540
Fax: 021-4875545

EPA Regional Inspectorate Castlebar
John Moore Road
Castlebar
Co. Mayo
F23 KT91
Tel: 094-9048400
Fax: 094-9021934

EPA Regional Inspectorate Kilkenny
Seville Lodge
Callan Road
Kilkenny
R95 ED28
Tel: 056-7796700
Fax: 056-7796798

EPA Regional Inspectorate Monaghan
The Glen
Monaghan
H18 YT02
Tel: 047-77600
Fax: 047-84987

E: info@epa.ie
W: www.epa.ie
LoCall: 1890 33 55 99