Drinking Water Report for Public Water Supplies 2015

epa
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 Radiological Protection
- 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 2015

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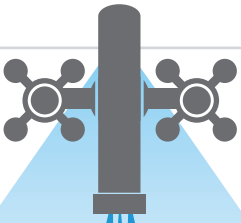


83% of people get drinking water from 962 public supplies

7% are supplied from public or private group water schemes or small private supplies

10% have their own private wells

DRINKING WATER QUALITY

PUBLIC SUPPLIES

99.9% comply with microbiological standards

99.4% comply with chemical standards

99.0% comply with indicator standards

8 E.coli detected in 7 supplies

153 THMs detected in 59 supplies

61 PESTICIDES DETECTED IN **45** SUPPLIES

41 supplies with MCPA failures

EPA ACTIONS

744 Exceedances of the standard in the Drinking Water Regulations investigated

69 Audits of public supplies

31 Directions issued by EPA

EPA REMEDIAL ACTION LIST

THIS IS A LIST OF PUBLIC SUPPLIES IN NEED OF IMPROVEMENT

SINCE 2007

357 supplies have been resolved

115 supplies on the RAL at the end of 2015

STRATEGIC ISSUES

- ELIMINATE LONG-TERM BOIL NOTICES
- IMPLEMENT ACTION PROGRAMMES FOR IMPROVED THM TREATMENT
- PROTECT SOURCES AND ABSTRACTION POINTS
- PROGRESS ACTION PROGRAMMES FOR RAL SUPPLIES
- INCREASE REPLACEMENT OF PRIVATE SIDE LEAD UNDER THE NATIONAL LEAD STRATEGY
- ASSESS PUBLIC BUILDINGS UNDER THE NATIONAL LEAD STRATEGY
- PROGRESS DRINKING WATER SAFETY PLANS

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

Key Findings for 2015

Quality of Public Water Supplies

- Overall compliance of microbiological and chemical parameters **remains consistent with 2014** figures.
- **99.92%** of samples comply with microbiological parameters and **99.39 %** of samples comply with chemical parameters.
- ***E. coli*** was detected at least once in **7 supplies,** down 1 on 2014.
- **Trihalomethanes** and **Lead** exceedances remain high with limits exceeded in **59** and **28 supplies** respectively.
- Exceedances of the **Pesticides - Total** limit increased from 4 supplies in 2014 to **14 supplies** in 2015. Exceedances were primarily **MCPA,** a herbicide used to control the growth of rushes.

Progress in 2015

- **115** supplies were on the EPA Remedial Action List (RAL) at the end of 2015. This is an overall reduction of 6 supplies from the end of 2014.
- **Action programmes** are in place for all RAL supplies affected by **THMs**
- Irish Water **removed and replaced** all **lead water mains** by the end of 2015.
- Irish Water began implementing a **National Disinfection Strategy** to **upgrade** and **standardise** all **disinfection systems** on a national level. The programme is being progressed on a county by county basis.
- **7** long-term **Boil Water Notices** were lifted in 2015, benefitting 17,763 people.

Areas for Further Progress

- **Pesticides**, specifically **MCPA** has **emerged** as a significant **water quality issue** in 2015.
- Irish Water notified the EPA of **61** supplies that detected **pesticide exceedances** in 2015. This is a significant increase on the 28 supplies in which pesticide exceedances were reported on in 2014.
- **6 DWSPs** were **complete** and **173** were in **preparation** at the end of 2015, compared with 6 complete and 53 in preparation in 2014.
- **Completing DWSPs** from source to tap is key to ensuring the **future resilience** of **public water supplies.**
- **Actions** to address exposure to **private side lead** need to be progressed to **improve lead compliance**.

Priority Actions

- Eliminate long-term **Boil Water Notices** through continued progress of the **National Disinfection Strategy**.
- **Implement action programmes** for improved **THM treatment** submitted and approved under the RAL.
- **Assess public buildings** for action under the **National Lead Strategy**.
- Encourage increased **replacement of private side lead** under the **National Lead Strategy**.
- Progress **action programmes** for **all RAL schemes**.
- **Protect sources** and abstraction points.
- Progress and complete **Drinking Water Safety Plans**.

Section 1: Introduction

Section 1.1: Background to the Drinking Water Report

This report provides an overview of the quality of drinking water in public water supplies in Ireland during 2015. Irish Water is responsible for the management of public drinking water supplies. A separate report is being prepared to provide information on the quality of drinking water in private water supplies. This report is based on the EPA's assessment of the 185,515 sample results reported to the EPA by Irish Water for public water supplies.

The drinking water regulations (S.I. 122 of 2014) provide the EPA with supervisory powers for public water supplies. The EPA can direct Irish Water to improve the management or quality of a public water supply. Under the regulations Irish Water must notify the EPA of drinking water non-compliances or risk to public health from a public water supply.

The core principle of the EPA's regulation of drinking water supplies is to ensure supplies are "safe" and "secure". Safety of supplies covers testing to ensure that the water quality meets the drinking water standards. Drinking water security means taking a proactive approach and involves examining the treatment in place, management systems, risks to the supply and remedial measures to ensure a constant and reliable supply of safe drinking water.

Irish Water

Irish Water is responsible for ensuring that drinking water in public supplies is wholesome and clean and meets the requirements of the Drinking Water Regulations. 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 1.2: Management of Drinking Water Supplies

A drinking water supply includes the abstraction, treatment, storage and distribution of water from source to consumers. Ireland has a large number of public supplies (962 supplies serving 83.3% of the population) compared to other EU countries. Scotland has 290 supplies for a similar population size. Managing Ireland's water supplies is complex due to the number and variation in types of supply - geographical location, size, treatment processes, management, distribution networks and a historical lack of investment. This variation in supply types needs detailed local knowledge, process expertise and a responsive management approach.

Drinking Water Supply Types in Ireland

Supply Type	*Supplier/Supplying*	*No. of Supplies*	*Population (%)*	*Supervisory Authority*
Public Water Supplies	Irish Water	962	83.3	EPA
Public Group Schemes	Local Group	498	1.8	Local Authorities
Private Group Schemes	Local Group	418	4.2	Local Authorities
Small Private Supplies	Commercial/public activity	1,760	0.9	Local Authorities
Exempted Supplies[1]	Individual supplier	170,000*	9.8	Exempted

*estimated number of private wells or boreholes

[1] Exempted supply means a supply of water which (a)(i) constitutes an individual supply of less than 10 cubic metres a day on average or serves fewer than 50 persons, and (ii) is not supplied as part of a commercial or public activity, or (b) is used exclusively for purposes in respect of which the relevant supervisory authority is satisfied that the quality of the water has no influence, either directly or indirectly, on the health of the consumers concerned.

81.5% of drinking water across both public and private water supplies is sourced from surface water (i.e. river and lakes), which varies in quality. 11.5% is sourced from groundwater and 7% is sourced from springs.

Public Water Supplies vary in size from one or two houses to over 245,000 people on a single supply. Larger supplies tend to have more infrastructure, treatment processes, management controls and resources while smaller rural ones tend to have less. Managing the variation in each supply, the different treatment processes and infrastructural issues is challenging.

Managing distribution networks to maintain good water quality is also challenging and depends on training, expertise, resources and water demand. Reservoirs and networks need cleaning and this work has to be balanced with consumer demand and maintaining pressure. New connections, bursts, leaks, old lead pipes and repairs pose risk of contamination. Long storage times in reservoirs affect disinfection and risks bacterial regrowth. Distribution networks vary in design (grids, loops, branches) and length. Inadequate disinfection can occur in short networks or stagnant water in long ones. Pipework in Public Water Supplies is owned by the water supplier up to the stopcock or meter but from there to the tap is the ownership and responsibility of the property owner or householder.

EPA Advice

The EPA has published a handbook on the implementation of the regulations to provide guidance to Irish Water. The EPA has also published a wide range of guidance and technical advice notes available at www.epa.ie/pubs/advice/drinkingwater/ in relation to the management of public supplies. Published advice covers source protection, borehole construction, chemical treatment, disinfection, service reservoirs and lead pipes.

The advice published by the EPA covers the technical water treatment aspects of what needs to be improved in relation to source protection, treatment and distribution systems. For drinking water supplies to be deemed secure, the water supplier should profile and manage the risks identified for the supply using the Water Safety Plan (WSP) approach. Water Safety Plans are discussed in more detail in Section 2.3.

Section 1.3: Regulation of Drinking Water Supplies

The EPA can direct Irish Water to improve the management or quality of a public water supply. The local authorities have a similar supervisory role in relation to group water schemes and private supplies. Private water supplies providing water to individual private dwellings are exempt from regulation. Handbooks[2] have been published by the EPA covering the implementation of the regulations for both public and private supplies.

EPA responsibilities, as the drinking water quality regulator, for drinking water include the following:

- Enforcing the Drinking Water Regulations for public supplies;
- Investigating notifications of failures to meet the drinking water standards and ensuring necessary action is taken to correct problems;
- Auditing public drinking water treatment plants;
- Issuing Directions where necessary to ensure action is taken to fix problems;
- Investigating drinking water quality complaints not resolved by the water supplier;
- Publishing an annual report on the quality of drinking water in Ireland.

[2] Available at http://www.epa.ie/pubs/advice/drinkingwater/publicwatersupplieshandbook/ and http://www.epa.ie/pubs/advice/drinkingwater/privatewatersupplieshandbook/

Irish Water is responsible for providing and developing water services. Irish Water took over responsibility for the operation of public water supplies from the Local Authorities from 1st January 2014. Irish Water responsibilities include:

- Management of national water assets and maintenance of the water system;
- Investment, planning and managing capital projects;
- Enforcing the Drinking Water Regulations for public supplies where failures occur in public buildings;
- Customer care and billing.

The **Health Service Executive** also has a statutory role under the drinking water regulations[3]. Irish Water and local authorities (for private supplies) must consult with the HSE in relation to drinking water exceedances or instances where there is a public health risk. Where Irish Water or the local authority (in consultation with the HSE) considers that the exceedance, risk or treatment failure constitutes a potential danger to human health, Irish Water or the local authority (subject to agreement of the HSE) must inform consumers promptly and provide the necessary advice.

The **Commission for Energy Regulation** (CER) is the independent economic regulator for public water services. Their role is to protect the interests of water customers, ensure water services are delivered in a safe, secure and sustainable manner and that Irish Water operates in an economic and efficient manner. The CER examines and challenges the costs of water and wastewater services and ensures that charges to customers reflect only efficiently incurred costs. These charges contribute to Irish Water's allowed revenue, which the CER approves and monitors. The CER approves the codes of practice in place to protect customers and provides a complaints resolution service to customers with an unresolved dispute with Irish Water.

[3] Regulation 9 of *European Union (Drinking Water) Regulations 2014*

Section 2: The Quality and Management of Public Supplies

This section of the report presents the EPA findings on the quality and management of **962** Public Water Supplies operating in 2015. This number is down slightly from the 973 public supplies covered in the report for 2014 as supplies have been rationalised by Irish Water.

Further Information

All 2015 monitoring results are available at: http://erc.epa.ie/safer/iso19115/displayISO19115.jsp?isoID=3080.

Current information on drinking water monitoring results can be accessed via Irish Water's website at https://www.water.ie/water-supply/water-quality/.

Historic information on drinking water monitoring results and water supply details for each county (dating back to the year 2000) is available on the EPA's SAFER (Secure Archive for Environmental Research Data) web-page at http://erc.epa.ie/safer/resourcelisting.jsp?oID=10206&username=EPA%20Drinking%20Water.

Irish Water's code of practice on complaint handling is available at http://www.water.ie/our-customer-commitment/.

Section 2.1: Quality of Public Supplies

Water quality across each of the parametric categories; microbiological, chemical and indicator, has remained consistent with 2014 figures. There has been continued improvement in microbiological compliance with supplies affected by *E. coli* failures reducing by 1 from 2014 to 2015 and supplies affected by *Enterococci* failures reducing by 2. Lead and trihalomethanes continue to be the dominant water quality issues affecting chemical parameter compliance however there has been a marked increase in the number of supplies with pesticide exceedances in 2015.

185,515 test results for public supplies were submitted to the EPA by Irish Water for assessment in 2015, a slight increase from 175,498 test results in 2014. This monitoring was carried out as part of the annual monitoring programme and is designed to provide information on the quality of drinking water. Irish Water is required to ensure that the monitoring programmes meet the monitoring requirements of the drinking water regulations and must be representative of the quality of the water consumed throughout the year, and be equally distributed through the supply. The overall compliance rate for these public supplies, based on samples analysed, was **99.92 %** for Microbiological parameters, **99.39 %** for Chemical parameters and **99.05 %** for Indicator parameters. This compares to 2014 figures of 99.90 % for Microbiological parameters, 99.44 % for Chemical parameters and 99.25% for Indicator parameters. A summary of compliance with the limits (termed 'parametric values' in the Regulations) is set out in Appendix 1 (Public Water Supplies). An explanation of the significance of each of the parameters described in the report is available at http://www.epa.ie/pubs/advice/drinkingwater/parameterappendix.html.

New regulations regarding the radioactive substances in drinking water (S.I. 160 of 2016) were signed into Irish legislation on April 1st 2016. The new regulations require that Irish Water include certain radioactive parameters in the monitoring programmes for public water supplies and ensure results are compliant with the relevant parametric values stated in the regulations. The EPA will publish a guidance note to cover the implementation of the radioactive substances in drinking water regulations.

Appendix 4 sets out the overall compliance rate for microbiological and chemical parameters by county.

950[4] supplies were fully compliant for *E. coli,* 8 samples (7 supplies) failed the *E. coli* standard and 2 samples (2 supplies) failed the *Enterococci* standard.

All supplies were 100% compliant for 14 of the 23[5] chemical parameters, Of the remaining parameters:

[4] 5 supplies were not sampled for *E.coli.*

- 1 sample failed the chemical parameters Arsenic, Benzene, Nitrate and Selenium.
- 7 samples (7 supplies) failed the standard for Copper[6].
- 17 samples (14 supplies) failed the standard for Pesticides - Total.
- 27 samples (19 supplies) failed the standard for Fluoride.
- 30 samples (28 supplies) failed the standard for Lead.
- 153 samples (59 supplies) failed the standard for Trihalomethanes.

The majority of the failures set out in Appendix 1 relate to "indicator" parameters. Indicator parameters are designed to provide information on the management of the treatment process, the look, taste and smell of the water. A value reported to exceed the limit for an indicator parameter should not, automatically, be considered a cause for concern but a guide for the water supplier to initiate an investigation into the cause of the elevated level of the particular parameter.

46% of these test results were reported as **accredited** results, increasing from 36% in 2014. From 2016 all results submitted to the EPA must be accredited in accordance with the *Drinking Water Handbook on the Implementation of the Regulations for Public water Supplies*[7].

Compliance with Key Microbiological and Chemical Parameters in Public Water Supplies

E. coli

99.3%	7	3,275	86.5%
of supplies complied with the standard in 2015.	supplies failed in 2015, an improvement of one from 2014.	population subject to a boil water notice for *E. coli* in 2015.	reduction in *E. coli* detections since 2007.

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

Disinfection controls need to be reviewed and standardised to ensure compliance with the *E. coli* standard in public supplies. The EPA has published an Advice Note on *E. coli* in Drinking Water available at http://www.epa.ie/pubs/advice/drinkingwater/epadrinkingwateradvicenoteadvicenoteno3.html and a Water Treatment Manual on Disinfection available at http://www.epa.ie/pubs/advice/drinkingwater/watertreatmentmanualdisinfection.html.

[5] The individual pesticide parameter is calculated separately.
[6] A failure of the Copper standard is an indication of internal copper plumbing in a building or property rather than a problem with the water supply served to that building/property.
[7] available at http://www.epa.ie/pubs/advice/drinkingwater/publicwatersupplieshandbook/

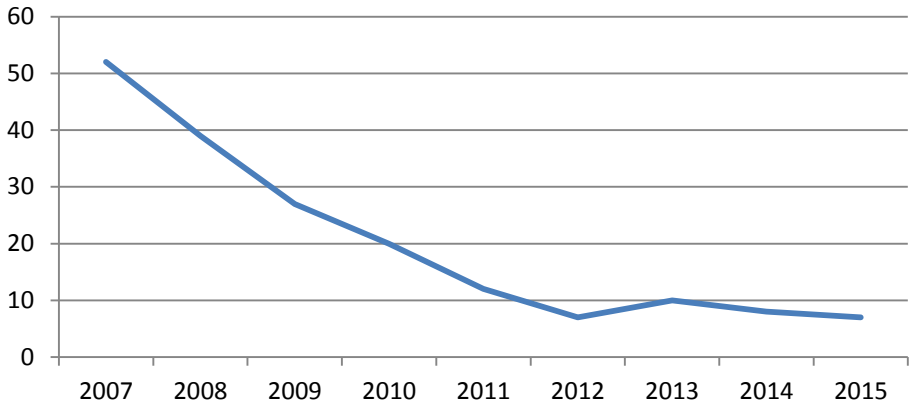


Figure 1: Trend in the number of public supplies where *E. coli* was detected.

Cryptosporidium *(non-mandatory parameter)*

1015	10	143,150	31
tests submitted in 2015.	supplies, serving 27,625 people, on Boil Water Notice due to a risk from *Cryptosporidium.*	population on 30 supplies listed on the RAL for risk from *Cryptosporidium* at the end of 2015.	samples detected *Cryptosporidium* in 14 supplies.

Cryptosporidium is not one of the 48 parameters listed in the drinking water regulations, for which monitoring is specified. However, the EPA has through the Advice Note No. 9: *Cryptosporidium* Sampling and Monitoring[8] provided guidance on *Cryptosporidium* monitoring.

Prior to the enactment of the Drinking Water Regulations 2014, the notification of *Cryptosporidium* detections was only required in cases where the local authority, in consultation with the HSE, considered the supply a potential danger to human health. This requirement has now changed and under the 2014 regulations Irish Water must notify the EPA of any detection of pathogenic micro-organisms or parasites, including *Cryptosporidium*, in the supply.

Trihalomethanes (THM)

91%	59	26	395µg/l
compliance with the Trihalomethanes standard.	supplies exceeded the 100 µg/l standard - the majority are in Donegal and Kerry.	of these 59 supplies had Trihalomethanes greater than 150 µg/l.	was the highest result found in Fintown, Co. Donegal.

Trihalomethanes are by-products of the chlorination (disinfection) process. These compounds are undesirable in drinking water and their presence should be minimised while not compromising disinfection. The causes of exceedances should be examined, with optimisation of plant treatment and network needed to reduce levels. A joint EPA-HSE fact sheet for consumers on THMs is available at http://www.epa.ie/pubs/advice/drinkingwater/trihalomethanesjointpositionstatement.html. An advice note on Disinfection By-Products for water suppliers is also available at http://www.epa.ie/pubs/advice/drinkingwater/epadrinkingwateradvicenoteadvicenoteno4.html.

A national strategy is necessary to ensure natural organic matter is removed through appropriate effective treatment, that disinfection is optimised and water age in reservoirs and distribution networks is managed to achieve compliance with the THM standard.

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

Fluoride

Irish Water, on behalf of the HSE, implements the fluoridation of public water supplies. 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 enforce the legal standards in the *European Union (Drinking Water) Regulations 2014* and where the standard is breached ensure that appropriate corrective action is taken. In the case of fluoride the Drinking Water Regulations set a lower limit of 0.6 mg/l and an upper limit of 0.8 mg/l. 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 is difficult to achieve. In 2015, 27 samples (19 supplies) failed the national standard of 0.8 mg/l for Fluoride. 1 supply, Arigna Regional, Co. Roscommon failed the EU standard of 1.5 mg/l in 2015. In 2014, 37 samples (24 supplies) failed the national standard while no sample failed the European standard.

Lead

96.4%	10µg/l	926	30
of supplies comply with the Lead standard.	the standard for Lead was exceeded in 28 supplies in 2015.	the population on a water restriction for lead in 2015.	samples taken during 2015 exceeded the Lead standard.

Lead pipes still exist in the distribution network both on the private side and the public side. Measures include optimisation of the treatment process to reduce plumbosolvency but the sustainable approach to comprehensively deal with lead exceedances is to remove lead pipes. Actions required to address lead issues are covered in the EPA Advice Note Number 2 published in 2009 on "*Action programmes to restore the quality of drinking water impacted by lead pipes and lead plumbing*"[9].

A National Lead Strategy was published by the Government in June 2015 and is available at http://www.environ.ie/en/Environment/Water/WaterSectorReform/News/MainBody,41734,en.htm
Irish Water published a Lead in Drinking Water Mitigation Plan – Issues Paper in June 2015 and is available at http://www.water.ie/about-us/project-and-plans/lead-mitigation-plan/Lead-Mitigation-Plan-Issues-Paper.pdf

Pesticides

0.5µg/l	0.1µg/l	61	MCPA
is the standard for Total Pesticides and was exceeded in 14 supplies.	the standard for individual pesticides was exceeded in 45 supplies.	the number of samples exceeding the individual pesticide standard.	was the pesticide (herbicide) detected in 41 of these supplies.

The WHO limit of 2µg/l for MCPA was exceeded in Templenoe PWSS 073A in Co. Kerry (2.113µg/l) in 2015. There is a seasonality to the detections of MCPA exceedances in May/June/July and in September/October. Typically MCPA is applied to grassland in these months for ragwort, rush and thistle control.

Source protection measures must be implemented to protect drinking water sources from pesticide contamination; this requires a catchment based approach including information, education and enforcement. Information leaflets and guidance on the safe use of pesticides is available at http://www.epa.ie/water/dw/sourceprotection/. A national strategy is necessary to achieve compliance with the pesticides standards.

[9] Available at http://www.epa.ie/pubs/advice/drinkingwater/epadrinkingwateradvicenoteno2.html

Compliance with Key Indicator Parameters in Public Water Supplies

The **aluminium** standard of 200 µg/l was exceeded in 41 supplies during 2015 compared to 32 in 2014. Aluminium is present in drinking water as a result of its use as aluminium sulphate (a coagulant) in the water treatment process, though can be naturally present in some waters. Historically, there has been some concern about possible links between aluminium in drinking water and Alzheimer's disease. However, the WHO states that: *"On the whole, the positive relationship between aluminium in drinking water and Alzheimer's disease which was demonstrated in several epidemiological studies, cannot be totally discounted. However, strong reservations about inferring a causal relationship are warranted in view of the failure of these studies to account for demonstrated confounding factors and for the total aluminium intake from all sources".* In recognition of poor coagulation processes observed during audits of treatment plants the EPA published *Advice Note 15 – Optimisation of Chemical Coagulation Dosing* in 2014[10].

The **turbidity** limit of 1.0 NTU at the treatment plant was exceeded in **21** supplies compared to 16 in 2014. The control of turbidity is one of the indicators of the efficiency of treatment at the plant. Elevated 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. While the parametric value for turbidity (at the tap) is that the water must be "*acceptable to consumers and* [there must be] *no abnormal change*" there is a parametric value for turbidity (for water leaving the treatment plant) of 1.0 NTU. In practice turbidity levels leaving the treatment plant should not exceed 0.2 NTU and preferably be below 0.1 NTU to be protective against *Cryptosporidium* breakthrough in the treatment plant. Technical guidance for operators on the importance of reducing turbidity has been published by the EPA in the EPA *Water Treatment Manual on Disinfection* and in the EPA *Advice Note No 5 - Turbidity in Drinking Water*[7].

Section 2.2: Water Restrictions and Boil Notices

Where drinking water exceeds the standard or where the water supplier considers there is a risk to public health, the water supplier must consult with the Health Service Executive to determine whether the supply should be prohibited or restricted, and where this is the case consumers must be informed promptly. Where the HSE considers the quality of water intended for human consumption constitutes a potential danger to human health, they recommend to the water supplier that a Water Restriction Notice and/or a Boil Notice is issued by the water provider. Similarly, these notices are removed from supplies, in consultation with the Health Service Executive, when the problem is resolved by the water supplier.

Notices can apply to all or part of a supply and last from several days to several years depending 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 2015 there were **35** Boil Notices and **9** Water Restriction Notices active in **17** counties affecting **47,271** people.

Boil Notices were in place on **20** supplies in 2015 as a result of detections of *E. coli* and *Cryptosporidium,* 12 of which were issued prior to 2015 and remained in place during 2015 and 8 of which were newly issued in 2015. Remedial works were carried out immediately on **7** of the 8 supplies where notices were issued in 2015, resulting in Boil Notices being lifted on these supplies within 6 weeks of issue. Of the long-term Boil Notices in place in 2015, **7** were lifted during the year, 5 in Co. Roscommon, benefiting a population of 17,243 people, 1 in Co. Longford, benefiting a population of 516 and 1 in Co. Tipperary benefiting a

[10] Available at http://www.epa.ie/pubs/advice/drinkingwater/epadrinkingwateradvicenoteno5.html

population of 4. A precautionary Boil Notice was also lifted in Co. Roscommon in 2015 benefiting 3,443 people and one in Co. Waterford affecting 36 people.

At the end of 2015 **18** Boil Notices were in place affecting **9,852** people. The same numbers of Boil Notices were in place at the end of 2014 however a larger population of 23,100 people were affected in 2014. A summary of all Boil Notices in place and lifted in 2015 is provided in Appendix 2.

The presence of lead pipes in the water distribution network accounted for **4** Water Restrictions in 2015, in comparison with 22 in 2014. A precautionary Water Restriction was in place on the Bundoran Urban supply in December 2015 following a flooding event at the treatment plant. The water treatment plant, which serves 6,000 people was back in operation and the Water Restriction lifted within 6 days.

Two separate Water Restrictions were issued to a housing estate on the Galway City Council public water supply as a result of hydrocarbon contamination. The EPA issued a Regulation 16 Direction on 1st December 2015 directing Irish Water to put measures in place to prevent a further incident. Irish Water installed non-return valves on each individual premise and is currently replacing the mains within the estate. Replacement works are due to be complete by the end of Q3 2016.

As of 21st October 2016, there were 18 supplies on Boil Water Notices affecting a population of 25,621 in 13 counties and 5 supplies on Water Restrictions affecting a population of 118 in 4 counties.

Section 2.3: Security of Public Supplies

Many of the current problems seen in the water supply network result from under-investment and a reactive management approach to water quality problems. In contrast, the Drinking Water Safety Plan (DWSP) is a preventive, management framework for safe drinking water that comprises system assessment and design, operational monitoring and management plans (including documentation and communication). A DWSP for each public water supply facilitates continuous improvement in the security of the supply and protection of human health. The aim of a DWSP is to ensure the safety and security of a water supply by identifying and managing risks. The concept of safe and secure is explained in Section 1.1. The EPA's *Advice Note No.8 – Developing Drinking Water Safety Plans*, provides guidance on the WSP approach.[11]

The EPA recommends that a DWSP is developed specifically for each drinking water supply and should be considered as a risk management strategy to ensure the continuous supply of safe water. The EPA's safe and secure model (Figure 2) for the provision of water is consistent with the World Health Organisation's Water Safety Plan approach that encompasses all potential hazardous events from the catchment to the consumer.

[11] Available at http://www.epa.ie/pubs/advice/drinkingwater/epadrinkingwateradvicenote-advicenoteno8.html.

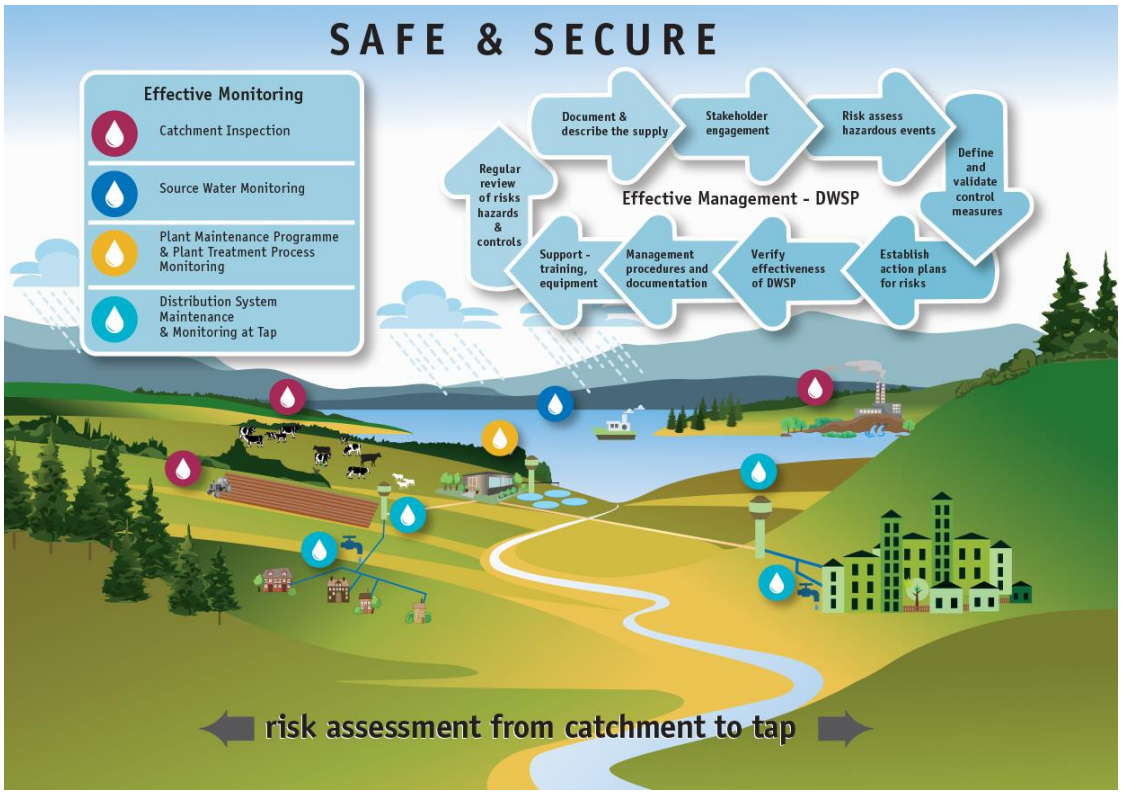


Figure 2: The Drinking Water Safety Plan Approach

The EPA continues to encourage and support the development of DWSPs as the most effective approach to securing and safeguarding Ireland's water services. During 2015, the EPA held quarterly meetings with Irish Water to discuss progression of the DWSP approach. The EPA continues to progress the implementation of DWSPs through support, guidance and sharing information on the preparation and implementation of DWSPs.

Irish Water submitted a "Draft Drinking Water Safety Plan: Implementation Plan 2014-2016" to the EPA in November 2014 and this will be used to drive improvements in the provision of drinking water and ensure funding is provided to the supplies that need it most. Irish Water specified in this Plan that it would complete DWSPs for 135 water supply zones serving a population of 2,130,308 (57%) by the end of 2016. At the end of 2015 there were 173 Drinking Water Safety Plans in preparation and 6 completed compared to 53 in preparation and 6 completed at the end of 2014, as reported by Irish Water.

Figure 3 illustrates progress with the implementation of DWSPs (completed, in preparation or to commence) to date for those served by a public water supply. This is an improvement from 2014 and 2015, however the EPA recognises that much progress is needed to achieve the goal of completing DWSPs for the number of public water supplies set out in Irish Water's Draft Implementation Plan.

The EPA awaits the submission of a Final DWSP Implementation Plan which Irish Water state will be submitted in September 2016. Irish Water stated that it is currently reviewing those DWSPs that are complete to ensure they are kept up-to-date.

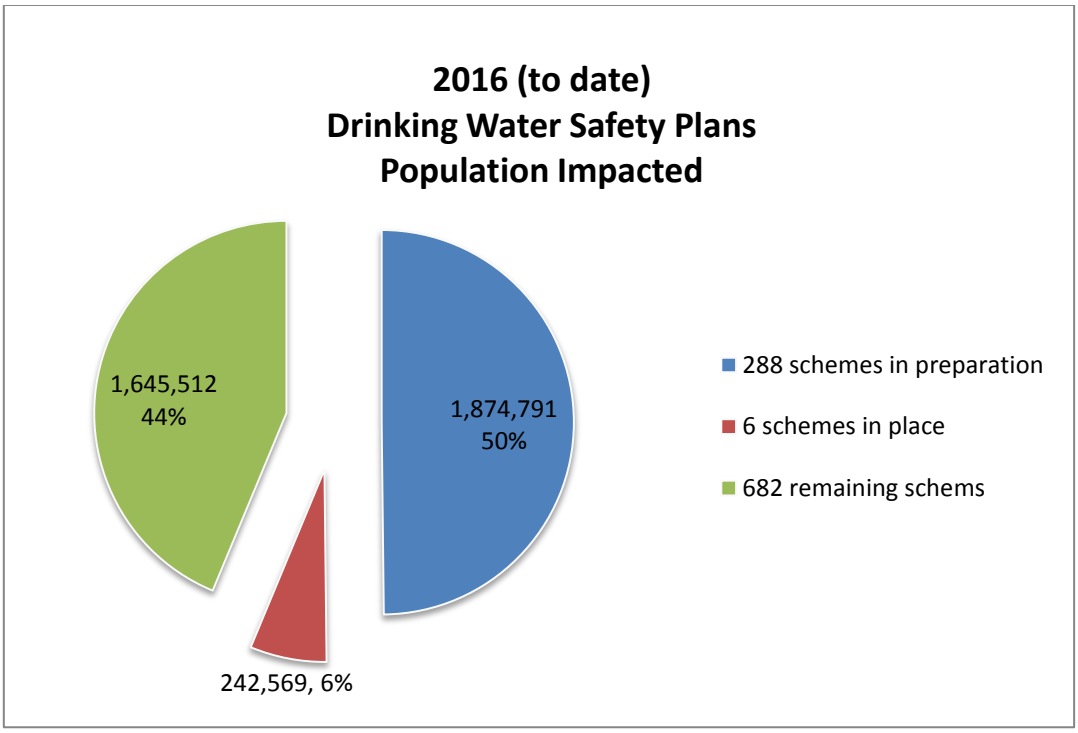


Figure 3: DWSP Implementation Progress August 2016 (population coverage, %)

Financial and resource requirements of water safety plans need to be addressed at the outset. Proper implementation of the DWSP approach can save money and better target resources in the longer term. The output of DWSP risk assessments should inform Capital Investment Programmes and in turn assist the targeting of investment towards priority (high risk) supplies.

Irish Water is adopting the DWSP approach for public water supplies, and in doing so must work in collaboration with its stakeholders (e.g. agriculture and industry sectors, landowners, local government and customers working on catchment protection measures) on bringing about risk reduction. A network of stakeholders should actively facilitate effective communication, identify, agree and put in place controls and mitigation measures and monitor their effectiveness. Implementation of the DWSP approach and providing relevant information on the DWSP risk assessment will increase consumer and stakeholder confidence in the safety and security of water supplies.

Section 3: Enforcement of Public Supplies

The drinking water regulations (S.I. 122 of 2014) provide the EPA with supervisory powers for public water supplies. The EPA can direct Irish Water to improve the management or quality of a public water supply. Under the regulations Irish Water must notify the EPA of drinking water non-compliances or risk to public health from a public water supply.

Section 3.1 Exceedances of legal parametric limits in Public Water Supplies

The Drinking Water Regulations require water suppliers to ensure that any failure to meet the limits set in the Regulations is immediately investigated to determine the cause of the failure. The water supplier must notify the EPA of any such failure and relay the results of its investigations in accordance with the *Drinking Water Handbook on the Implementation of the Regulations for Public water Supplies*[12].

A significant increase was noted in the number of supplies reporting pesticide failures to the EPA in 2015. The number of supplies reporting microbiological failures continued to decline in 2015 and there were slight improvements in the number of supplies dealing with lead and trihalomethane failures, although these issues continue to affect a significant number of supplies.

During 2015, the EPA received and assessed **744** non-compliance notifications from Irish Water in relation to public water supplies, up from 606 in 2014. A breakdown of the number of public water supplies in which a microbiological or chemical parameter exceeded the standards in 2014 and 2015 and was subsequently notified to the EPA is provided in Table 1.

Table 1: Number of Public Water Supplies where the microbiological or chemical exceedances were notified to the EPA during 2014 and 2015.

Parameter	No. of supplies with Notifications in 2014	No. of supplies with Notifications in 2015	Change since 2014
Microbiological			
E. coli	13	8	↓ 5
Enterococci	6	3	↓ 3
Chemical			
Antimony	1	0	↓ 1
Arsenic	0	1	↑ 1
Benzene	1	2	↑ 1
Benzo(a)pyrene	0	0	No change
Bromate	1	1	No change
Cadmium	0	0	No change
Copper	7	8	↑ 1
Fluoride	2	4	↑ 2
Lead[13]	47	39	↓ 8
Nickel	2	1	↓ 1
Nitrate	6	3	↓ 3
Nitrite (at tap)	0	0	No change
PAH	3	0	↓ 3
Pesticides (individual)	28	61	↑ 33
Pesticides (Total)	3	8	↑ 5
Trihalomethanes (Total)	68	62	↓ 6

↓ Improvement on 2014 ↑ Deterioration on 2014

[12] available at http://www.epa.ie/pubs/advice/drinkingwater/publicwatersupplieshandbook/
[13] Individual lead notifications may relate to more than one supply zone.

A trend of improved public water supply compliance across 8 parameters can be seen during 2015. There was no change in public water supplies' performance in relation to 4 parameters and there was deterioration in relation to 6 parameters. 6 parameters were not exceeded at all, in any supply. Overall, the year-on-year trend from 2014 to 2015 was similar to the 2013 to 2014 year-on-year assessment period.

The number of supplies where the detection of ***E. coli*** was notified to the EPA reduced by 5 to **8** supplies during 2015 compared to the previous year. Findings made during EPA audits in relation to disinfection systems, however, highlight that meeting the minimum disinfection criteria remains an issue.

Chlorination is vital to make our water supplies safe from infectious microorganisms. The chlorination process may also produce trihalomethanes (THM), undesirable by-products, under certain conditions. There has been a decrease in the number of public water supplies where **THM** failures were notified to the EPA, however the number of supplies remaining is high at **62** and a significant improvement in the avoidance of THM by-product production is required. Continued implementation of recommendations in the *EPA Advice Note No. 4 on Disinfection by-Products in Drinking Water*[14] is recommended to further manage THM formation in supplies towards achieving compliance. A position paper developed by the Health Service Executive and the Environmental Protection Agency on Trihalomethanes in 2011 provides a summary of the issues in relation to trihalomethanes in drinking water including health, legislation and interventions[15].

Arsenic above the legal limit of 10 µg/l was detected in **1** supply, (Collierstown, Co. Meath) on two occasions in 2015. Arsenic is a naturally occurring mineral associated with igneous bedrock or soils derived from igneous bedrock. Irish Water's investigation into the arsenic exceedances concluded that the detection was as a result of the natural geological conditions of the groundwater source.

There was 1 **bromate** exceedance of the 10 µg/l limit in 2015 (Lyreacrompane, Co. Kerry). Bromate can be a disinfection by-product associated with the ozonation of bromide in the raw water, where ozone is used as a disinfectant; however in this case the bromate was found to be a constituent of the sodium hypochlorite disinfectant used on the supply. Irish Water switched to using an ultra-low bromate sodium disinfectant at Lyrecrompane and no further exceedances were detected.

Nitrate levels above the parametric value of 50 mg/l were notified to the EPA for **3** supplies in 2015, a decrease of 3 from the previous year. Two supplies were located in Co. Wicklow, one spring fed and the second a groundwater supply. One supply, a groundwater supply was located in Co. Limerick. Investigations showed no nitrate exceedances had been detected at any of the three supplies in the past and subsequent sampling determined that these exceedances appeared to be once-off events. Nitrate in springs and groundwater is attributed largely to diffuse pollution from agricultural sources. A position paper developed by the Health Service Executive and the Environmental Protection Agency on nitrate in 2010 provides a summary of the issues in relation to nitrate in drinking water including health, legislation and interventions[16].

The number of supplies affected by excessive **lead** levels reduced by 8 in 2015 to **39,** however this number remains unacceptably high. A national lead strategy was published in June 2015[17]. A position paper developed by the Health Service Executive and the Environmental Protection Agency on lead in 2013 provides a summary of the issues in relation to lead in drinking water including health, legislation and interventions[18].

[14] Available at http://www.epa.ie/pubs/advice/drinkingwater/epadrinkingwateradvicenoteadvicenoteno4.html
[15] Available at http://www.epa.ie/pubs/advice/drinkingwater/trihalomethanesjointpositionstatement.html
[16] Available at http://www.epa.ie/pubs/advice/drinkingwater/nitratepositionpaper.html
[17] Available at http://www.environ.ie/en/Environment/Water/WaterSectorReform/News/MainBody,41734,en.htm
[18] Available at http://www.epa.ie/pubs/advice/drinkingwater/leadpositionpaper.html

Update on Lead Strategy

Lead mains replacement works underway in Mallow, Co. Cork.

The standard for lead in drinking water was reduced to 10µg/l from 25µg/l at the end of 2013 to reflect the public health impact that lead can have, particularly on vulnerable users such as pregnant women, infants and young children. Lead is found in drinking water when it dissolves from water supply pipes and connections either made of lead or containing lead materials.

In June 2015 the Government published a National Lead Strategy to reduce exposure to lead in drinking water, to reflect the shared responsibilities that exist in this area between property owners and water suppliers. The strategy sets out responsibilities and 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.

A summary of the significant actions taken in 2015 to address exceedances of the lead standard in drinking water is provided below.

- A series of advice letters for consumers affected by lead in drinking water were developed. The advice was produced by Irish Water for consumers on public supplies, with input on environmental and health aspects from the EPA and HSE respectively. Advice letters are being issued to properties with lead connections as they are identified.
- Irish Water developed and expanded their monitoring programme to further assess lead levels and inform the risk assessment process of their draft Lead in Drinking Water Mitigation Plan. This will result in approximately 36,000 samples being taken per year, in addition to the approximately 3,000 taken for compliance sampling under the Drinking Water Regulations. The programme commenced in Limerick in 2015 and was established nationally from January 2016.
- An initial workshop was held in November 2015 by the Department of Housing, Planning, Community and Local Government to progress the identification of public buildings requiring action under the National Strategy. These buildings are owned by a range of public bodies and require surveys and monitoring programmes to quantify the extent of lead plumbing within schools, hospitals, residential facilities etc. It is important that the further work required to establish these programmes is prioritised and tracked under the National Strategy.

Irish Water prepared a draft 'Lead in Drinking Water Mitigation Plan – Issues Paper' in July 2016, for public consultation. This paper is the next phase in the development of a national plan to address the issue of exposure to lead in drinking water.

During 2016 the EPA moved to a national approach to dealing with lead exceedances using the framework of the National Lead Strategy and Irish Water's draft mitigation plan. This approach is being used to track the progress of actions outlined in the strategy and plan e.g. compliance levels within the inventory monitoring, numbers of customers given advice and numbers of public side lead services replaced.

In 2015, **8** supplies were affected by **copper** levels exceeding the 2.0 mg/l limit, an increase of 1 from the previous year. In all 8 supplies, the investigation undertaken by Irish Water discovered that the exceedances were due to copper in the consumer's own plumbing system. Irish Water in each case informed the property owner of the findings of the investigation and either advised or directed, in the case of public use buildings, that they remove the privately owned copper piping causing the problem.

The number of supplies with **Antimony** exceedances decreased from 1 in 2014 to 0 in 2015.

An increase in the number of public water supplies affected by **pesticides** exceedances was noted in 2014 and continued during 2015. Pesticide levels above the parametric value were detected in **61** schemes compared to 28 in 2014. As was observed during 2012 and 2013, the herbicide MCPA prevailed in the notifications received. The Pesticides Working Group continued with an awareness-raising campaign which was launched in the summer of 2014. In 2015 the Working Group published and disseminated a number of pesticide information leaflets, including Advice for Farmers and Other Professional Users and Herbicide Use in Grassland with a focus on MCPA and rush control. The EPA with other stakeholders also collaborated in a

joint initiative with farmers to facilitate the removal of farm hazardous waste including pesticides. Over a three year period approximately 46,411 kg of pesticides were removed for disposal.

Irish Water is in the process of developing a National Pesticides Strategy which is due to be completed in 2017. In the interim, the EPA will continue to ensure that actions are taken in relation to pesticide exceedances in drinking water and collaborate with all interest groups where possible.

Section 3.2 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 were listed by the EPA on the original RAL for one or more reasons:

- Failure(s) of the following priority RAL parameters in the previous two years:
  - Table A (microbiological parameters): *E. coli*
  - Table B (chemical parameters): nitrate, trihalomethanes, bromate
  - Table C (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).
- 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 RAL includes supplies where the primary issue to be addressed is the water treatment plant. The list does not include supplies where there are issues of quality caused by the distribution network. For example, supplies that have failed to meet the lead parametric value due to the presence of lead pipework in the distribution network are not included on the list. Actions required to address lead issues are covered in the EPA Drinking Water Advice Note No. 2 published in 2009 on "*Action programmes to restore the quality of drinking water impacted by lead pipes and lead plumbing*"[19].

At regular intervals, additional supplies are added to the RAL based on further information from EPA audits, notifications of exceedances or information gathered from Irish Water, the Health Service Executive and the Department of Environment, Community and Local Government. Supplies are removed from the list at each update when sufficient corrective action is taken by Irish Water and the effectiveness of the measures is demonstrated to the satisfaction of the EPA. In general, a supply will not be removed from the list on the basis of monitoring results alone. Irish Water must demonstrate that appropriate actions have been taken (e.g. new infrastructure, procedures or training) to ensure that compliance is secured and the risks of failure have been minimised. In addition, Irish Water must ensure ongoing quality and management of all supplies to prevent them being placed on the RAL in the future.

Remedial Action Progress

The first RAL collated by the EPA in 2008 identified **339** public water supplies representing **36%** of public drinking water supplies that required detailed profiling to ensure that the supply is providing clean and wholesome drinking water. The number of supplies on the RAL is steadily decreasing year on year and at the end of 2015 there were **115** schemes on the RAL, serving **782,496 persons**. Appendix 3 contains progress of RAL supplies at the end of 2015 which is summarised as follows:

- 264 (78%) of the original 339 supplies were removed from the RAL by the end of 2015 (Figure 4).
- 93 supplies were added to the original RAL but have been subsequently removed.
- 40 supplies were added to the original RAL and remain on the current RAL.
- 115 supplies were on the RAL at the end of 2015, supplying water to 782,496 consumers (Figure 4).

[19] Available at http://www.epa.ie/pubs/advice/drinkingwater/epadrinkingwateradvicenoteno2.html

- Dates for completion of works were available for all schemes on the list at the start of 2015. Completion dates were to be submitted for 5 supplies which were added to the RAL in Q4 2015.
- 23 supplies were added to the RAL in 2015. The majority of these were supplies (13 supplies) that were found, following an EPA review of recent monitoring, to be failing to meet the THM parametric value. The remaining supplies were added for inadequate treatment for *Cryptosporidium* (5 supplies) and EPA concerns about the management/operation of the plants (5 supplies).
- Remedial works were completed in 29 supplies serving 265,908 persons in 2015. In particular, the installation of UV in Stillorgan enabled the removal of supplies serving over 220,000 persons from the RAL in September 2015.
- The EPA engaged in a targeted enforcement action in 2015 to ensure that all supplies had action programmes in place. As a result 14 Directions were issued by the EPA to Irish Water in June 2015. A summary of the status of these Directions is provided in Section 3.4.

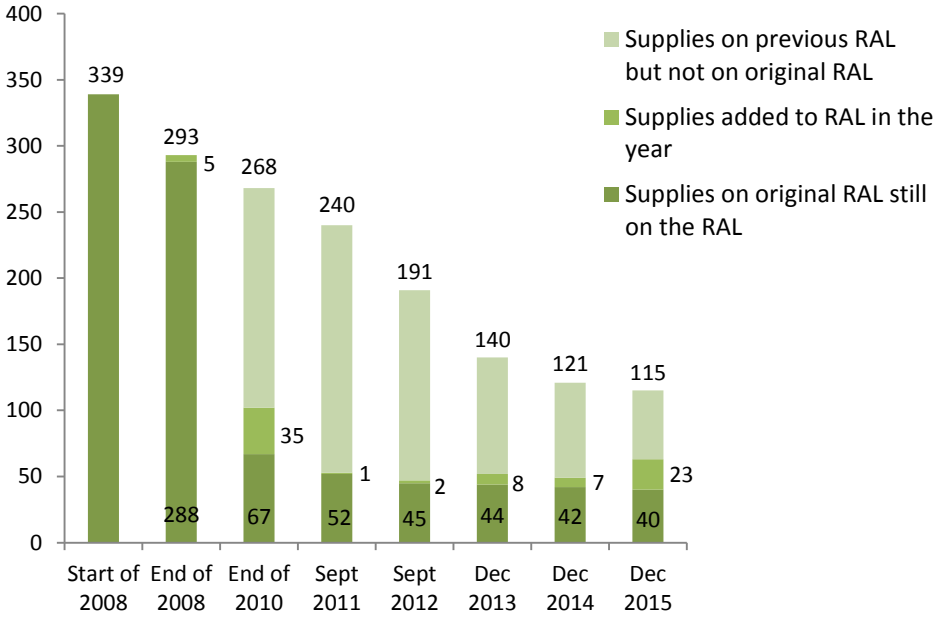


Figure 4: Breakdown of number of original RAL supplies that remain on the RAL and number of new supplies added to the RAL in a particular year.

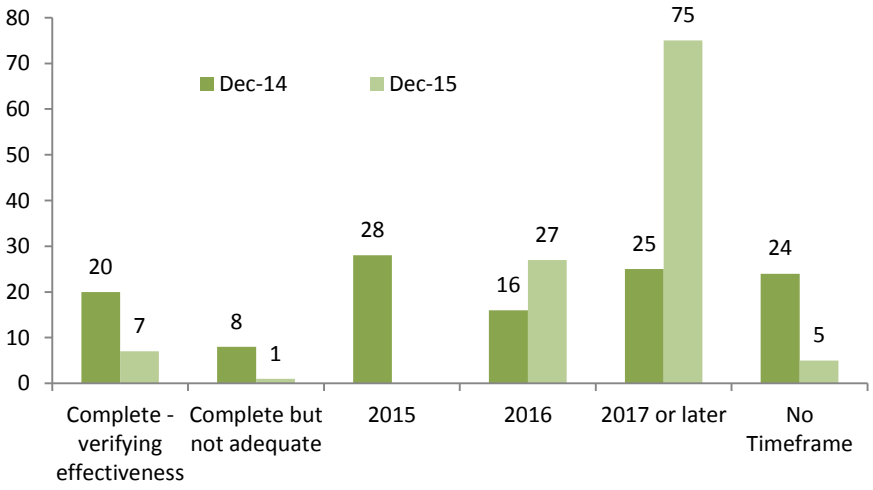


Figure 5: RAL completion dates provided by Irish Water in December 2015.

Completion dates for all but 5 RAL supplies were provided to the EPA by Irish Water by the end of 2015. The 5 supplies without completion dates were supplies added to the RAL in Q4, 2015 and completion dates were submitted by Irish Water for these supplies in Q1, 2016. Action programmes to achieve completion dates were also submitted to the EPA and are being tracked under the quarterly RAL assessment.

Of the 75 supplies where Irish Water have indicated a completion date of 2017 or later, 22 of these supplies are in Co. Kerry, 12 of which are on the RAL due to inadequate treatment for *Cryptosporidium*. 9 supplies in Co. Wicklow are linked to the upgrade of the Vartry water treatment plant and replacement of the 4km Callowhill Tunnel between the Vartry water treatment plant and the Callowhill pumping station. A further 8 supplies with completion dates of 2017 or later are in Co. Donegal and are on the RAL due to elevated levels of THMs above the standard in the Drinking Water Regulations or inadequate treatment for *Cryptosporidium*.

Appendix 3 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 2015.

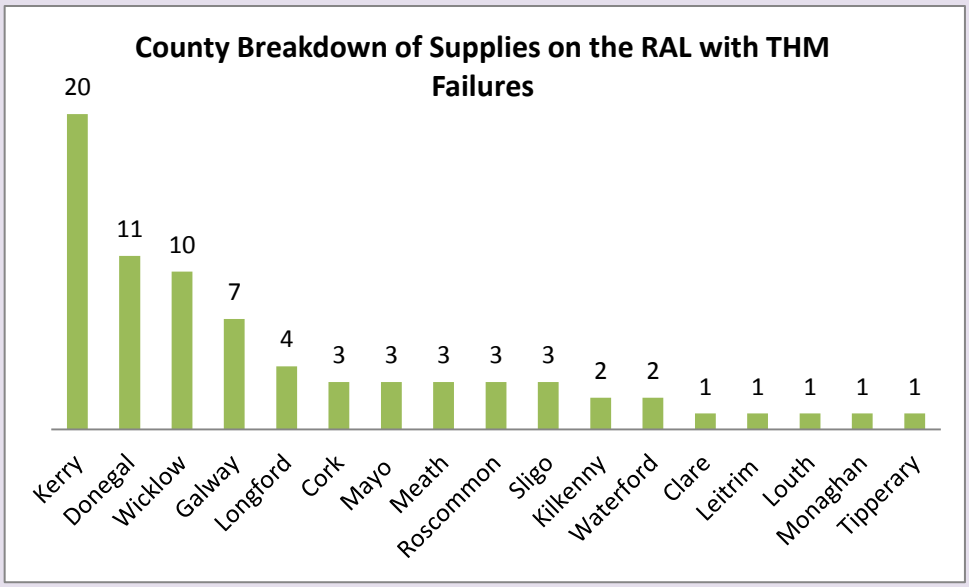
Spotlight on Trihalomethanes

Trihalomethanes (THMs) are disinfection by-products that can form where the organic matter in the raw water reacts with chlorine in the disinfection process. These compounds are undesirable in drinking water and their presence should be minimised through optimising the removal and treatment of organic matter and without compromising disinfection.

The EPA Remedial Action List highlights the supplies in need of improvement and that pose a risk to consumers (see section 3.2). At the end of 2015 the RAL comprised of 115 supplies of which 76 were related to inadequate treatment for Trihalomethanes and consequent THM exceedances. This number consists of 43 supplies where elevated THMs is the primary concern and a further 33 are listed on the RAL primarily for reasons other than THMs, but which also have THM non-compliances. The population served by the 76 public water supplies is approximately 415,000.

The European Commission initiated pilot infringement proceedings against Ireland in 2015 (ref 7554/2015/ENVI) as a result of the failure to comply with the THM parametric value. Quarterly reports are being submitted to the Commission on progress towards THM compliance and the quarterly RAL updates are being included in these reports to the Commission.

13 supplies were added to the RAL for persistent THM failures in 2015. A breakdown of the number of supplies per county on the RAL for THMs is provided below.



THMs have been identified as a priority action area in previous Drinking Water Reports and the EPA has targeted enforcement efforts in the area to ensure that action programmes are being prepared and implemented by Irish Water. In 2015, the EPA issued 9 Directions to Irish Water to prepare and implement action programmes to deal with THM exceedances in public water supplies. The EPA secured completion dates for upgrade works on all 76 of the RAL supplies in April 2016 and are Irish Water are submitting quarterly progress reports as RAL updates to the EPA for each of these supplies.

The EPA successfully prosecuted Mayo County Council on 1st February 2012 for failure to comply with the THM parametric limit within the Lough Mask PWS, and similarly the EPA prosecuted Donegal County Council on 5th April 2016 for failure to ensure THM compliance in the Letterkenny PWS. The EPA successfully prosecuted Irish Water on 20th September 2016 for failure to implement an action programme to address THM exceedances in the Carraroe PWS.

Supplies on the RAL at the end of 2015.

36	52	7	20
for a microbiological failure e.g. *E. coli, Cryptosporidium.*	for a chemical failure e.g. nitrate, pesticides, 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.

115 supplies were on the RAL at the end of 2015.

The complete list of public water supplies currently on the RAL, including details of the proposed remedial measures and associated timeframes, is available at http://www.epa.ie/pubs/reports/water/drinking/.

A key factor to ensure that supplies on the RAL are progressed is that investment in infrastructural improvements at these supplies is prioritised. Investment must prioritise boil water notices/restrictions and all supplies on the RAL list.

Section 3.3 Audits

During 2015 the EPA conducted **69 audits**[20] (Appendix 4) of public drinking water supplies across 21 local authority areas; 31 were scheduled audits, 30 were reactive audits and 8 were campaign audits to further the work of particular enforcement campaigns such as disinfection or Lead. Audits, particularly reactive audits, are undertaken at problem supplies following the notification of an exceedance or the identification of another issue associated with the supply. 6 audits were undertaken of supplies where a boil water or water restriction notice was active during the year. A summary of the main compliance issues identified across the 69 audits completed is provided below:

Audit Findings: Source Protection

Of the 69 audits undertaken during 2015, **30** of the supplies used surface water as their raw water source. **26** were groundwater-fed and **7** supplies sourced their water from springs only. **6** supplies used water from a mixture of these source types. During an EPA audit, the adequacy of source protection measures in the catchment and in the immediate area of the abstraction point is appraised. The main findings in relation to source protection at 54 supplies where the source was inspected as part of the audit were:

EPA Audit Findings - Source (Total = 54)

33	12	9	1
supplies had inadequate source protection. 21 had adequate 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 in catchments or zones of contribution and poorly protected well heads or springs can lead to the contamination of the source water. Disinfection can address some contaminants but not all. 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 supply safety and security.

[20] Available at http://www.epa.ie/pubs/advice/drinkingwater/audits/

Where source protection was recorded as inadequate the EPA audit report, issued subsequently to Irish Water, sought that either source protection be enhanced or that the suitability of the current treatment be critically assessed to determine if it was adequate to ensure safe drinking water.

Audit Findings: Treatment Process

The majority of an EPA audit is dedicated to a detailed, critical appraisal of the treatment process. The first metric of a treatment plant to be examined is the treatment capacity. Of 69 audits completed during 2015, **3** supplies were found to be operating above 110% of its design capacity. These were; Ballykelly Campile, Co. Wexford, Spiddal PWS, Co. Galway and Graiguenamanagh Public Water Supply, Co. Kilkenny. A further **4** supplies were found to be by-passing some part of the treatment process. At the Barrow public water supply, Co. Kildare an operational issue with the water conditioning plant resulted in this part of the treatment process being by-passed from January to March of 2015. At Inishmore, the Cregacarren water treatment plant was shut-down at the time of the EPA audit as a result of the UV disinfection unit operating outside of its validated range. At Bunclody, Co. Wexford, pH correction of the raw water was not operational during the EPA audit and in Aughrim Annacurra, Co. Wicklow, ozonation was not in use.

The two key processes in water treatment are chemical treatment and disinfection. Audit findings in relation to both are summarised below.

Audit Findings: Chemical Treatment

All public water supplies using surface water sources or using groundwater sources which are influenced by surface water are required to have in place a treatment barrier. Chemical treatment functions as a barrier to remove contaminants and particulate matter from water, treating it to the required standard and to prevent entry of *Cryptosporidium* into the water supply. **37** of the supplies audited by the EPA during 2015 involved chemical treatment.

EPA Audit Findings – Chemical Treatment (Total = 37)

8	6	8	5
supplies had problems with the operation of filters.	supplies had turbidity > 1.0 NTU after filtration. A further 7 did not have a turbidity monitor on each filter.	supplies had inadequate chemical dosing.	supplies had floc carryover from the clarifiers.

Floc carryover indicates poor control over chemical dosing. 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. In response to continued findings on audits in relation to chemical treatment, in 2014 the EPA published an Advice Note on Optimisation of Chemical Coagulant Dosing at Water Treatment Works[21].

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

Audit Findings: Disinfection

As a minimum, all drinking water supplies should be disinfected to provide a barrier to microbiological contamination in order to ensure the safety of the final water for drinking. The disinfection system should be reliable and verifiable. **21** supplies audited during 2015 did not meet the minimum disinfection criteria set out by the EPA. This is a marginal improvement from 2014 where 27 supplies audited did not meet the EPA minimum disinfection criteria, including 3 supplies which had no disinfection at all. Irish Water has developed a draft National Disinfection Strategy which aims to standardise the disinfection infrastructure in

[21] Available at http://www.epa.ie/pubs/advice/drinkingwater/dwadvicenote15.html

place at every drinking water treatment plant across the country. Irish Water are currently implementing their Disinfection Programme which will assess and upgrade disinfection systems countrywide to ensure minimum disinfection criteria are met.

EPA Audit Findings – Disinfection (Total = 69)

9	5	11	8
supplies did not have a chlorine/ UV monitor and alarm. 6 of these were in Co. Clare.	supplies had inadequate disinfection contact time. A further 8 had not calculated the contact time.	supplies did not have duty and standby disinfection dosing.	supplies had disinfection monitors and alarms that were not working or not being responded to.

The EPA sets out minimum disinfection dosing requirements. **21 supplies** audited during 2015 did not meet these disinfection criteria. This figure includes supplies that did not have disinfection contact time calculated. Inadequate disinfection contact time can result in insufficient disinfection and the entry of microorganisms into the supply. Duty and standby dosing equipment is necessary to provide disinfection security in the event of pump failure. 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.

Reliable and verifiable disinfection is critical to ensuring supply safety and security.

Audit Findings: Distribution

Treated water can encounter a number of hazards after it enters the distribution system or storage reservoirs which have the potential to compromise drinking water security, and consequently, its safety. **44** of the supplies audited during 2015 had treated water storage tanks or reservoirs as part of their infrastructure. **12** supplies' treated water storage tanks or reservoirs did not have adequately sealed vents to prevent ingress or animal access to treated water which can result in contamination. 1 supply, DLR Zone 1, had a reservoir that was completely uncovered, Stillorgan Reservoir. Validated UV disinfection is now installed after the reservoir to protect against the risk of microbial contamination and Irish Water are expected to submit a planning permission application to Dun Laoghaire-Rathdown County Council in autumn 2016 for the Stillorgan Reservoir Upgrade Project, which will include a covered reservoir.

Spotlight on Clare – Ensuring Disinfection

In 2015 the EPA carried out a drinking water disinfection audit campaign in Co. Clare. The audits were initiated following a scheduled EPA audit of the Broadford public water supply in October 2015. The Broadford audit identified two online chlorine monitors that were in place but not operational. The EPA subsequently met with Irish Water and Clare County Council to identify whether any additional public water supplies were failing to meet the minimum disinfection criteria outlined in the EPA in *Advice Note No. 3 E. Coli in Drinking Water.* A further 8 supplies were identified, serving a population of approximately 2,900. The table below outlines the public water supplies and disinfection issues that were identified.

Public Water Supppy	Chlorine Monitor or Alarm in place	Chlorine monitor or alarm operational and being responded to when triggered	Duty Standby Chlorine Dosing Pumps in place	Automatic Switchover between Duty Standby Dosing Pumps	Adequate Contact Time
Broadford PWS	×	×	✓	✓	✓
Carron	✓	✓	✓	×	×
Feakle PWS	×	×	✓	✓	×
Flagmount PWS	×	×	✓	✓	✓
Miltown Malbay	×	✓	✓	✓	✓
Mountshannon PWS	×	×	✓	✓	×
O'Briens Bridge PWS	×	×	✓	✓	✓
Scarriff	✓	✓	✓	×	✓
West Clare	×	✓	✓	✓	✓

Further drinking water audits focusing specifically on disinfection issues were carried out in Co. Clare and 11 Directions (7 in 2015 and 4 in 2016) were issued to Irish Water directing them to upgrade the disinfection systems. 8 Directions had been complied with at the time of writing this report and 3 Direction deadline dates had not yet been reached.

Irish Water developed and submitted a draft National Disinfection Strategy and National Disinfection Programme to the EPA in early 2016. Irish Water's draft National Disinfection Strategy outlines standard specifications for disinfection treatment infrastructure and equipment with the aim that all water treatment plants across the country will meet the same quality and technical standards for disinfection. Irish Water's National Disinfection Programme uses the principles of the Drinking Water Safety Plan approach to assess and upgrade disinfection systems at water treatment plants. The EPA is tracking the progress of the National Disinfection Programme through quarterly progress reports submitted to the EPA by Irish Water.

In Q2 2016, Irish Water confirmed that the disinfection systems in each public water supply in Co. Clare had been surveyed and that disinfection upgrade works will be complete countywide by 31st December 2016. This action will improve the safety and security of drinking water supplies in Co. Clare and reduce the risk of microbial contamination.

Chlorine monitor and alarm not operational

Duty/Standby dosing pumps with no automatic switchover

Section 3.4 Directions and Prosecutions

Following an exceedance of a parametric value or a finding made during an audit, the EPA may issue a Direction under the Drinking Water Regulations **if it is not satisfied that the actions taken by the water supplier are adequate** or if proposed actions are required to be completed within a particular timeframe.

The EPA issued **31** legally binding Directions to Irish Water during 2015.

EPA Directions Issued

7	2	2	14
issued for lack of chlorine monitor or alarm. All issued in Co. Clare (Regulation 13).	issued for Protection of Human Health (Regulation 9).	issued for lack of out of hours alarms and response procedures in Co. Galway.	issued for inadequate progress with Remedial Action Programmes.

Directions are used by the EPA where necessary to ensure that works are carried out to provide safe and secure drinking water.

Compliance with EPA directions is legally binding and the EPA can enforce the directions through the courts.

The reasons for issue of 31 Directions during 2015 and the status of the Directions at the end of 2015 are tabulated below. The total number of Directions issued during 2015 showed an increase from 29 issued in 2014. Notably, Directions were issued due to inadequate progress with Remedial Action Programmes in 14 supplies during 2015, where no directions were issued for this reason in 2014. 9 Directions were issued due to trihalomethane exceedances in 2015 which reflected a similar pattern to 2014 where 9 Directions were also issued. In addition, 2015 saw the EPA issue 6 Directions due to inadequate responses by Irish Water to EPA Audit Reports or queries. 3 were issued in 2014 for this reason.

Table 2: EPA directions issued during 2015 – reason for issue and status at end of 2015.

Area/ County	Supply	Reason for Direction	Issue Date	Status at end of 2015
Clare	Broadford	No chlorine monitor	21-Oct-15	
Clare	Feakle	No chlorine alarm	19-Nov-15	
Clare	Flagmount	No chlorine alarm	19-Nov-15	
Clare	Milltown Malbay	No chlorine alarm	19-Nov-15	
Clare	Mountshannon	No chlorine alarm	19-Nov-15	
Cork City	Lee Road	No action programme/failure to adhere to RAL dates?	05-Jun-15	
Galway	Kilconnell	No Cryptosporidium barrier	09-Dec-15	
Galway	Leenane	No Cryptosporidium barrier	05-Jun-15	
Kerry	Lauragh	No action programme/Failure to adhere to RAL dates/	05-Jun-15	
Kilkenny	Kilkenny City (Radestown)	No action programme/Failure to adhere to RAL dates/Trihalomethane exceedances	05-Jun-15	Irish Water has complied with the Direction
Limerick City	Kilglass	No action programme/Failure to respond to EPA requests/Trihalomethane exceedances	16-Jul-15	
Limerick City	Newcastlewest	No action programme/Failure to respond to EPA requests/Polycyclic aromatic hdyrocarbon exceedances	16-Jul-15	
Mayo	Swinford	Failure to respond to EPA requests	27-Nov-15	
Tipperary	Graigue	No action programme/failure to adhere to RAL dates/inadequate Cryptosporidium barrier	05-Jun-15	
Waterford	Ballyhane	No action programme/failure to	05-Jun-15	

Area/ County	Supply	Reason for Direction	Issue Date	Status at end of 2015
		adhere to RAL dates/Nitrate exceedances		
Waterford	Tallow	No action programme/failure to adhere to RAL dates/trihalomethane exceedances	05-Jun-16	
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	
Clare	O Briens Bridge	No chlorine alarm	19-Nov-15	The dates in the directions have not yet been reached. Compliance status will be determined after the due dates
Cork	Drimoleague	THM exceedances	05-Jun-15	
Cork	Kealkill	THM exceedances	05-Jun-15	
Dublin	Ballyboden/Ballymore Eustace	No action programme/failure to adhere to RAL dates	05-Jun-15	
Galway	Inishmore Cregacareen	No action programme/THM exceedances	29-May-15	
Meath	Kells-Oldcastle	No Cryptosporidium barrier	05-Jun-15	
Waterford	Ring Helvick	THM exceedances	16-Dec-15	
Galway	Leenane	No out of hours response procedure	18-Aug-15	Action programme submitted but more specific direction issued by the EPA as insufficient detail was provided.
Tipperary	Clonmel Poulavanogoe	Inadequate progress with Remedial Actions	05-Jun-15	
Wicklow	Aughrim/Annacurra	Failure to implement previous audit recommendations	29-Sep-15	
Waterford	LCB Lismore	THM exceedances	06-Jun-15	Direction not complied with – further enforcement action under consideration.
Galway	Galway City	Inadequate response to EPA audit report	01-Dec-15	On-going Enforcement Action
Clare	West Clare	No chlorine alarm	09-Nov-15	Under Assessment by EPA Inspector

A number of Directions issued prior to 2015 remained open and were actively pursued by the EPA during 2015. A summary of these directions and an update on their status is provided in Table 3.

Table 3: Directions issued prior to 2015 - reason for issue and status at end of 2015.

Area/County	Supply	Reason for Direction	Issue Date	Status at end of 2015
Sligo	Lough Talt	Trihalomethane exceedances.	03-Dec-14	Action Programme being implemented by Irish Water
Sligo	North Sligo	Iron and Turbidity exceedances	24-Sep-07	
Sligo	Lough Gill (Cairns Hill)	Trihalomethane exceedances and inadequate *Cryptosporidium* barrier.	14-Mar-13	Directions not complied with - enforcement action under consideration
Roscommon	NERWSS Strokestown/ Elphin	No *Cryptosporidium* barrier in place and no action plan submitted	10-Jun-14	
Galway	Kilkerrin Moylough	No Cryptosporidium barrier	26-Sep-11	Direction deadline passed. Further enforcement action not currently being pursued due to verified progress with action programme/necessary works
Laois	Ballyroan	Inadequate disinfection system.	03-Dec-14	
Donegal	Cashilard	Trihalomethane exceedances.	11-Dec-14	The legal statute of limitation has passed – alternative enforcement action under consideration
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	
Donegal	Rathmullen	Trihalomethane exceedances.	04-Jul-14	
Donegal	Letterkenny	Trihalomethane exceedances.	24-Mar-11	On-going enforcement action
Galway	Carraroe	Trihalomethane exceedances.	12-May-14	
Mayo	L. Mask RWSS	Trihalomethanes exceedances.	21-Apr-09	LA prosecuted for non-compliance with direction

In April 2016, the EPA successfully prosecuted Donegal County Council for failure to ensure THM compliance in the Letterkenny PWS.

Section 4: Concluding Remarks and Recommended Actions

Conclusions and recommendations made in this report are based on the EPA's findings on drinking water quality during 2015 and findings of EPA audits. The EPA outlined a number of priority actions which should be addressed to ensure safe and secure drinking water across Ireland. While progress has been made in some areas, others have been delayed. The Priority Actions are:

- Eliminate long-term Boil Water Notices through continued progress of the National Disinfection Strategy.
- Implement action programmes for improved THM treatment submitted and approved under the RAL.
- Assess public buildings for action under the National Lead Strategy.
- Encourage increased replacement of private side lead under the National Lead Strategy.
- Progress action programmes for all RAL schemes.
- Protect sources and abstraction points.
- Progress and complete Drinking Water Safety Plans.

Section 4.1: Concluding Remarks

Progress to eliminate long-term **boil water notices** has been made in 2015 with 7 long-term boil water notices lifted in 2015 benefitting 17,763 consumers. The population affected by a boil water notice at the end of 2015 was over 13,000 less than population affected at the end of 2014. New boil water notices are being prioritised for immediate remedial action to prevent the occurrence of long-term boil water notices. Of the 16 Boil Water Notices issued in 2015, 8 were addressed and lifted within 6 weeks of issue.

The Irish Water draft **National Disinfection Strategy** outlines standard specifications for disinfection systems at all drinking water treatment plants and will proactively tackle many of the treatment risks that contribute to boil water notices. The draft National Disinfection Strategy is being implemented by the **National Disinfection Programme** which commenced in 2015 and is assessing and upgrading disinfection systems on a phased county by county basis.

EPA assessment of exceedances of the legal parametric limits in 2015 identified that public drinking water supplies continue to be affected by major chemical water quality issues such as **trihalomethanes** and **lead**. The number of supplies reporting trihalomethane exceedances remains high and EPA notifications and audits demonstrate that progress to review and **optimise chemical treatment systems for THMs** has been slow. The European Commission initiated **pilot infringement proceedings** against Ireland in 2015 as a result of the failure to comply with the parametric limit for trihalomethanes. Quarterly reports, including progress updates of **action programmes** submitted and approved under the EPA **Remedial Action List**, are being submitted to the Commission outlining progress towards trihalomethane compliance.

Lead exceedances in drinking water are being addressed under the **National Lead Strategy** published by the Department of Environment, Communities and Local Government. The strategy sets out the major objectives and actions required to achieve the long-term national objective of reducing consumer exposure to lead. Positive actions taken in 2015 under the National Lead Strategy include; development of a series of **advice letters** for consumers affected by lead in their drinking water, development and implementation of an **expanded monitoring programme for lead** to inform further actions and a workshop to discuss the **identification of public buildings** requiring action under the strategy. Irish Water prepared a draft **'Lead in Drinking Water Mitigation Plan – Issues Paper'** during 2015 and 2016 as the next phase in Irish Water's contribution to the National Lead Strategy. The EPA actively engaged with Irish Water throughout the process of developing this document.

While good progress has been made in relation to public drinking water supplies under the National Lead Strategy, continued efforts are required to progress the identification of public buildings that require action and to encourage householders to replace private side lead plumbing.

The 2015 year saw significant work progressed by Irish Water towards reducing the numbers of public water supplies on the **Remedial Action List**, however 23 supplies were also added to the RAL in 2015, 13 for elevated Levels of THMs. Continued commitment is required to progress action programmes for supplies on the Remedial Action List and meet stated completion dates.

Pesticides as a **source-protection-related contaminant** has increased significantly in 2015 and recent EPA reports have identified pesticides as an emerging issue affecting drinking water abstractions. A new series of **catchment-based engagement** efforts need to be devised and acted on, co-ordinated and instructed by a national strategy. Irish Water is developing a National Pesticides Strategy which is due to be implemented by 2017. Catchment management activities will also contribute to Ireland achieving its water quality goals under the Water Framework Directive. Treatment options for pesticides should be considered where catchment-based activities prove unsuccessful in reducing pesticide exceedances in drinking water.

Irish Water has adopted the **Water Safety Plan approach** to the long-term management of drinking water supplies. This reflects a holistic and active view to the management of **risk** and improving the system's resilience. Irish Water has used the national utility structure to deal with a range of risks to drinking water supply by developing national and regional strategic plans.

Section 4.2: Recommended Actions

A summary of specific actions recommended for Public Water Supplies is provided below.

Eliminate Long-Term Boil Water Notices	• Ensure the Capital Investment Plan **provides investment** to address all boil water notices.
	• Implement the **national disinfection strategy** to reduce the risk of long-term boil water notices and improve the safety and security of supply.
	• Fast track necessary improvement works ahead of the national disinfection strategy.
	  - Provide ***Cryptosporidium* barriers** on all surface water or surface water-influenced groundwater supplies.
	  - Meet the minimum **disinfection criteria** as published by the EPA.
	• Monitor all supplies for ***E. coli***.
	• Provide **comprehensive and timely information** to the EPA on investigations into exceedances of microbiological parametric values.
	• Implement **raw water monitoring programmes** to inform treatment system design, operation and management.
	• Deliver **resilient treatment plants** able to cope with severe weather and changes in the nature of the raw water source.

Implement action programmes for improved THM treatment	• Develop and implement a **national trihalomethanes strategy** to reduce trihalomethane exceedances • Implement an **optimisation programme for chemical dosing** and review/upgrade chemical dosing processes in supplies in order to **reduce trihalomethanes and aluminium exceedances**. • Assess disinfection dosing under the **national disinfection programme**. • Implement adequate **out of hours response** backed up by suitable, real-time monitoring of process parameters and response to alarms. • Deliver **resilient treatment plants** able to cope with severe weather and changes in the nature of raw water sources. • Publish **comprehensive programmes**, with timeframes for key milestones, for

	EPA Remedial Action List supplies. • Provide **comprehensive and timely information** to the EPA on progress made with supplies on the Remedial Action List. • Develop and implement a **national mains cleaning and maintenance** programme.
Implement the National Lead Strategy	• Engage with all stakeholders to continue to finalise and implement Irish Water's **Lead in Drinking Water Mitigation Plan – Issues Paper**. • Issue **advice letters** to properties with lead connections as they are identified. • Implement the **expanded monitoring programme** for lead. • Identify **public buildings** with internal lead plumbing which require action under the National Lead Strategy. • Encourage increased **replacement of private side lead** under the National Lead Strategy.
Progress action programmes for all RAL schemes	• Ensure the Capital Investment Programme **provides investment** to all supplies on the Remedial Action List. • Publish comprehensive action programmes, with timeframes for key milestones, for **EPA Remedial Action List** supplies. • Provide **comprehensive and timely information** to the EPA on progress made with supplies on the **Remedial Action List** and on **investigations into exceedances** of the parametric values.
Protect sources and abstraction points.	• Engage with stakeholders and develop **catchment-based measures** (including water safety plans) aimed at improving the quality of drinking water sources including specific measures to address the **risk from pesticide use** and excess **nitrate run-off** in drinking water catchments. • Develop and implement a **national pesticides strategy**. • Implement **raw water monitoring programmes** to inform treatment system design, operation and management.
Develop Drinking Water Safety Plans	• Implement the **Water Safety Plan approach** in all supplies and as a guide to future capital investment. • Develop **resilient treatment plants** able to cope with future expansion and predicted risks in the supply. • Protect sources from contamination. • Develop a structure for **minimum qualification, training and experience standards** for water service employees in key operations positions (for example supervisors and plant operators).

In **conclusion**, this report reflects that considerable work has been undertaken to improve the microbiological compliance of public drinking water supplies. A significant population benefitted from the removal of long-term boil water notices in 2015 and new boil water notices were prioritised to ensure that customers were impacted for as short a time as possible. Implementing Irish Water's National Disinfection Strategy and the Drinking Water Safety Plan approach will ensure future risks are proactively addressed.

The legacy of poor chemical compliance for trihalomethanes and lead continues and pesticide compliance has been identified as an emerging issue. A strong basis for tackling lead compliance is seen in the National Lead Strategy and similar national approaches are required for trihalomethanes and pesticides.

In this context, continued and increased investment in Ireland's public drinking water sector, remains imperative, prioritising supplies subject to boil water or water restriction notices and supplies on the RAL, whilst also having regard to preventative investment where risk assessments identify it is most needed.

Section 5: Appendices

Appendix 1 lists compliance results and percentages for Public Water Supplies

Appendix 2 lists Boil Notices and Water Restriction Notices in place on Public Water Supplies during 2014.

Appendix 3 lists, for each county or area the details of Remedial Action List supplies.

Appendix 4 lists, for each county or area, the microbiological and chemical compliance rates in public supplies, the number of boil notice and water restrictions and population affected and selected enforcement information (audits, directions, RAL).

Appendix 1: Public Water Supplies – Zones Monitored and Samples Analysed in 2015

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	957	7	**99.3**	10238	8	**99.9**
Enterococci	643	2	**99.7**	1774	2	**99.9**
Chemical						
1,2-dichloroethane	648	0	**100**	1463	0	**100**
Antimony	639	0	**100**	1386	0	**100**
Arsenic	640	1	**99.8**	1402	1	**99.9**
Benzene	647	1	**99.8**	1471	1	**99.9**
Benzo(a)pyrene	652	0	**100**	1400	0	**100**
Boron	639	0	**100**	1386	0	**100**
Bromate	652	0	**100**	1389	0	**100**
Cadmium	639	0	**100**	1393	0	**100**
Chromium	639	0	**100**	1393	0	**100**
Copper	654	7	**98.9**	1493	7	**99.5**
Cyanide	571	0	**100**	1211	0	**100**
Fluoride	701	19	**97.3**	3009	27	**99.1**
Lead	747	28	**96.4**	2267	30	**98.7**
Mercury	639	0	**100**	1370	0	**100.0**
Nickel	654	0	**100**	1433	0	**100**
Nitrate	765	1	**99.9**	3541	1	**99.97**
Nitrite (at tap)	669	0	**100**	4193	0	**100**
Nitrites (at WTW)	55	0	**100**	491	0	**100**
PAH	652	0	**100**	1399	0	**100**
Pesticides - Total	647	14	**97.8**	1399	17	**98.8**
Selenium	639	1	**99.8**	1390	1	**99.9**
Tetrachloroethene & Trichloroethene	647	0	**100**	1465	0	**100**
Total Trihalomethanes	655	59	**91**	1801	153	**91.5**
Indicator						
Aluminium	755	41	**94.6**	7874	80	**99.0**
Ammonium	958	7	**99.3**	10398	13	**99.9**
Chloride	685	0	**100**	1686	0	**100**
Clostridium perfringens	718	8	**99**	8308	9	**99.9**
Coliform Bacteria	957	84	**91.2**	10238	114	**98.9**
Colony Count @ 22°C	654	17	**97.4**	1580	18	**98.9**
Colour	942	55	**94.2**	10007	123	**98.8**
Conductivity	958	0	**100**	10913	0	**100**
Iron	811	60	**92.6**	7050	129	**98.2**
Manganese	670	31	**95.4**	2702	45	**98.3**
Odour	931	19	**98.0**	9898	130	**98.7**
pH	958	184	**80.8**	10804	369	**96.56**
Sodium	650	3	**99.5**	1400	3	**99.8**
Sulphate	645	1	**99.8**	1389	2	**99.9**
Taste	930	1	**99.9**	9900	1	**99.9**
Total Organic Carbon	577	12	**97.9**	1256	12	**99.0**
Turbidity (at tap)	957	27	**97.2**	10402	36	**99.7**
Turbidity (at WTW)	159	21	**86.8**	1188	31	**97.4**
Radioactivity						
Total Indicative Dose	2	0	**100**	22	0	**100**
Tritium	2	0	**100**	23	0	**100**

Appendix 2: Boil Notices and Water Restrictions in place on Public Water Supplies during 2015

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
Clare	Ennis PWS	Lead	WR	618	Part	07/10/2008	
Cork	Dromahane	Lead	WR	20	Part	28/07/2015	
Cork	Glashaboy	Lead	WR	6	Part	07/11/2014	
Donegal	Bundoran Urban	Other	WR	6000	Full	06/12/2015	12/12/2015
Galway	Ballygar P.S.	E. coli	BN	1123	Full	12/08/2015	17/09/2015
Galway	Kilconnell	Precautionary - no exceedance confirmed	BN	233	Full	31/11/2015	
Galway	Leenane P.S.	Precautionary - no exceedance confirmed	BN	219	Part	15/07/2015	16/08/2016
Galway	Williamstown PS	Turbidity (at WTW)	BN	1020	Full	30/10/2014	24/05/2016
Galway City Council	Galway City Council Public Water S.S.	PAH	WR	320	Part	25/03/2015	01/04/2015
Galway City Council	Galway City Council Public Water S.S.	Odour	WR	320	Part	13/10/2015	16/10/2015
Kilkenny	Gorteen Ws 1016	Lead	WR	282	Full	07/04/2015	31/07/2015
Leitrim	Dowra	Precautionary - no exceedance confirmed	BN	46	Full	18/12/2015	22/04/2016
Leitrim	Drumcong	Turbidity (at WTW)	BN	19	Part	25/07/2014	16/02/2015
Leitrim	Kiltyclogher	Cryptosporidium	BN	333	Full	15/08/2015	
Leitrim	North Leitrim Regional	Precautionary - no exceedance confirmed	BN	122	Part	19/06/2015	07/07/2016
Limerick City and	Loughill PUB DWS	Inadequate Disinfection	BN	18	Part	07/05/2015	
Limerick City and	Newcastle West PUB DWS	PAH	WR	6	Part	01/08/2015	01/03/2016
Longford	Newtowncashel	Cryptosporidium	BN	516	Part	04/09/2014	13/05/2015
Mayo	Westport WSS	Cryptosporidium	BN	8600	Part	06/05/2015	12/06/2015
Meath	Baltrasna	E. coli	BN	9	Full	22/12/2014	
Roscommon	Ballinlough/Loughglynn	Clostridium Perfringens	BN	3500	Full	29/12/2015	
Roscommon	Boyle	Cryptosporidium	BN	4300	Full	13/05/2013	01/05/2015
Roscommon	Boyle/Ardcarne	Cryptosporidium	BN	1700	Full	13/05/2013	01/05/2015
Roscommon	Castlerea Regional	Precautionary - no exceedance confirmed	BN	3443	Full	04/07/2012	30/06/2015
Roscommon	Castlerea Urban	Cryptosporidium	BN	1800	Full	01/02/2014	30/06/2015
Roscommon	Hugestown	Cryptosporidium	BN	340	Part	09/04/2015	01/05/2015
Roscommon	North East Regional	Cryptosporidium	BN	3908	Full	27/03/2014	14/10/2016
Roscommon	SRRWSS - Killeglan	Cryptosporidium	BN	6000	Part	24/10/2013	30/06/2015

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
Sligo	Killaraght Public Water Supply	Cryptosporidium	BN	128	Part	14/05/2013	08/07/2016
Sligo	Lough Talt Regional Water Supply	Free Chlorine	BN	78	Part	21/05/2015	19/10/2016
Tipperary	Burncourt Regional	E. coli	BN	178	Part	01/09/2009	
Tipperary	Burncourt Regional	E. coli	BN	15	Part	13/05/2015	02/06/2015
Tipperary	Cloran Regional	E. coli	BN	9	Part	22/10/2008	13/10/2016
Tipperary	Gortnapisha Regional	E. coli	BN	9	Part	22/10/2008	13/10/2016
Tipperary	Templetney Borehole	Inadequate Disinfection	BN	20	Part	03/05/2012	
Tipperary	Tipperary UDC	E. coli	BN	4	Part	15/06/2012	08/07/2015
Waterford City and County	Ballydermody	Nitrate	WR	2	Full	12/12/2013	
Waterford City and County	Nire	Precautionary - no exceedance confirmed	BN	16	Part	13/08/2014	
Waterford City and County	Shean	Precautionary - no exceedance confirmed	BN	36	Full	03/12/2015	10/12/2015
Wexford	Ballykelly, Campile	E. coli	BN	10	Full	25/09/2015	14/10/2015
Wexford	Chestnut Grove	E. coli	BN	20	Part	08/05/2015	22/06/2015
Wexford	Oldcourt	Coliform Bacteria	BN	21	Full	18/09/2014	23/01/2015
Wicklow	Aughrim Annacurra Public Supply	E. coli	BN	1898	Full	15/09/2015	21/09/2015
Wicklow	Johnstown South (Arklow) Public Supply	Coliform Bacteria	BN	6	Full	04/06/2015	

This is a list of 44 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.

Appendix 3: Details of Remedial Action List Supplies for each Area/County (as of December 2015)

	No. of Supplies on RAL		Progress on Completion of Remedial Works				
	Original RAL	RAL at the end of 2015	Works Completed	To be completed in 2016	To be completed in 2017	To be completed in or after 2018	No Timeframe for Completion
Kerry	41	29	3	4	22	0	0
Wicklow	22	12	2	0	0	10	0
Donegal	33	11	0	1	2	8	0
Galway	34	10	2	5	2	1	0
Tipperary	20	8	0	3	3	2	0
Mayo	15	6	1	1	1	3	0
Clare	9	5	0	0	0	0	5[1]
Meath	8	5	0	2	2	1	0
Longford	5	4	0	3	0	1	0
Roscommon	10	4	0	1	1	2	0
Waterford	18	4	0	3	0	1	0
Cork	38	3	0	0	1	2	0
Sligo	8	3	0	2	0	1	0
Kilkenny	7	2	0	0	1	1	0
Cavan	10	1	0	0	1	0	0
Cork City	1	1	0	0	0	1	0
Dublin City	1	1	0	0	1	0	0
Dun Laoghaire Rathdown	0	1	0	0	0	1	0
Laois	8	1	0	0	1	0	0
Leitrim	2	1	0	1	0	0	0
Louth	3	1	0	0	1	0	0
Monaghan	12	1	0	0	1	0	0
Wexford	4	1	0	1	0	0	0
Carlow	4	0	n/a	n/a	n/a	n/a	n/a
Fingal	0	0	n/a	n/a	n/a	n/a	n/a
Galway City	1	0	n/a	n/a	n/a	n/a	n/a
Kildare	0	0	n/a	n/a	n/a	n/a	n/a
Limerick	12	0	n/a	n/a	n/a	n/a	n/a
Limerick City	1	0	n/a	n/a	n/a	n/a	n/a
Offaly	8	0	n/a	n/a	n/a	n/a	n/a
South Dublin	0	0	n/a	n/a	n/a	n/a	n/a
Waterford City	1	0	n/a	n/a	n/a	n/a	n/a
Westmeath	3	0	n/a	n/a	n/a	n/a	n/a

[1]Timeframes for completion were provided in the Q1, 2016 Remedial Action List update from Irish Water

Appendix 4: Quality and Enforcement Information for Public Supplies by County/Area for 2015

	Public Supplies[1]		Parameter Compliance (%)		Boil Notices[2]		Water Restrictions[2]		RAL[3, 4]	Directions[3]	Audits[3, 5]
County/ Area[6]	Number	Population	Microbiological	Chemical	Number	Population affected	Number	Population Affected	Number (Supplies, end 2015)	Number Issued	Number
Carlow	16	47,804	100	99.2							2
Cavan	16	24,988	100	100					1		1
Clare	19	79,388	100	99.5			1	618	5	7	9
Cork	178	329,682	100	99.6			2	26	3	2	3
Cork City	1	125,230	100	99.6					1	1	
Dun Laoghaire Rathdown	8	207,350	100	100					1		1
Donegal	32	135,794	100	97.8			1	6000	11	1	
Dublin City	6	522,914	100	99.4					1	1	
Fingal	2	271,000	100	99.52							
Galway	37	106,377	99.8	99.73	4	2595			10	4	10
Galway City	1	75,415	100	100			2	640		1	2
Kerry	71	113,981	100	98.7					29	1	3
Kildare	11	185,208	100	100							2
Kilkenny	22	60,706	100	99.8			1	282	2	2	3
Laois	27	58,573	100	99.8					1		2
Leitrim	5	16,160	100	99.17	4	520			1		
Limerick	42	120,857	100	99.94	1	18	1	6		2	
Longford	6	40,563	100	97.36	1	516			4		1
Louth	14	100,745	100	99.9					1		1
Mayo	25	92,956	100	99.47	1	8600			6	1	3
Meath	64	147,475	99.58	99.57	1	9			5	1	
Monaghan	10	31,712	100	99.5					1		1
Offaly	23	44,267	100	100							
Roscommon	26	63,993	100	98.9	8	24991			4		7
Sligo	9	65,034	100	99.1	2[7]	206			3		
South Dublin	4	257,600	100	100							
Tipperary	54	128,803	100	97.6	6	235			8	2	2
Waterford	109	79,657	100	99.37	2	52	1	2	4	4	4
Westmeath	15	71,063	100	99.48							2
Wexford	44	104,374	99.37	99.90	3	51			1		5
Wicklow	65	113,749	99.42	99.48	2	1904			12	1	5
Totals:	**962**	**3,823,418**	**N/A**	**N/A**	**35**	**39697**	**9**	**7574**	**115**	**31**	**69**

[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] Further information in Section 2.5.2; [4]Current RAL list is available at http://www.epa.ie/pubs/reports/water/drinking/; [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.; [7]One Supply served by a supply in Co. Roscommon

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
• An Oifig um Cosaint Raideolaíoch
• 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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An Ghníomhaireacht um Chaomhnú Comhshaoil

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