Drinking Water Report for Public Water Supplies 2016

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.

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- 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 Report for Public Supplies 2016

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DRINKING WATER QUALITY PUBLIC SUPPLIES

Environmental Protection Agency
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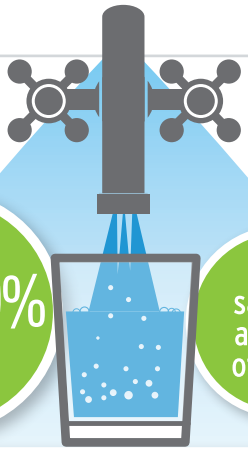

>99.9% of samples are free of *E.coli*

Drinking water quality public supplies 2016

If there's a problem

EPA oversees > Irish Water takes action < HSE advises

National priorities

- **Disinfection** keeping water free of bugs
- **Trihalomethanes** minimising disinfection by-products
- **Lead** Eliminating lead from our networks
- **Pesticides** Preventing pesticides from entering our waters
- **Water safety plans** Managing the risks to our supplies

Irish water to develop and implement strategies

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 2016

Quality of Public Water Supplies

- The quality of drinking water in public supplies remains high
- Microbiological compliance is better than 99.9%
- Chemical compliance is 99.5%
- 4,000 fewer people on boil notices at end 2016, compared to end 2015

Main issues affecting water quality

- High levels of disinfection by-products
- Persistent pesticide failures in some supplies
- Large numbers of lead pipe connections in properties

Progress in 2016

- EPA Remedial Action List down from 115 supplies in 2015 to 99 supplies during 2016
- The downward trend in the number of *E. coli* failures continued in 2016
- Plans are now in place to deal with key priorities of disinfection, lead and trihalomethanes

Action Required

- Put a plan in place to tackle pesticides in drinking water
- Put Drinking Water Safety Plans in place to protect supplies

Section 1: Introduction

This report is an overview of the quality of drinking water in public water supplies during 2016. It is based on the assessment of monitoring results reported to the EPA by Irish Water, and on the EPA's enforcement activities.

A drinking water supply includes the abstraction, treatment, storage and distribution of water from catchment to consumer. In 2016, Ireland had 904 public water supplies serving 1.3 million households[1].

Roles and Responsibilities

Irish Water is responsible for providing and developing public water services; and ensuring drinking water is safe and secure and meets the standards in the Drinking Water Regulations.

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

The **Health Service Executive** (HSE) must be consulted by Irish Water where there is a failure to meet drinking water quality standards or where there is a public health risk.

The **Commission for Energy Regulation** (CER) is the independent economic regulator for public water services, responsible for ensuring that Irish Water operates in an economic and efficient manner.

Protecting and Improving Our Drinking Water Supplies

The EPA has identified the most important issues which should be addressed on a national level to protect and improve public drinking water supplies. Progress on the required actions will be discussed in this report.

Priority Issue	Required Actions
Keeping water free of harmful bugs (Disinfection)	Eliminate long-term Boil Water Notices by providing robust disinfection systems.
Minimising harmful disinfection by-products (Trihalomethanes)	Put in place treatment that adequately removes pre-cursors which lead to harmful by-products.
Eliminating lead from our networks	Assess public buildings for lead pipes and fittings; encourage increased replacement of private side lead pipework; and replace all public side lead pipework.
Preventing pesticides from entering our waters	Protect drinking water sources and abstraction points and promote responsible use of pesticides.
Managing risks to our public water supplies	Progress and complete Drinking Water Safety Plans.
Ensuring all water treatment plants are effective	Progress action programmes for all Remedial Action List schemes.

Table 1: National Priorities for Drinking Water Supplies

[1] CSO, Census 2016

Section 2: The Quality and Management of Public Supplies

This section of the report presents the EPA findings on the quality and management of public water supplies operating in 2016.

Section 2.1: Quality of Public Supplies

Monitoring of drinking water quality is carried out by Irish Water. Programmes are drawn up to ensure that a specified number of samples are taken at planned times throughout the year and at planned locations throughout the distribution network. The EPA audits Irish Water's monitoring programmes to ensure that the monitoring is satisfactory. Monitoring results submitted to the EPA must be accredited.

Irish Water submitted over 140,000 test results for 2016 to the EPA. These are called 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[2].

Three categories of parameters are monitored. "Microbiological" parameters include *E. coli* and *Enterococci* while "Chemical" parameters include 26 parameters which are monitored to protect public health. These are the two most important groups of parameters. The third group, "Indicator" parameters, give information on the management of the treatment process, as well as the look, taste and smell of the water.

Water quality across each of the three categories has remained relatively unchanged in 2016 compared to 2015. There has been further improvement in microbiological quality, with only three supplies found to contain *E. coli* in 2016, a reduction from the 2015 levels (seven supplies). Lead and trihalomethanes continue to be the main chemical water quality parameters of concern.

Parameter Types	2015	2016	Change
Microbiological parameters	99.94%	99.94%	No change
Chemical parameters	99.39%	99.47%	↑
Indicator parameters	99.05%	98.82%	↓

Table 2: Overall Compliance for Public Water Supplies

A summary of the monitoring results is set out in Appendix 1 (public water supplies). All monitoring results from 2000-2016 and information on water supplies for each county is available on the EPA's SAFER (Secure Archive for Environmental Research Data) webpage at: http://erc.epa.ie/safer/resourcelisting.jsp?oID=10206&username=EPA%20Drinking%20Water.
An explanation of each of the parameters described in the report is available at: http://www.epa.ie/pubs/advice/drinkingwater/parameterappendix.html.

[2] European Union (Drinking Water) Regulations 2014, S.I. No. 122 of 2014

New regulations regarding radioactive substances in drinking water (S.I. 160 of 2016) were signed into Irish law on April 1st 2016. They require Irish Water to monitor certain radioactive parameters in public water supplies and ensure compliance with the standards set in the regulations. The EPA has published an advice note on the implementation of the radioactive substances in drinking water regulations[3]. Monitoring under these regulations commenced in 2017 and will be reported on in future years.

Compliance with Key Microbiological and Chemical Parameters in Public Water Supplies

A breakdown of the number of samples analysed and the number failing to meet the standards is presented in Appendix 1. The monitoring results show that:

- 901 supplies met the standard for *E. coli* at all times during 2016, with only three samples (in three supplies) found to be contaminated with *E. coli.* Four samples (in four supplies) were found to be contaminated with *Enterococci*.
- Supplies were monitored for 23[4] chemical parameters. 13 of these were not detected above the standards in any supply. Of the remaining parameters:
    - There was one failure to meet the standard for each of bromate, nickel and nitrite.
    - Two samples (in two supplies) failed the standard for copper.
    - Five samples (in four supplies) failed the standard for total pesticides.
    - Six samples (in six supplies) failed the standard for arsenic.
    - 21 samples (in 18 supplies) failed the standard for fluoride.
    - 29 samples (in 25 supplies) failed the standard for lead.
    - 55 samples (in 29 supplies) failed the standard for individual pesticides.
    - 85 samples (in 59 supplies) failed the standard for trihalomethanes.

A more detailed assessment of the most important microbiological (*E. coli* and *Cryptosporidium*) and chemical (trihalomethanes, lead, pesticides and fluoride) parameters is given below.

E. coli

99.7%	3	377	94.2%
of supplies complied with the standard in 2016	supplies failed in 2016, an improvement of four from 2015	people affected by a boil water notice for *E. coli* in 2016	reduction in supplies with *E. coli* detections since 2007

The most important health indicators of drinking water quality are the microbiological parameters particularly, *E. coli*. The presence of *E.coli* indicates that the disinfection treatment process is not operating adequately or that contamination has entered the distribution system after treatment.

The EPA has published an Advice Note[5] on *E. coli* in Drinking Water and a manual on disinfection[6]

[3] Available at: http://www.epa.ie/pubs/advice/drinkingwater/epadrinkingwateradvicenoteno16.html
[4] While there are 26 chemical parameters listed in the drinking water regulations, acrylamide, epichlorohydrin and vinyl chloride compliance may be determined by product specification and do not need to be monitored directly.
[5] Available at http://www.epa.ie/pubs/advice/drinkingwater/epadrinkingwateradvicenoteadvicenoteno3.html

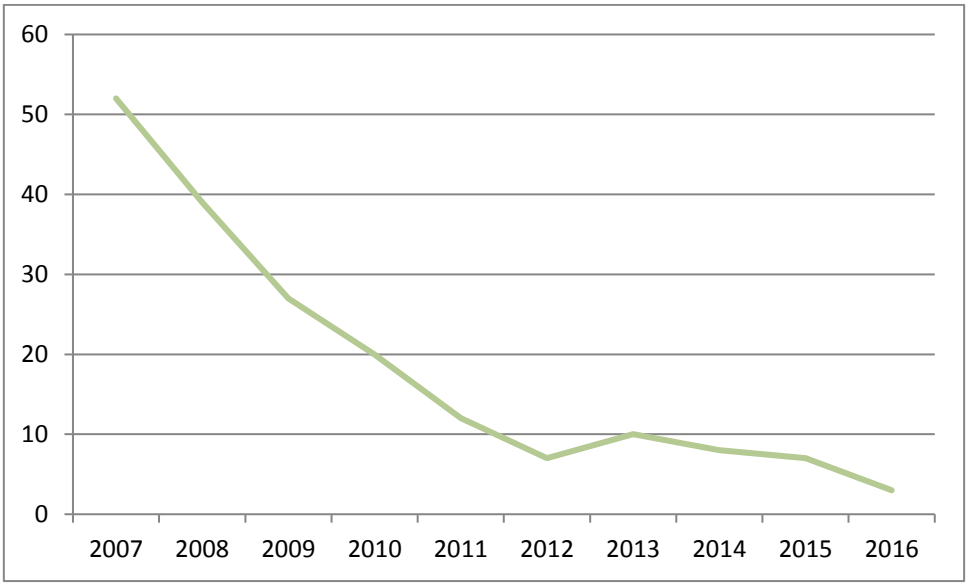

Figure 1: Trend in the number of public water supplies where *E. coli* was detected.

Cryptosporidium

970 test results submitted in 2016	10 supplies, serving 58,938 people, on Boil Water Notice due to a risk from *Cryptosporidium* in 2016	163,809 people on 32 supplies listed on the Remedial Action List due to the risk from *Cryptosporidium* at the end of 2016	24 The number of test results in which *Cryptosporidium* was detected (12 supplies)

Cryptosporidium is a parasite that is found in human or animal waste. If present in drinking water, it can cause persistent diarrhoea.

Cryptosporidium monitoring is not required by the drinking water regulations. However, the EPA has produced guidance on *Cryptosporidium* monitoring[7]. Irish Water must notify the EPA of any detection of *Cryptosporidium* in a supply.

[6] Available at http://www.epa.ie/pubs/advice/drinkingwater/watertreatmentmanualdisinfection.html.
[7] Available at http://www.epa.ie/pubs/advice/drinkingwater/epadrinkingwateradvicenote-advicenoteno9.html

Trihalomethanes (THMs)

92%	59	23	363µg/l
of supplies complied with the THM standard	supplies exceeded the 100 µg/l standard - the majority are in Donegal and Kerry	of these 59 supplies had Trihalomethane levels greater than 150 µg/l	was the highest result found in Allihies, Co. Cork

Trihalomethanes are by-products of the chlorination (disinfection) process. These compounds should not be present in drinking water and their presence should be minimised while not compromising disinfection.

A joint EPA-HSE fact sheet for consumers on THMs is available at http://www.epa.ie/pubs/advice/drinkingwater/trihalomethanesjointpositionstatement.html
An EPA advice note on Disinfection By-Products is also available[8].

Lead

Lead does not come from either the raw water or the water treatment process. It is found in drinking water when the water flows through and dissolves the metal lead pipework, mains connections and plumbing fittings. Lead was commonly used in plumbing fixtures into the 1970's. Lead has an impact on the development of the nervous system and particularly affects infants and young children.

The standard for lead in drinking water is 10µg/l.

In 2016, 97.8% of samples complied with the standard.

If lead is found in a public water supply, Irish Water informs the consumers affected. A grant is available to replace lead fittings in the home. For more details see: www.housing.gov.ie .

[8] Available at http://www.epa.ie/pubs/advice/drinkingwater/epadrinkingwateradvicenoteadvicenoteno4.html

Pesticides

0.5µg/l	0.1µg/l	55	MCPA
is the standard for Total Pesticides and was exceeded in 4 supplies	is the standard for individual pesticides was exceeded in 29 public water supplies	the number of samples exceeding the individual pesticide standard	was the pesticide (herbicide) detected in 37 of these samples

MCPA is usually detected in the months of May/June/July and in September/October. This is because MCPA is applied to grassland in these months for ragwort, rush and thistle control.

An EPA advice note[9] outlines the measures to be taken when pesticides are detected.

Fluoride

Irish Water, on behalf of the HSE, ensures that public water supplies are fluoridated. Under the Health (Fluoridation of Water Supplies) Act, the Minister for Health and Children has established an Expert Body on Fluorides and Health, charged with responsibility for advising the Minister on this topic. Details are available at www.fluoridesandhealth.ie.

The EPA enforces the legal standards in the *European Union (Drinking Water) Regulations 2014* and where the standard is breached ensures that appropriate corrective action is taken. If fluoride is added to drinking water, the Regulations set an upper limit of 0.8 mg/l. Where it is naturally present, a standard of 1.5 mg/l applies. The standard in Ireland is more stringent than the EU Drinking Water Directive standard of 1.5 mg/l and the narrow range of compliance can be difficult to achieve. In 2016, 21 samples (18 supplies) failed the national standard of 0.8 mg/l for Fluoride. No samples were found to contain levels in excess of the EU standard of 1.5 mg/l in 2016.

Compliance with Key Indicator Parameters in Public Water Supplies

The majority of the failures set out in Appendix 1 relate to "indicator" parameters. These give information on the management of the treatment process, the look, taste and smell of the water.

For example, the control of turbidity is one of the indicators of the efficiency of treatment at the plant. High levels of turbidity in the treated water indicate that the treatment process is not operating adequately. It also provides a good indication of whether the treatment plant is capable of removing *Cryptosporidium* oocysts.

Aluminium may be found in drinking water due to the use of aluminium sulphate as a coagulant to remove solids from the raw water during the treatment process. The aluminium standard of 200µg/l was exceeded in 44 supplies during 2016. A failure to meet the standard indicates insufficient control over the coagulation process.

[9] Available at http://www.epa.ie/pubs/advice/drinkingwater/dwadvicenoteno13.html

Another parameter that affects the success of the coagulation process is pH. The pH of a water supply can also vary depending on where the water comes from e.g. groundwater or surface water and the surrounding geology.

Parameters such as odour and taste will indicate whether a drinking water supply is acceptable to members of the public as well as flagging potential problems with the source water or the treatment works.

A failure to meet the standard for an indicator parameter should not, automatically, be considered a cause for concern. EPA Guidelines do not require that such failures are notified to the EPA in all cases[10]. However, where the indicator parameter standard is exceeded Irish Water must carry out an investigation into the cause of the failure to determine if there is a cause for concern. Appendix 1 gives the number of samples analysed and the number exceeding the standard in public water supplies.

Section 2.2: Water Restrictions and Boil Notices

Irish Water must consult with the Health Service Executive (HSE) where drinking water fails to meet the standards or where Irish Water considers there is a risk to public health. A water restriction notice and/or a boil notice may be issued by Irish Water where the HSE considers that drinking water from a supply might endanger health. If this is the case, consumers must be informed promptly. When the problem is resolved by the water supplier, the HSE is again consulted and the notice is removed. Notices can apply to all or part of a supply and their duration depends on the scale of works necessary to solve the issue. In some cases notices are precautionary in nature due to inadequate treatment or failure of the disinfection system, whereas in other cases notices are put in place because *E. coli* or *Cryptosporidium* is detected.

During 2016, 41 boil notices and 10 water restriction notices were in place in 16 counties affecting 84,348 people. The largest supply affected by a boil notice or water restriction during 2016 was the Lough Mask supply in Co. Mayo, which serves 39,435 people. This boil notice was issued following the detection of *Cryptosporidium*. This was investigated by Irish Water and an EPA audit of the supply was completed. The notice was lifted 10 days later on the advice of the HSE. A boil water notice was also issued on the Whitegate Regional supply in Co. Cork on three occasions during 2016 affecting a population of 10,392 each time. Concerns here were of potential risk to human health due to elevated turbidity and the detection of *Cryptosporidium*. The final notice was issued in February and remained in place until October. Irish Water installed a new filtration system and validated UV disinfection system which allowed the lifting of the notice.

At the end of 2016, 10 boil notices were in place affecting 5,654 people. This is a reduction in both the number of boil notices and the population affected, compared to at the end of 2015. At that time 18 boil notices were in place affecting 9,852 people. At the end of 2016, two water restriction notices were in place affecting 11 people.

A summary of all boil notices and water restrictions in place and lifted in 2016 is provided in Appendix 3.

[10] Available at http://www.epa.ie/pubs/advice/drinkingwater/publicwatersupplieshandbook/

Section 2.3: Security of Public Supplies

Providing a safe and secure drinking water supply to the public is of the utmost importance as contaminated drinking water is a potential danger to human health. A supply is safe if the water quality meets the drinking water standards. A supply is secure if risks to the supply are properly managed from the source to the tap.

The World Health Organisation states "The most effective means of consistently ensuring the safety of a drinking water supply is through the use of a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer."

The majority of public water supplies in Ireland use surface water (rivers and lakes) as their source. These serve 81% of the population. Rivers and lakes are much more exposed to potential contamination than groundwater and springs, which serve 12% and 7% of the population respectively. The EPA has identified the preparation and implementation of Drinking Water Safety Plans as one of the priority actions required to protect our drinking water supplies.

Drinking Water Safety Plans

A Drinking Water Safety Plan (DWSP) (see Figure 2) is based on a comprehensive assessment of potential risks that can occur in the catchment, the treatment plant, distribution network and consumer's tap. Whilst monitoring can show that the water quality is satisfactory at a point in time, a drinking water safety plan is necessary to provide security so that people can have confidence in the quality of their drinking water at all times. Through the DWSP approach, all potential risks are identified and the appropriate control measures and mitigation plans are put in place. A DWSP must be prepared for each public water supply. The *EPA Drinking Water Advice Note No. 8 – Developing Drinking Water Safety Plans* provides guidance on the approach.

A properly implemented Drinking Water Safety Plan will protect our water supplies. This approach identifies risks and addresses them before they become a problem in the supply. This reduces the likelihood of things going wrong in the supply and is significantly cheaper than having to deal with an incident. When hazardous events occur in the catchment, they can be managed by carrying out pre-prepared action plans. Therefore it is vital that Irish Water continue to develop and implement the Drinking Water Safety Plan approach.

The DWSP approach allows Irish Water to identify drinking water priorities and to focus resources and investment on the supplies and specific drinking water issues that most need it. In 2016 Irish Water continued to make progress in the development of DWSPs, increasing the number of assessments from 4,336 across 151 water treatment plants in 2015 to 10,082 across 422 water supplies in 2016. The assessments have ensured high priority issues such as *Cryptosporidium*, lead and THMs are targeted through national programmes, which are putting in place the controls and mitigation measures to address the issues, and also to verify their effectiveness.

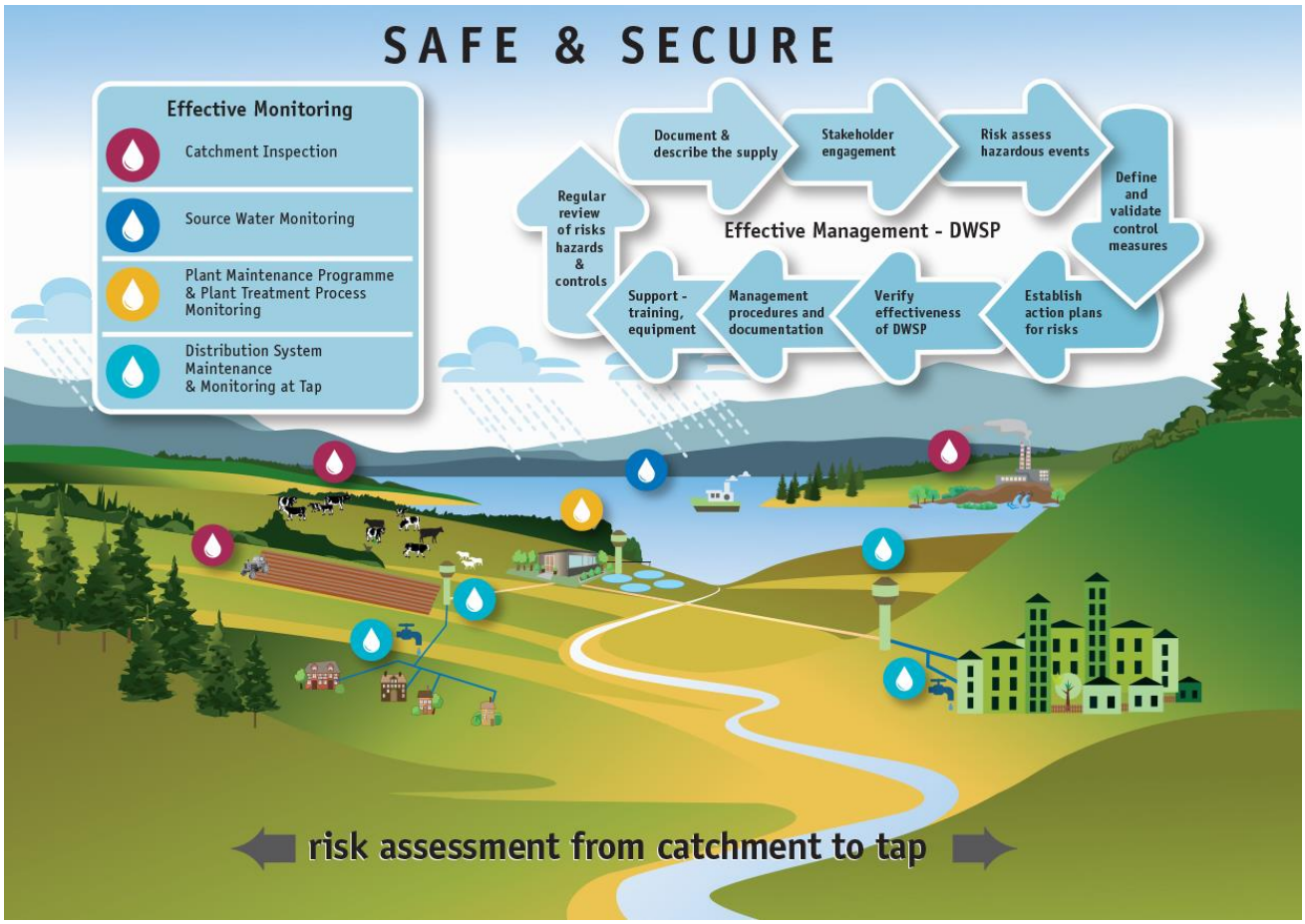

Figure 2: The Drinking Water Safety Plan Approach to managing risks to water supplies

Section 3: Enforcement of Public Supplies

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 European Union (Drinking Water) Regulations 2014**.**

Section 3.1 Failures to meet Drinking Water standards in Public Water Supplies

During 2016, the EPA received and assessed 854 notifications of drinking water quality failures in public water supplies from Irish Water, up from 744 in 2015. This was mainly due to an increase in the number of pH and iron failures (indicator parameters) being notified to the EPA. A breakdown of the number of public water supplies that notified a microbiological or chemical failure to the EPA in 2015 and 2016 is provided in Table 3.

Parameter	No. of supplies with Notifications in 2015	No. of supplies with Notifications in 2016	Change since 2015
Microbiological			
E. coli	8	12	↑ 4
Enterococci	3	6	↑ 3
Chemical			
Antimony	0	0	No exceedances
Arsenic	1	7	↑ 6
Benzene	2	0	↓ 2
Benzo(a)pyrene	0	0	No exceedances
Bromate	1	2	↑ 1
Cadmium	0	0	No exceedances
Copper	8	4	↓ 4
Fluoride	4	1	↓ 3
Lead[11]	39	See Section 3.2	See Section 3.2
Nickel	1	2	↑ 1
Nitrate	3	2	↓ 1
Nitrite (at tap)	0	1	↑ 1
PAH	0	1	↑ 1
Pesticides (individual)	61	44[12]	↓ 17
Pesticides (Total)	8	3	↓ 5
Trihalomethanes (Total)	62	90	↑ 28

Table 3: Number of Public Water Supplies where the microbiological or chemical exceedances were notified to the EPA during 2015 and 2016.

If a microbiological or chemical failure is found when carrying out routine monitoring described in Section 2.1, it must be notified to the EPA. Irish Water also carries out additional monitoring, for example, when carrying out investigations or responding to complaints. If a failure is found when this additional monitoring is being carried out it must also be notified to the EPA. This can result in

[11] Individual lead notifications may relate to more than one supply zone.
[12] These include four supplies in Kerry which were amalgamated with the Listowel Regional Supply during 2016.

more failures being notified to the EPA than are reported in the monitoring returns addressed in Section 2.1. The important point to note is that all failures must be reported and investigated.

Section 3.2 National Priorities

The EPA has identified priority issues affecting drinking water quality and has recommended that Irish Water take a strategic approach to these issues. Irish Water, as a national utility, is in a position to implement programmes to take actions on these issues on a national level.

Disinfection

Disinfection is the most important step of the water treatment process. It makes our water supplies safe from bugs, such as *E. coli*, which can cause illness. In 2016, Irish Water prepared a National Disinfection Strategy to address deficiencies in disinfection of public water supplies. The Strategy was accompanied by a National Disinfection Programme. The Strategy outlined the standard specifications for disinfection systems that should be in place in all water treatment plants. The Disinfection Programme sets out the plan for the assessment and upgrading of the disinfection treatment systems at water treatment plants across the country. It also provides timeframes for completion of the works to upgrade these systems.

UV Disinfection System

The EPA is monitoring Irish Water's progress with the implementation of the National Disinfection Programme via the updates which Irish Water provides on a quarterly basis.

During 2016, the upgrade works were concentrated in the following counties: Clare, Kerry, Donegal, Longford, Kildare, Dublin, Westmeath, Wicklow, Waterford, Mayo, and Sligo. At the end of 2016, 363 individual water treatment plants (WTPs) had been surveyed and upgrade works had commenced at 86 plants out of a total of 859 to be assessed nationally.

The population affected by a boil water notice at the end of 2016 was over 4,000 less than population affected at the end of 2015.

Irish Water has stated that the National Disinfection Programme will continue to expand during 2017 with site assessment and upgrade works scheduled to take place in 12 additional counties (Wexford, Carlow, Kilkenny, Tipperary, Limerick, Cavan, Monaghan, Leitrim, Offaly, Laois, Louth and Meath). The remaining counties are currently under assessment and will be completed subsequently. The programme is scheduled for completion in Quarter 2 2019. The improvements being made to disinfection systems across the country will ensure that disinfection is carried out in a reliable and consistent way, safeguarding the quality of drinking water.

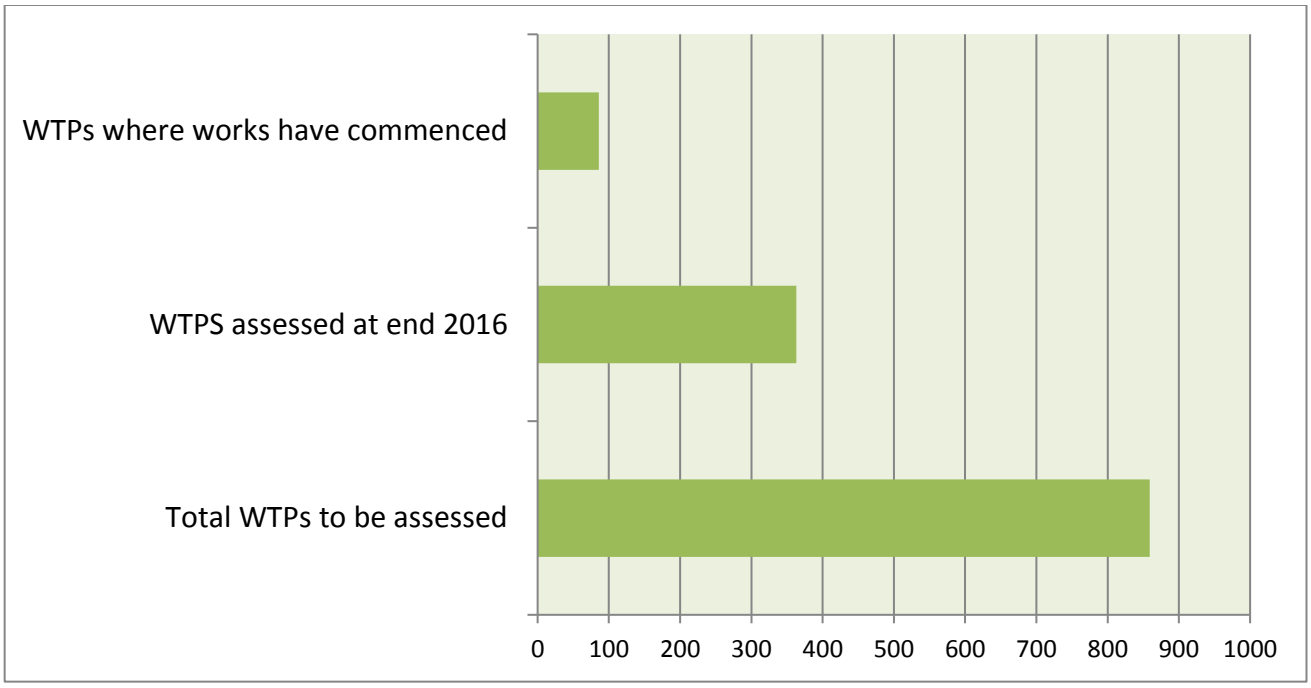

Figure 3: Progress made at Water Treatment Plants (WTPs) under National Disinfection Programme

Trihalomethanes (THMs)

Trihalomethanes (THMs) are chemicals that can form when organic matter in the raw water, such as decaying vegetation, reacts with chlorine in the disinfection process. This is a particular problem in Ireland because of the large amount of supplies using surface water (rivers and lakes) as their source. The presence of THMs should be minimised by optimising the removal and treatment of organic matter without compromising disinfection. The standard for THMs in drinking water is 100 µg/l.

The EPA Remedial Action List (RAL) highlights the water supplies that pose a risk to consumers, and are, therefore, in need of improvement. At the end of 2016, there were 99 supplies on the RAL. Of these, 71 are supplies where THMs exceeded the standard. These 71 supplies serve 464,718 people.

Irish Water is working to ensure that natural organic matter is removed by appropriate effective treatment, that disinfection is optimised and water age in reservoirs and distribution networks is managed to achieve compliance with the THMs standard.

The European Commission initiated pilot infringement proceedings against Ireland in 2015 (ref 7554/2015/ENVI) due to the number of supplies which were failing to meet the THMs standard. A decision on the infringement proceedings is currently with the European Commission and a letter of formal notice is expected before the end of 2017. The EPA has identified THMs as a priority action area in previous Drinking Water Reports and has targeted enforcement efforts in the area to ensure that action programmes are being prepared and implemented by Irish Water. Irish Water submits quarterly progress reports to the EPA for each of these supplies and has indicated that remedial works will be completed in all supplies by 2020.

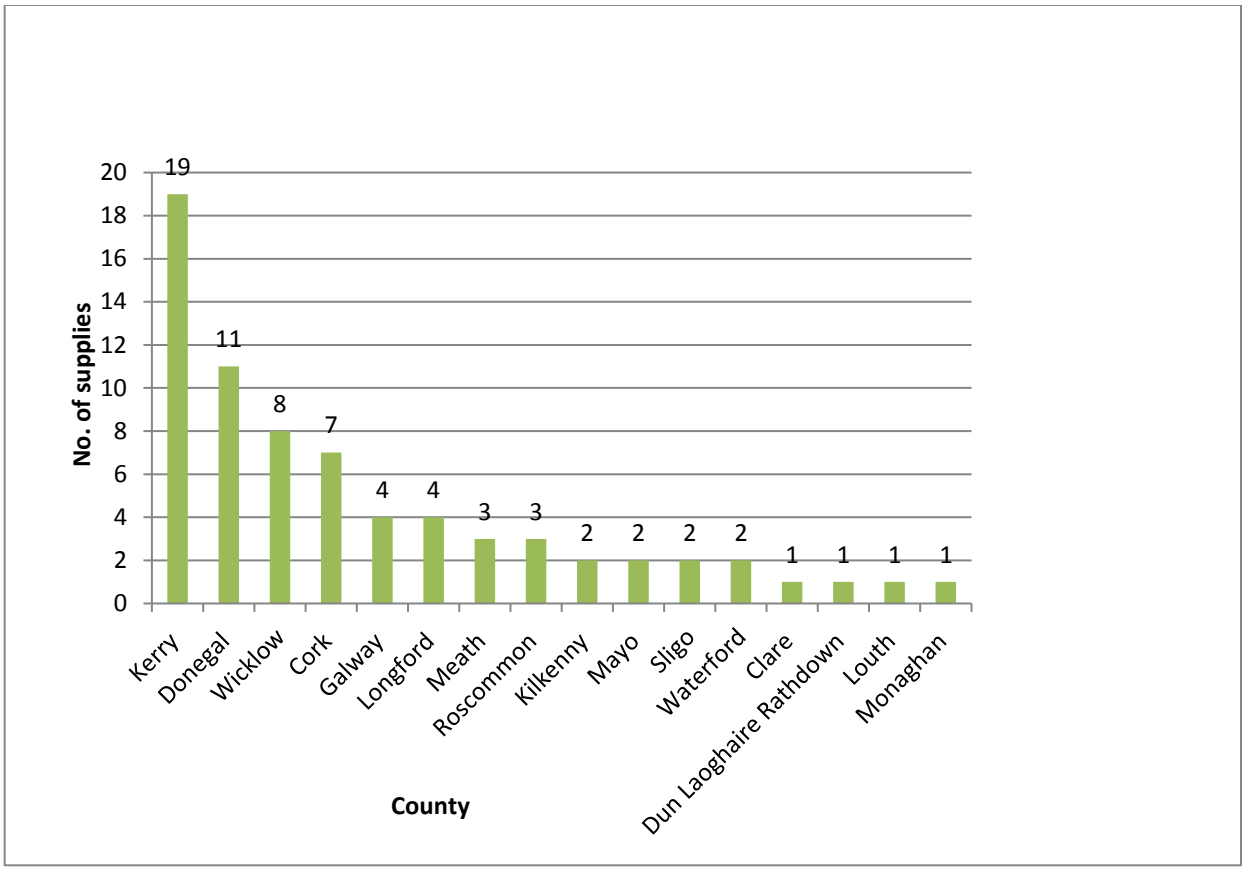

Figure 4: Number of public water supplies, by county, with THM failures in 2016

Lead

Lead is found in drinking water when it dissolves from lead pipework, mains connections and plumbing fittings. The standard for lead in drinking water is 10 µg/l.

In June 2015, the Government published a National Lead Strategy to reduce exposure to lead in drinking water. This strategy reflects the fact that lead in drinking water is both the responsibility of water suppliers (lead pipework within the distribution network) and property owners (internal lead plumbing in buildings). The strategy sets out actions to reduce the population's exposure to lead, and these actions are to be reported on by the Department of Housing, Planning, Community and Local Government.

During 2016, Irish Water developed its Lead in Drinking Water Mitigation Plan which sets out what it is going to do to reduce the public side lead in its control. The EPA also moved to a national approach to assessing lead compliance using the framework of the National Lead Strategy and Irish Water's Mitigation Plan. The EPA now tracks the progress of actions outlined in the mitigation plan to reduce public exposure to lead in drinking water.

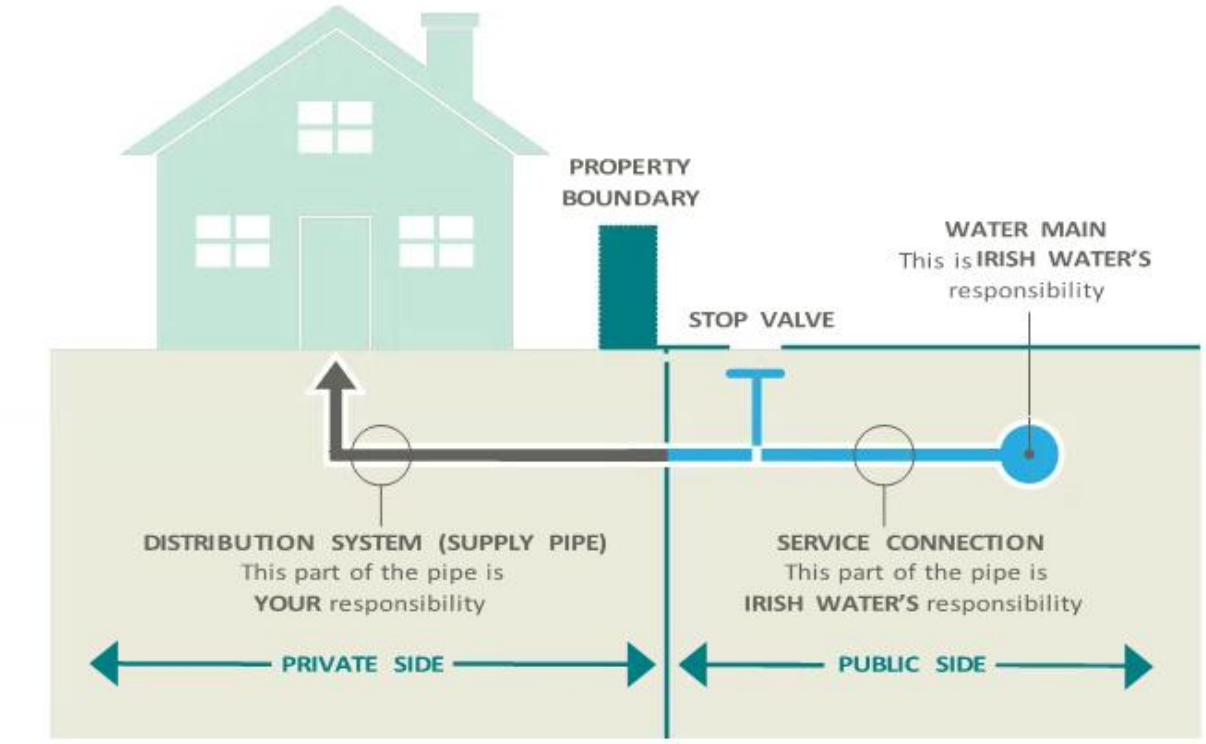

Figure 5: Responsibility for water distribution systems

The ultimate goal of both the National Strategy and the Mitigation Plan is the removal of all lead pipework. It is estimated that there are 180,000 lead service connections: 140,000 service connections from water mains which run under the roads, and 40,000 backyard service connections (where lead pipes run through backyards serving a number of houses). Irish Water aims to remove all of this public side lead pipework by 2026. It is the responsibility of a property owner to remove any lead pipework within the property.

However, given the scale of this task, other actions are also required to reduce people's exposure to lead through their drinking water and protect public health in the interim.

Main actions carried out in 2016:

- Raising awareness and advising consumers - almost 37,000 advice letters were issued to consumers where lead pipes were identified when water meters were being installed or where a sample from their premises failed to meet the lead standard.
- The introduction of orthophosphate dosing at two water treatment plants, Hacketstown in Co. Carlow and Clareville, Limerick City supply to reduce the amount of lead that can dissolve from the pipework.
- Additional monitoring - Irish Water commenced an expanded programme of lead monitoring to gain a better understanding of the extent of lead in the drinking water networks and to inform decisions on prioritisation of areas for lead mitigation.

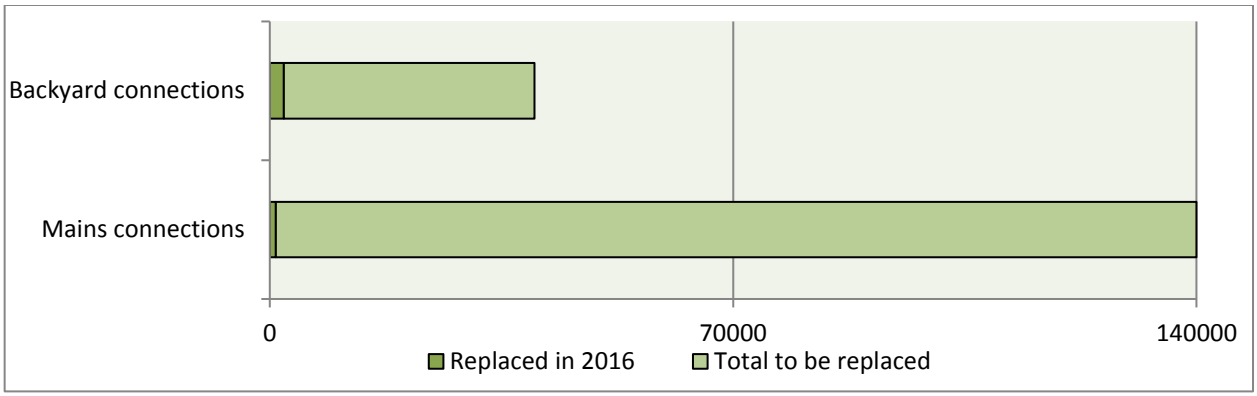

Figure 6: Number of lead connections replaced in 2016 as a proportion of the total to be replaced

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[13] 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 standards:

Parameter	Limit
Pesticides (individual)	0.10 µg/l
Aldrin, dieldrin, heptachlor, heptachlor epoxide	0.030 µg /l
Pesticides – Total	0.50 µg/l

Table 4: Pesticide Limits

The standards are set considerably below levels which would give rise to potential effects on human health. Compliance with these standards in drinking water demands the utmost care in the use of these products in the environment, and particularly near drinking water sources and abstraction points.

Improved monitoring of public water supplies for pesticides has taken place in recent years, and in 2016, Irish Water began a programme of monitoring all public supplies for 21 pesticides most likely to be found in Irish waters. An issue of widespread and, in a small number of supplies, persistent failures to meet the standard has emerged.

- At the end of 2016, 63 supplies serving over 900,000 people had open investigations due to failures to meet the pesticide standard.
- Failures notified to the EPA in 44[14] supplies during 2016.
- Eight supplies had no failures in 2016 and the investigations are now closed.
- 15 supplies had no failures in 2016 but had not submitted enough compliant monitoring, therefore these investigations remain open.

[13] 2-methyl-4-chlorophenoxyacetic acid

[14] These include four supplies in Kerry which were amalgamated with the Listowel Regional Supply during 2016, reducing this number to 40 at the end of 2016.

Where pesticides are detected, the EPA advice note[15] recommends a combination of targeted investigation, monitoring, and awareness raising activities to prevent further contamination of water supplies. The EPA now also requires that the investigative monitoring should include monthly sampling from April to November to reflect the seasonal use of herbicides, in particular MCPA. A National Pesticide and Drinking Water Action Group, led by the Department of Agriculture, Food and the Marine, meets quarterly to tackle the issue of sustainable use of pesticides, through engagement with relevant stakeholder organisations.

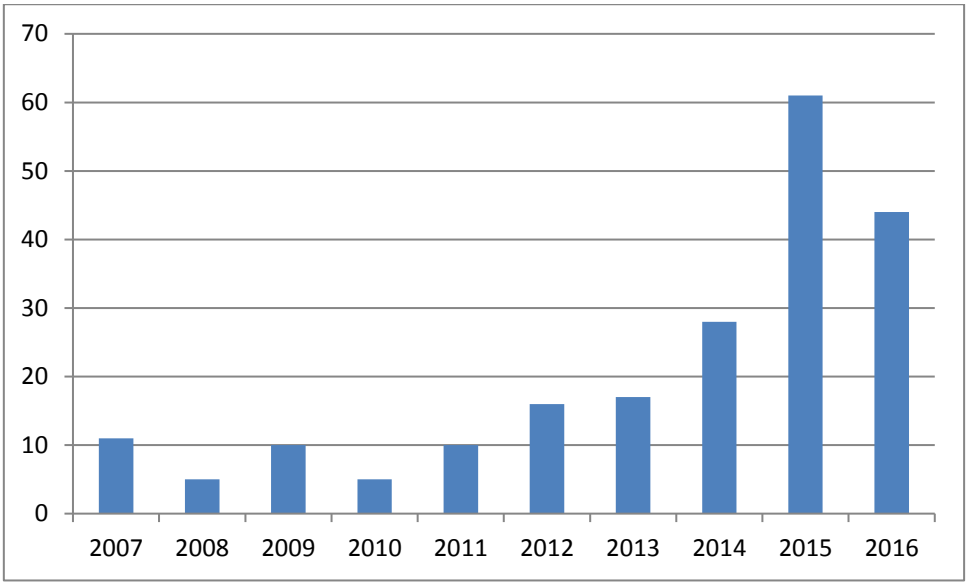

Figure 7: Number of public water supplies with reported pesticide failures

Irish Water is currently adopting different approaches to deal with the issue of pesticides in drinking water in different parts of the country depending on local circumstances. In some areas progress has not been adequate and the EPA has identified 16 supplies with pesticide exceedances for which Irish Water has not taken or identified adequate measures to return them to compliance. The EPA has identified the need for a National Pesticides Strategy and Irish Water has stated that a Strategy will be published in Q3 2017.

Section 3.3 Remedial Action List

The Remedial Action List, first prepared by the EPA in 2008, is a dynamic list of public water supplies in need of remedial action. Public water supplies are added to the RAL for one or more of the following reasons, which focus on the adequacy of the treatment plant:

- Failure(s) of the following priority RAL parameters in the previous two years:
  - Microbiological parameters - *E. coli*
  - Chemical parameters - nitrate, trihalomethanes, bromate
  - Indicator parameters - aluminium, turbidity
- Inadequate treatment (e.g. no treatment other than chlorination for a surface water supply or poor turbidity removal or excessive levels of aluminium in the treated water).

[15]Available at http://www.epa.ie/pubs/advice/drinkingwater/dwadvicenoteno13.html

- Monitoring results or compliance checks by the EPA indicated a lack of operational control at the supply's treatment plant.
- Identified by the Health Service Executive as a supply where improvements were required.

The EPA has identified the continued progress of action programmes for RAL schemes as one of the priority actions required to protect our drinking water supplies.

The EPA updates the RAL on a quarterly basis. Supplies are removed from the RAL when Irish Water has demonstrated that the supply is safe and secure.

Remedial Action Progress

The first RAL collated by the EPA in 2008 identified 339 public water supplies (representing 36% of public water supplies) that required remedial action. The number of supplies on the RAL is steadily decreasing year on year and at the end of 2016 there were 99 schemes on the RAL, serving 774,340 persons. Appendix 4 contains progress of RAL supplies at the end of 2016 which is summarised as follows:

- 277 (82%) of the original 339 supplies were removed from the RAL by the end of 2016 (Figure 8).
- 110 supplies were added to the original RAL but have been subsequently removed.
- 37 supplies were added to the original RAL and remain on the current RAL.
- 99 supplies were on the RAL at the end of 2016, supplying water to 774,340 consumers (Figure 8).
- 18 supplies were added to the RAL in 2016. The two most common reasons that supplies were added to the RAL were for the failure to meet the THM standard, and inadequate treatment for *Cryptosporidium*.
- Remedial works were completed in 35 RAL supplies serving 141,634 persons in 2016.

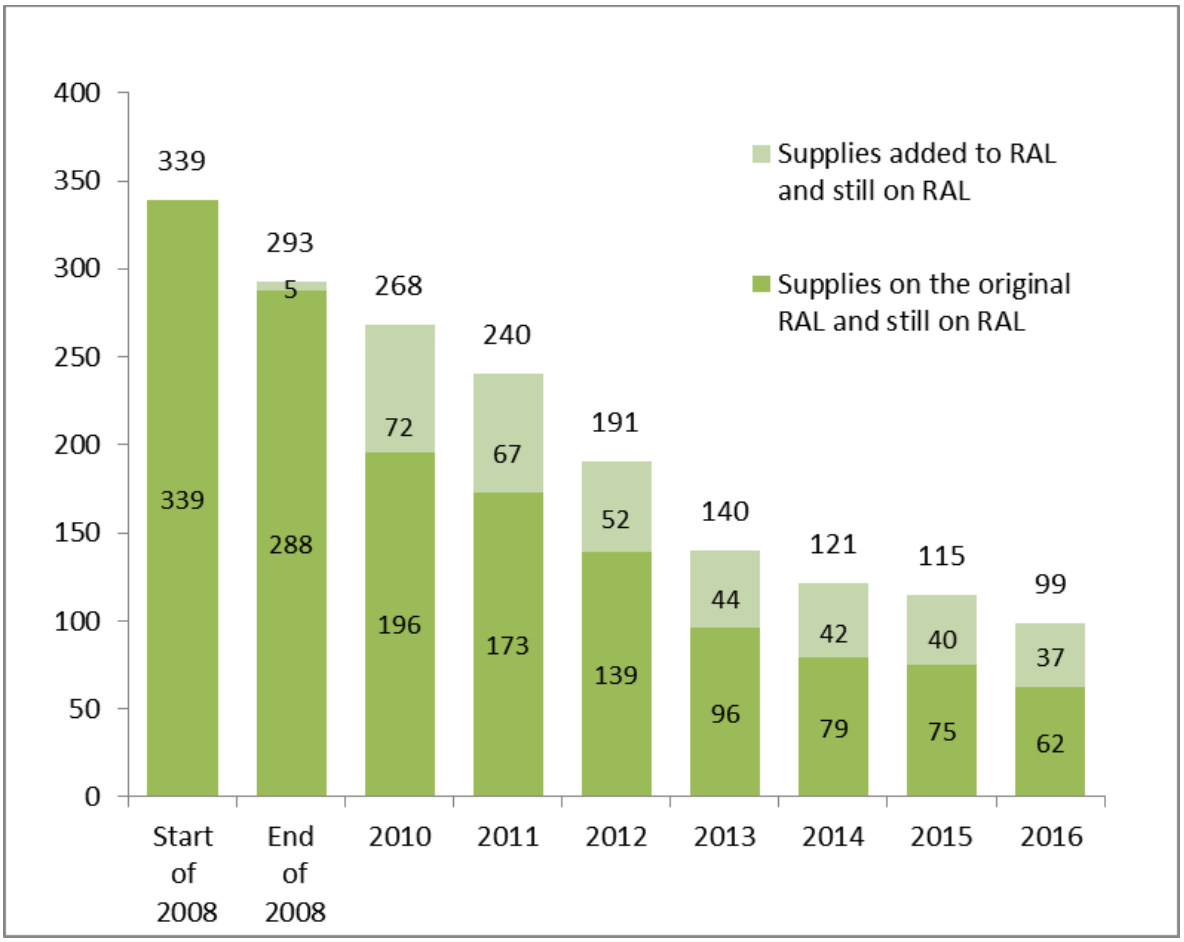

Figure 8: Breakdown of number of public supplies on the original RAL and added to the RAL.

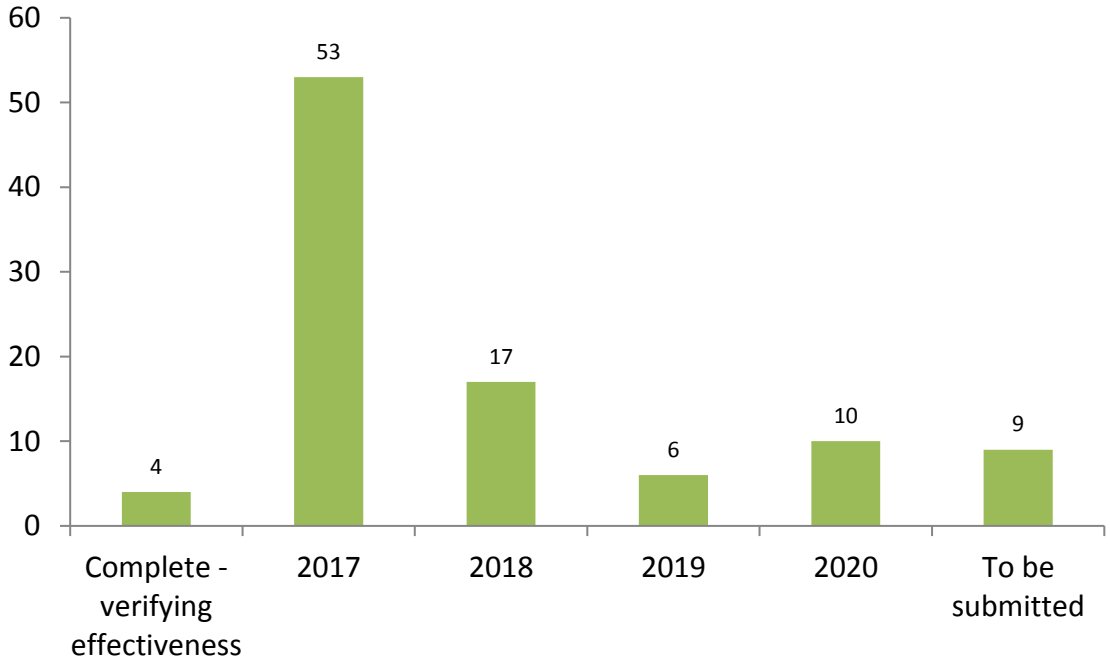

Figure 9: RAL completion dates provided by Irish Water in December 2016.

Completion dates for all but nine RAL supplies were provided to the EPA by Irish Water by the end of 2016. Eight supplies without completion dates were supplies added to the RAL in Q4, 2016 and completion dates were submitted by Irish Water for these supplies in Q1, 2017. The remaining supply does not have a completion date due to difficulties in obtaining planning permission. Irish Water submits quarterly progress reports to the EPA and a summary is published on the EPA website (http://www.epa.ie/pubs/reports/water/drinking/).

Appendix 4 gives a breakdown of the supplies on the RAL in each county along with anticipated completion dates as provided by Irish Water as of December 2016.

Supplies on the RAL at the end of 2016.			
40	72	9	20
for a microbiological failure e.g. *E. coli, Cryptosporidium*	for a chemical failure e.g trihalomethanes	for an indicator failure e.g. aluminium, coliforms	for another reason e.g. vulnerable source, EPA audit
These supplies were either on the original RAL or were subsequently added to the RAL.			
99 supplies were on the RAL at the end of 2016. Some supplies are on the RAL for more than one reason.			

Section 3.4 Directions and Prosecutions

The EPA may issue a Direction to Irish Water under the Drinking Water Regulations where there is a risk to human health or where remedial action is required. Examples of cases where directions have been issued include the following:

- There is no chlorine monitor or alarm in place;
- A previous recommendation has not been implemented and that failure is a contributory factor in an incident;
- A response to an audit is not submitted or is not satisfactory;
- A follow up audit finds no progress in implementing previous recommendations;
- A RAL scheme has no completion date or there is evidence of significant slippage in progress;
- There is inadequate progress in implementation of a national strategy;
- Following a notification it appears that there was an inadequate investigation or inadequate corrective action.

The EPA issued 15 legally binding Directions to Irish Water during 2016. A number of Directions issued prior to 2016 remained open and were actively pursued by the EPA during 2016. A summary of these directions and an update on their status is provided in Appendix 2.

The EPA may initiate a prosecution against Irish Water where it considers that a Direction has not been complied with. In April 2016, the EPA took a case against Donegal County Council and Irish Water for failure to ensure THM compliance in the Letterkenny PWS. Donegal County Council was given the Probation Act and the case against Irish Water was dismissed. The EPA also took a case against Irish Water in September 2016 for failure to ensure THM compliance in the Carraroe PWS. In this case, Irish Water was given the Probation Act on condition of a donation to a local charity of €3,000.

Section 3.5 Audits

During 2016, the EPA conducted 59 audits (Appendix 5) of public water supplies across 23 local authority areas. These were a mixture of 39 scheduled audits and 20 reactive audits. Reactive audits are undertaken to follow up on issues as they arise. These can include boil notices, *Cryptosporidium* outbreaks, disinfection or microbiological failures. Audits may be scheduled for a number of reasons, such as checking that planned works have been carried out, or before a supply is removed from the RAL. Audit reports are issued to Irish Water and the EPA ensures that actions are taken to address any audit findings. An audit may address some or all of the following aspects of a supply: source protection; treatment capacity; treatment process; distribution network.

A summary of the main compliance issues identified across the 59 audits is provided below:

Audit Findings: Source Protection & Storage

Water sources, storage tanks and reservoirs must be protected to prevent contamination. The main findings in relation to source protection at 48 supplies where the source was inspected were:

EPA Audit Findings - Source

15	10	3	1
supplies had inadequate source protection	supplies were using uncovered springs or poorly protected wells	supplies using spring or groundwater sources had microbiological contamination in the raw water	supply using a spring or groundwater source showed evidence of surface water ingress

Poor source protection measures can lead to the contamination of the source water. Supplies with inadequate source protection that do not have a treatment barrier are at risk of entry of *Cryptosporidium* into the supply.

Adequate source protection is critical to ensuring safety and security of public water supplies.

Audit Findings: Chemical Treatment

All public water supplies using surface water sources or using groundwater sources which are influenced by surface water must have a treatment barrier. Chemical treatment functions as a barrier to remove contaminants and particulate matter from water, treating it to the required standard. This prevents *Cryptosporidium* getting into the water supply and prevents the formation of by-products, such as trihalomethanes. Chemical treatment was in place in 37 of the supplies audited by the EPA during 2016.

EPA Audit Findings – Chemical Treatment (Total = 37)

14	5	10	7
supplies had problems with the operation of filters	supplies had turbidity > 1.0 NTU after filtration. A further 6 did not have a turbidity monitor on each filter	supplies had inadequate chemical dosing	supplies had floc carryover from the clarifiers

Poor operation of filters and poor turbidity removal means that if *Cryptosporidium* is present in the source water it is likely to be in the treated water and may pose a risk to human health. Floc carryover indicates poor control over chemical dosing.

Chemical treatment requires careful management to remove contaminants and prevent entry of *Cryptosporidium* into the public water supply.

Audit Findings: Disinfection

All drinking water supplies should be disinfected to prevent harmful bugs entering the supply. The minimum disinfection standards set by the EPA[16] were not met in 17 supplies audited during 2016.

EPA Audit Findings – Disinfection			
2	6	8	3
supplies (in Clare and Waterford) did not have a chlorine/ UV monitor and alarm	supplies had inadequate disinfection contact time. A further 7 had not calculated the contact time	supplies did not have duty and standby disinfection dosing equipment	supplies had disinfection monitors and alarms that were not working or not being responded to
The absence of a working chlorine monitor means that the adequacy of disinfection cannot be verified. A working alarm is required in order to alert the operator to any issues that might arise. Inadequate disinfection contact time can result in insufficient disinfection and the entry of harmful bugs into the supply. Duty and standby dosing equipment is necessary to provide disinfection security in the event of pump failure.			
Reliable and verifiable disinfection is critical to ensuring the safety and security of a drinking water supply.			

[16] Available at http://www.epa.ie/pubs/advice/drinkingwater/epadrinkingwateradvicenoteadvicenoteno3.html

Section 4: Concluding Remarks and Recommended Actions

Section 4.1: Conclusions and Recommendations on National Priorities

Priority Issue	Required Actions
Keeping water free of harmful bugs (Disinfection)	Eliminate long-term Boil Water Notices by providing robust disinfection systems.

Irish Water continues to make progress in carrying out site assessments and upgrade works under the National Disinfection Programme.

The population affected by a boil water notice at the end of 2016 was over 4,000 less than population affected at the end of 2015.

All public water supplies were monitored for *E. coli* in 2016 and only three supplies reported non-compliant *E. coli* results as part of the annual monitoring returns.

At the end of 2016, 32 public water supplies serving over 163,000 people still did not have adequate treatment to prevent *Cryptosporidium* entering the supply.

Recommendations: Irish Water should continue to progress the National Disinfection Programme. Where urgent issues are identified e.g. no chlorine alarm in place, they should continue to be addressed immediately.

Priority Issue	Required Actions
Minimising harmful disinfection by-products (Trihalomethanes)	Put in place treatment that adequately removes pre-cursors which lead to the formation of harmful by-products.

The number of supplies reporting THM failures remains high, with 71 supplies on the Remedial Action List for persistent THM failures. Quarterly reports, including progress updates of action programmes submitted and approved under the EPA Remedial Action List, are being submitted to the European Commission outlining progress towards THM compliance.

Recommendation: Irish Water should continue to carry out works to deliver on time the action programmes for supplies on the RAL. It is critical to ensure that natural organic matter is removed through appropriate treatment, to prevent THM formation and achieve compliance with the THM standard.

Priority Issue	Required Actions
Eliminating lead from our networks	Assess public buildings for lead pipes and fittings; encourage increased replacement of private side lead pipework; and replace all public side lead pipework.

Progress has been made in relation to public water supplies under the National Lead Strategy, in particular:

- Raising awareness and providing advice to consumers.
- The introduction of orthophosphate dosing at two water treatment plants to reduce the amount of lead that can dissolve from the pipework.
- Expansion of the lead monitoring programme.

Recommendation: Continued efforts are required to progress the replacement of lead pipes and fittings, and to actively encourage householders to replace private side lead plumbing.

Priority Issue	Required Actions
Preventing pesticides from entering our waters	Protect drinking water sources and abstraction points and promote responsible use of pesticides.

Progress in delivering a catchment based approach to the reduction of pesticides in drinking water has been made in some areas, most notably in the north-west of the country. However, there is still a major deficit in the engagement with stakeholders in some areas and in the information being provided to the EPA. A consistent national approach must be adopted to ensure that pesticides are prevented from entering our drinking water supplies.

Recommendation: Irish Water needs to produce a strategy to address the issue of pesticides in drinking water on a national and local level. The resources available from the National Pesticides and Drinking Water Action Group should be utilised as much as possible in developing activities in catchments. Treatment options for pesticides should be considered where catchment-based activities prove unsuccessful in reducing pesticide exceedances in drinking water. The monitoring programme for the 21 most commonly used pesticides needs to be carried out on all public water supplies.

Priority Issue	Required Actions
Managing risks to our public water supplies	Progress and complete Drinking Water Safety Plans.

Irish Water has committed to the DWSP approach but has not, to date, provided the EPA or the public with neither the details of these risk assessments nor of the mitigation measures proposed.

Recommendation: Irish Water should prepare an implementation plan for DWSP for public water supplies, including metrics, and provide regular reports to the EPA on progress towards achieving the goal of having a DWSP for all public water supplies.

Priority Issue	Required Actions
Ensuring all water treatment plants are effective	Progress action programmes for all Remedial Action List schemes.

The number of supplies on the RAL reduced from 115 at the end of 2015 to 99 at the end of 2016. All RAL supplies have an action programme in place, with just one action programme without a completion date.

Recommendation: Continued commitment is required to progress action programmes for supplies on the Remedial Action List and to meet stated completion dates.

Section 4.2: Concluding Remarks

A large number of people benefitted from improvements to their water supplies which allowed the removal of long-term boil water notices in 2016. Where a new boil water notice has had to be issued, the EPA is satisfied that Irish Water has taken action to ensure that consumers were affected for as short a time as possible. Implementing Irish Water's National Disinfection Strategy will ensure that risks are proactively addressed and the downward trend of supplies contaminated with *E. coli* is evidence of the effectiveness of this approach.

Trihalomethanes, lead and pesticides are the most significant issues for chemical compliance in public water supplies. While Irish Water is tackling trihalomethanes and lead on a national level, there is no such consistent approach to dealing with pesticide failures. Putting in place a national strategy on pesticides will be critical in addressing this issue which has unique challenges in that pesticide contamination arises in the catchment. This will require cooperation from the various different stakeholders in the affected catchments.

The priority issues identified by the EPA and discussed throughout this report can be viewed under the umbrella of the Drinking Water Safety Plan approach. This approach assesses the risks to a water supply from the source to the tap. Only by implementing such an approach can we be sure that risks to our public water supplies are managed.

Irish Water, as a national utility, is in a position to implement programmes to take actions on the priority issues on a national level. Continued and sustained investment in Ireland's public water sector will be essential if Irish Water is to complete works to remove all 99 supplies from the Remedial Action List and to ensure the delivery of safe and secure water to all consumers.

Appendices

Appendix 1 lists monitoring results and compliance rates for public water supplies

Appendix 2 lists the status of EPA Directions at end of 2016

Appendix 3 lists Boil Notices and Water Restriction Notices in place on Public Water Supplies during 2016.

Appendix 4 lists the details of Remedial Action List supplies for each county or area

Appendix 5 lists, for each county or area, the microbiological and chemical compliance rates in public water supplies, the number of boil notice and water restrictions, and selected enforcement information (audits, directions, RAL).

Appendix 1: Public Water Supplies – Zones Monitored and Samples Analysed in 2016

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	903	3	**99.7**	9186	3	**>99.9**
Enterococci	611	4	**99.3**	1207	4	**99.7**
Chemical						
1,2-dichloroethane	709	0	**100**	1160	0	**100**
Antimony	672	0	**100**	1112	0	**100**
Arsenic	672	6	**99.1**	1122	6	**99.5**
Benzene	709	0	**100**	1170	0	**100**
Benzo(a)pyrene	675	0	**100**	1112	0	**100**
Boron	728	0	**100**	1206	0	**100**
Bromate	673	1	**99.9**	1110	1	**99.9**
Cadmium	728	0	**100**	1206	0	**100**
Chromium	728	0	**100**	1208	0	**100**
Copper	734	2	**99.7**	1226	2	**99.8**
Cyanide	605	0	**100**	1019	0	**100**
Fluoride	741	18	**97.6**	1704	21	**98.8**
Lead	740	25	**96.6**	1346	29	**97.8**
Mercury	672	0	**100**	1110	0	**100**
Nickel	734	1	**99.9**	1223	1	**99.9**
Nitrate	738	0	**100**	2219	0	**100**
Nitrite (at tap)	734	1	**99.9**	2329	1	**100**
Nitrites (at WTW)	15	0	**100**	175	0	**100**
PAH	675	0	**100**	1122	0	**100**
Pesticides - Total	733	4	**99.5**	1223	5	**99.6**
Selenium	672	0	**100**	1122	0	**100**
Tetrachloroethene & Trichloroethene	709	0	**100**	1171	0	**100**
Total Trihalomethanes	734	59	**92.0**	1235	85	**93.1**
Indicator						
Aluminium	758	44	**94.2**	6609	81	**98.8**
Ammonium	903	4	**99.6**	9204	8	**99.9**
Chloride	734	2	**99.7**	1212	2	**99.8**
Clostridium perfringens	795	14	**98.2**	7813	15	**99.8**
Coliform Bacteria	903	72	**92.0**	9169	97	**98.9**
Colony Count @ 22°C	731	19	**97.4**	1367	22	**98.4**
Colour	596	29	**95.1**	6083	103	**98.3**
Conductivity	903	0	**100**	9220	0	**100**
Iron	900	80	**91.1**	7978	135	**98.3**
Manganese	733	13	**98.2**	2183	20	**99.1**
Odour	877	49	**94.4**	8876	225	**97.5**
pH	903	199	**78.0**	9229	420	**95.4**
Sodium	728	4	**99.5**	1202	4	**99.7**
Sulphate	729	0	**100**	1201	0	**100**
Taste	874	12	**98.6**	8805	30	**99.7**
Total Organic Carbon	731	6	**99.2**	1214	6	**99.5**
Turbidity (at tap)	903	15	**98.3**	9177	15	**99.8**
Turbidity (at WTW)	57	3	**94.7**	235	3	**98.7**
Radioactivity						
Total Indicative Dose	21	0	**100**	29	0	**100**
Tritium	1	0	**100**	9	0	**100**

Appendix 2: Status of Directions at end of 2016

EPA directions issued during 2016 – reason for issue and status at end of 2016.

Area/ County	Supply	Reason for Direction	Issue Date	Status at end of 2016
Clare	Carron	No residual chlorine alarm	29/02/2016	Irish Water had complied with the direction
Clare	Feakle	Inadequate Contact Time	29/02/2016	
Clare	Mountshannon	Inadequate Contact Time	29/02/2016	
Galway	Loughrea	Slippage in timeframe to install UV disinfection system	21/03/2016	
Limerick	Hospital	Failure to submit action programme and timeframes	02/08/2016	
Mayo	Ballina Wherrew	Non-response to an EPA request regarding an exceedance.	11/01/2016	
Mayo	Ballina Lisglennon	Audit Report recommendation not implemented	18/05/2016	
Mayo	Erris PWS	Non-response to an EPA request regarding an exceedance	11/01/2016	
South Dublin	South Dublin Zone 3	Failure to implement remedial actions	30/03/2016	
Donegal	Letterkenny	Noncompliance with THMs standard	11/04/2016	Action Programme being implemented by Irish Water
Donegal	Rathmullan	Non-compliance with THMs standard	11/04/2016	The date in the direction had not yet been reached. Compliance status to be determined after the due date
Kerry	Templenoe	To decommission the plant due to water quality issues	29/09/2016	
Roscommon	Ballinlough/ Loughglynn	Replace source or install Crypto barrier by 31 Dec 2017	26/08/2016	
Waterford	Stradbally	Noncompliance with Aluminium standard	07/12/2016	
Clare	Carron	UV disinfection not in compliance with EPA standards	14/07/2016	Direction deadline passed. Further enforcement action not currently being pursued due to verified progress with works

Directions issued prior to 2016 - reason for issue and status at end of 2016.

Area/County	Supply	Reason for Direction	Issue Date	Status at end of 2016
Clare	Broadford	No chlorine monitor or alarm	21-Oct-15	IW had complied with the Direction
Clare	O Briens Bridge	No chlorine alarm	19-Nov-15	
Clare	Feakle	No chlorine alarm	19-Nov-15	
Clare	Flagmount	No chlorine alarm	19-Nov-15	
Clare	Miltown Malbay	No chlorine alarm	19-Nov-15	
Clare	Mountshannon	No chlorine alarm	19-Nov-15	
Clare	West Clare	No chlorine alarm	19-Nov-15	
Tipperary	Clonmel Poulavanogoe	Inadequate progress with Remedial Actions	05-Jun-15	
Waterford	Ring Helvick	THM exceedances	16-Dec-15	
Wicklow	Aughrim/Annacurra	Failure to implement previous audit recommendations	29-Sep-15	
Donegal	Owenteskna/Kilcar	Trihalomethane exceedances.	20-Jan-15	Action Programme being implemented by Irish Water
Kilkenny	Inistiogue	Trihalomethane exceedances/Lack of Response from IW	05-Jun-15	
Galway	Inishmore Cregacareen	THM exceedances	29-May-15	
Waterford	LCB Lismore	THM exceedances	06-Jun-15	
Cork	Drimoleague	THM exceedances	05-Jun-15	The deadline in the directions has not yet been reached. Compliance will be determined after the due date.
Cork	Kealkill	THM exceedances	05-Jun-15	
Dublin	Ballyboden/Ballymore Eustace	No action programme/failure to adhere to RAL dates	05-Jun-15	
Meath	Kells-Oldcastle	No Cryptosporidium barrier	05-Jun-15	
Donegal	Cashilard	Trihalomethane exceedances.	11-Dec-14	
Donegal	Gortahork- Falcarragh	Trihalomethane exceedances.	11-Dec-14	
Donegal	Fintown	Trihalomethane exceedances.	11-Dec-14	
Donegal	Greencastle	Trihalomethane exceedances.	11-Dec-14	
Donegal	Portnoo Narin	Trihalomethane exceedances.	11-Dec-14	
Galway	Leenane	No out of hours alarm response procedure	18-Aug-15	Direction deadline not met but works completed shortly after Direction deadline
Roscommon	NERWSS Strokestown/Elphin	No Cryptosporidium barrier in place and no action plan submitted	10-Jun-14	
Galway	Galway City	Inadequate response to EPA audit report	01-Dec-15	
Galway	Kilkerrin Moylough	No Cryptosporidium barrier	26-Sep-11	
Laois	Ballyroan	Inadequate disinfection system.	03-Dec-14	

Area/County	Supply	Reason for Direction	Issue Date	Status at end of 2016
Sligo	North Sligo	Iron and Turbidity exceedances	24-Sep-07	The legal statute of limitation had passed - alternative enforcement action under consideration
Sligo	Lough Gill (Cairns Hill)	Trihalomethane exceedances and inadequate Cryptosporidium barrier.	14-Mar-13	Direction not complied with - enforcement action under consideration
Sligo	Lough Talt	Trihalomethane exceedances.	03-Dec-14	
Galway	Carraroe	Trihalomethane exceedances.	12-May-14	Prosecution case taken against Irish Water for non-compliance with Direction

Appendix 3: Boil Notices and Water Restrictions in place on Public Water Supplies during 2016

Area/County	Scheme Name	Reason	Boil Notice (BN) / Water Restriction (WR)	Population Affected	Affecting Full Or Part Of Supply	Date Notice Issued	Date Notice Lifted
Cavan	Ballyhaise	Coliform Bacteria	BN	750	Full	14/10/2016	25/11/2016
Clare	Carron	Cryptosporidium	BN	88	Full	04/05/2016	15/12/2016
Clare	Turlough	Cryptosporidium	BN	784	Full	05/07/2016	30/01/2017
Cork	Charleville	*E. coli*, Coliform Bacteria	BN	30	Part	07/01/2016	29/01/2016
Cork	Whitegate Regional	Turbidity (at WTW)	BN	10,392	Full	01/01/2016	08/01/2016
Cork	Whitegate Regional	Turbidity (at WTW)	BN	10,392	Full	13/02/2016	17/02/2016
Cork	Whitegate Regional	Turbidity (at WTW)	BN	10,392	Full	27/02/2016	21/10/2016
Cork	Bilberry	Arsenic	WR	21	Part	03/11/2016	21/12/2016
Galway	Williamstown	Turbidity (at WTW)	BN	1,020	Part	30/10/2014	24/05/2016
Galway	Leenane Public Supply	Precautionary - no exceedance confirmed	BN	219	Full	15/07/2015	16/08/2016
Galway	Kilconnell	Precautionary - no exceedance confirmed	BN	233	Full	13/11/2015	22/12/2016
Galway	Teeranea/Lettermore	Cryptosporidium	BN	1,040	Full	21/01/2016	28/04/2016
Galway	Loughrea Public Supply	Cryptosporidium	BN	6,104	Full	02/02/2016	07/09/2016
Galway	Carraroe	Cryptosporidium	BN	3,612	Full	05/03/2016	19/09/2016
Galway	Ahascragh	Turbidity (at WTW)	BN	841	Full	01/04/2016	19/04/2016
Galway	Ballinasloe Public Supply	Iron	WR	15	Part	30/09/2016	18/11/2016
Galway	Mid-Galway	Turbidity (at WTW)	BN	8,560	Full	18/10/2016	25/10/2016
Kilkenny	Galmoy Rathdowney	Coliform Bacteria	BN	281	Part	08/07/2016	22/09/2016
Laois	Ballinakill 2	Nitrate	WR	400	Part	17/06/2016	08/07/2016
Laois	Durrow 2	Nitrate	WR	744	Full	17/06/2016	08/07/2016
Leitrim	North Leitrim Regional	Precautionary - no exceedance confirmed	BN	122	Part	19/06/2015	07/07/2016
Leitrim	Kiltyclogher	Cryptosporidium	BN	241	Full	15/08/2015	16/12/2016
Leitrim	Dowra	Precautionary - no exceedance confirmed	BN	46	Full	18/12/2015	22/04/2016
Limerick	Loughill	Inadequate Disinfection	BN	18	Part	07/05/2015	
Limerick	Newcastle West	PAH	WR	6	Part	01/08/2015	01/03/2016
Limerick	Newcastle West	PAH	WR	9	Part	24/06/2016	
Mayo	Lough Mask RWSS	Cryptosporidium	BN	39,435	Full	03/09/2016	13/09/2016
Meath	Baltrasna	E. coli	BN	9	Full	22/12/2014	

Area/County	Scheme Name	Reason	Boil Notice (BN) / Water Restriction (WR)	Population Affected	Affecting Full Or Part Of Supply	Date Notice Issued	Date Notice Lifted
Roscommon	North East Regional	Cryptosporidium	BN	3,908	Part	27/03/2014	14/10/2016
Roscommon	Ballinlough/Loughglynn	Clostridium Perfringens	BN	3,500	Full	29/12/2015	21/01/2016
Roscommon	Ballinlough/Loughglynn	Cryptosporidium	BN	3,598	Full	20/01/2016	
Sligo	Killaraght	Cryptosporidium	BN	128	Full	14/05/2013	08/07/2016
Sligo	Lough Talt Regional	Free Chlorine	BN	78	Part	21/05/2015	19/10/2016
Tipperary	Cloran Regional	E. coli	BN	9	Part	22/10/2008	13/10/2016
Tipperary	Fethard Regional	E. coli	BN	9	Part	22/10/2008	13/10/2016
Tipperary	Burncourt Regional	E. coli	BN	178	Part	01/09/2009	01/11/2016
Tipperary	Templetney/Brackford Bridge	Inadequate Disinfection	BN	20	Part	03/05/2012	02/05/2017
Tipperary	Dundrum Regional	E. coli	BN	100	Part	18/10/2016	
Waterford	Ballydermody	Nitrate	WR	2	Full	12/12/2013	
Waterford	Nire	Precautionary - no exceedance confirmed	BN	12	Part	13/08/2014	
Waterford	Scrothea	Coliform Bacteria	BN	3	Part	16/10/2014	
Waterford	Dromore Upper	Precautionary - no exceedance confirmed	BN	12	Full	11/01/2016	01/09/2016
Waterford	Ring/Helvick/Seaview	Coliform Bacteria	BN	1,104	Full	13/07/2016	13/02/2017
Wexford	Aughclare, Campile	E. coli	BN	15	Full	08/09/2016	06/10/2016
Wexford	Bridgequarter	Coliform Bacteria	BN	12	Full	04/10/2016	24/11/2016
Wicklow	Johnstown South (Arklow)	Coliform Bacteria	BN	6	Full	04/06/2015	
Wicklow	Raheengraney Publc Supply	E. coli	BN	9	Part	18/01/2016	03/02/2016
Wicklow	Killavaney Public Supply (Arklow)	E. coli	BN	18	Full	22/01/2016	03/02/2016
Wicklow	Ballingate Public Suppy	Arsenic	WR	15	Full	28/05/2016	03/06/2016
Wicklow	Brittas Bay North	Arsenic	WR	49	Full	08/07/2016	16/09/2016
Wicklow	Brittas Bay South	Arsenic	WR	49	Part	08/07/2016	16/09/2016
Wicklow	Newtown Newcastle Kilcoole*	E. coli	BN	180	Part	07/09/2016	23/09/2016

This is a list of boil notices and water restrictions that were /are the responsibility of either Irish Water or both Irish Water and the property owner to resolve*. See section 2.2 for general information on boil notices and water restrictions.

*This boil notice was placed on Newcastle Hospital due to contamination within the premises and was solely the responsibility of the property owner to resolve.

Appendix 4: Details of Remedial Action List Supplies for each County or Area (as of December 2016)

County	No. of Supplies on RAL		Progress on Completion of Remedial Works					
	Original RAL	RAL at the end of 2016	Works Completed	To be completed in 2017	To be completed in 2018	To be completed in or after 2019	To be completed in or after 2020	No Timeframe for Completion
Kerry	41	22	0	21	0	0	0	1
Donegal	33	12	0	5	6	0	0	1
Cork	38	9	0	1	3	0	0	5
Wicklow	22	8	1	0	0	0	7	0
Tipperary	20	5	0	3	1	0	1	0
Clare	9	5	3	1	1	0	0	0
Galway	34	4	0	4	0	0	0	0
Longford	5	4	0	1	0	3	0	0
Mayo	15	4	0	3	0	1	0	0
Meath	8	4	0	2	2	0	0	0
Roscommon	10	4	0	3	0	1	0	0
Waterford	18	4	0	2	1	0	0	1
Kilkenny	7	2	0	0	1	0	1	0
Limerick	12	2	0	2	0	0	0	0
Sligo	8	2	0	1	0	0	0	1
Cavan	10	1	0	1	0	0	0	0
Cork City	1	1	0	0	0	1	0	0
Dublin City	1	1	0	0	1	0	0	0
Dun Laoghaire Rathdown	0	1	0	0	0	0	1	0
Laois	8	1	0	1	0	0	0	0
Louth	3	1	0	0	1	0	0	0
Monaghan	12	1	0	1	0	0	0	0
Wexford	4	1	0	1	0	0	0	0
Carlow	4	0	n/a	n/a	n/a	n/a	n/a	n/a
Fingal	0	0	n/a	n/a	n/a	n/a	n/a	n/a
Galway City	1	0	n/a	n/a	n/a	n/a	n/a	n/a
Kildare	0	0	n/a	n/a	n/a	n/a	n/a	n/a
Leitrim	2	0	n/a	n/a	n/a	n/a	n/a	n/a
Limerick City	1	0	n/a	n/a	n/a	n/a	n/a	n/a
Offaly	8	0	n/a	n/a	n/a	n/a	n/a	n/a
South Dublin	0	0	n/a	n/a	n/a	n/a	n/a	n/a
Waterford City	1	0	n/a	n/a	n/a	n/a	n/a	n/a
Westmeath	3	0	n/a	n/a	n/a	n/a	n/a	n/a

Appendix 5: Quality and Enforcement Information for Public Supplies by County or Area for 2016

	Public Supplies[1]		Parameter Compliance (%)		Boil Notices[2]		Water Restrictions[3]		Directions[4]	Audits[5]
County/ Area[6]	Number	Population	Microbiological	Chemical	Number	Population affected	Number	Population Affected	Number Issued	Number
Carlow	16	44,975	100	100						2
Cavan	16	38,886	100	99.8	1	750				2
Clare	19	114,988	100	99.9	2	872			4	2
Cork	177	348,204	100	99.6	4	10422	1	21		5
Cork City	1	106,681	100	99.5						
Dun Laoghaire-Rathdown	8	207,350	100	99.7						
Donegal	33	171,179	100	99.0					2	4
Dublin City	6	525,907	100	98.9						1
Fingal	2	272,000	100	100						
Galway	40	131,158	100	99.5	8	21629	1	15	1	10
Galway City	1	80,558	100	100						
Kerry	69	134,448	99.4	99.8					1	4
Kildare	11	195,088	100	99.8						
Kilkenny	20	79,172	100	99.7	1	281				3
Laois	27	65,691	99.6	99.9			2	1144		2
Leitrim	4	25,433	100	99.8	3	409				1
Limerick	42	157,574	100	99.9	1	18	2	9	1	2
Longford	6	43,154	100	97.5						1
Louth	14	107,178	100	99.3						1
Mayo	24	81,811	100	99.7	1	39435			3	7
Meath	36	144,225	99.7	99.3	1	9				1
Monaghan	10	28,526	100	98.2						
Offaly	23	53,824	100	100						1
Roscommon	14	56,088	100	98.8	3	7506			1	1
Sligo	9	58,104	100	98.4	2	206				2
South Dublin	4	266,312	100	100					1	
Tipperary	54	165,672	100	99.9	5	316				1
Waterford	104	88,578	100	99.6	4	1131	1	2	1	1
Westmeath	10	79,466	99.4	100						
Wexford	52	136,155	99.7	99.6	2	27				2
Wicklow	52	111,248	99.7	99.5	3	33	1	15		3

[1] Full list of public supplies available at http://www.epa.ie/pubs/advice/drinkingwater/publicdrinkingwatersupplies/; [2] 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. [3] Water Restrictions excludes advice issued to consumers in respect of lead. [4]Further information in Section 3.5; [5]Audit reports available at http://www.epa.ie/pubs/advice/drinkingwater/audits/; [6]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.;

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.

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