Drinking Water Report 2013

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 Climate, Licensing and Resource Use
- Office of Environmental Enforcement
- Office of Environmental 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 2013

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The authors would also like to thank Ruth Barrington, Niall Dunne, John Doheny and Jane Brogan for their assistance.

Published by the Environmental Protection Agency, Ireland

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ISBN: 978-1-84095-573-6

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Key Findings for 2013

Public Water Supplies

- **99.82 %** of samples comply with microbiological parameters.
- **99.51 %** of samples comply with chemical parameters.
- **40 Boil Notices and 4 Water Restriction Notices** were issued, affecting 30,519 people.
- ***E. coli*** was detected at least once in **10 supplies,** up 3 on 2012.
- **Trihalomethanes** limit was exceeded in **61 supplies**, down 35 on 2012.

Private water supplies

- **97.53 %** of samples comply with microbiological parameters.
- **99.57 %** of samples comply with chemical parameters.
- ***E. coli*** detected at least once in **63 small private supplies , 32 private group water schemes and 1 public group water scheme**.
- The microbiological quality of private supplies, while improving, remains inferior to public supplies**.**

Enforcement Issues

- **240,718** sample results reported to the EPA.
- **429** notifications of exceedances of the standards were investigated by the EPA.
- **53** audits of public supplies were conducted by the EPA.
- **16** directions were issued by the EPA in 2013 (up from 4 in 2012).
- More than half of supplies audited required disinfection system improvements.

Remedial Action List

- Since 2008, the EPA has listed **449** supplies on its **Remedial Action List.**
- **309** were resolved at the end of 2013.
- **72 %** of the original 339 listed on the RAL were removed.
- **140** supplies were on the RAL at the end of 2013.

Strategic Issues

- Remove Boil Water Notices by improving disinfection standards.
- Implement a national lead strategy.
- Optimise chemical dosing and reduce THM exceedances.
- Prioritise RAL schemes for improvement / investment.
- Protect sources and abstraction points.
- Develop 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 Ireland during 2013. The report covers both public and private drinking water supplies. During the reporting period local authorities were responsible for the management of public drinking water supplies.

This report is based on the EPA's assessment of the 240,718 sample results reported to the EPA by local authorities for public water supplies and private water supplies. For 2013 the local authorities were responsible for public water supplies. The public supplies are now the responsibility of Uisce Éireann : Irish Water. The local authorities continue to be the supervisory authorities for private water supplies.

Ensuring that our drinking water is of the highest quality is vital for public health, for our food industry, for tourism and for inward investment. The supply of clean drinking water is crucial to Ireland's economic future. It is estimated that 200,000 - 250,000[1] Irish jobs are in water intensive industries. Ireland has an abundance of water resources. If sustainably managed these resources can be a national asset which can continue to be used to supply drinking water to homes and business and to provide future jobs and investment.

The drinking water regulations (S.I. 106 of 2007, since updated by S.I. 122 of 2014) provide the EPA with supervisory powers for public water supplies. The EPA can direct a public water supplier to improve the management or quality of a public water supply. Under the regulations a public water supplier 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". This principle was adopted by the EPA in 2009. 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

This report pre-dates the period from January 2014 when Irish Water became responsible for providing public drinking water. Irish Water is now responsible for ensuring that drinking water is wholesome and clean and meets the requirements of the Drinking Water Regulations. The EPA is the supervisory authority for Irish Water 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 and private supplies (3,831) for a relatively small population, compared to other EU countries. Ireland has 978 public water supplies in comparison to Scotland's 298 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, consumers, ownership issues, distribution networks and a historical lack of funding. This variation in the characteristics of supplies needs detailed local knowledge, process expertise and a responsive management approach.

[1] available at http://www.epa.ie/pubs/reports/other/events/oee/nationalwaterevent2014/

Drinking Water Supply Types in Ireland

Supply Type	*Supplier/Supplying*	*No. of Supplies*	*Population (%)*	*Supervisory Authority*
Public Water Supplies	Irish Water	978	82.1	EPA
Public Group Schemes	Local Group	614	2.3	Local Authorities
Private Group Schemes	Local Group	438	4.2	Local Authorities
Small Private Supplies	Commercial/public entity	1,801	0.8	Local Authorities
Exempted Supplies[2]	Individual supplier	estimated 170,000 (e.g. private wells or boreholes)	10.6	Unregulated

81% of Ireland's drinking water is sourced from surface water (i.e. river and lakes), which varies in quality. 12% 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[3] 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 but from there to the tap is the ownership and responsibility of the property owner or householder.

EPA Advice

The EPA has published a wide range of guidance and technical advice notes available at http://www.epa.ie/pubs/advice/drinkingwater/ in relation to the management of 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.

[2] 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.

[3] The largest supply zone in Ireland is Fingal Zone 1, which serves 245,372 people.

Section 1.3: Regulation of Drinking Water Supplies

The EPA can direct a public water supplier (previously local authorities, now 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. Handbooks[4] have been published by the EPA covering the implementation of the regulations for both public and private supplies.

EPA responsibilities 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.

Local Authority responsibilities for drinking water include the following:

- Enforcing the Drinking Water Regulations for private supplies;
- Investigating notifications of failures to meet the drinking water standards and ensuring that private water suppliers are taking the necessary action to correct problems;
- Auditing private drinking water treatment plants;
- Issuing Directions to private water suppliers where necessary to ensure action is taken to fix problems;
- Investigating drinking water quality complaints not resolved by the water supplier.
- From 2014, local authorities also continue to operate, manage and maintain treatment plants and distribution networks for public supplies under service level agreements with Irish Water.

The **Health Service Executive** also has a statutory role under the drinking water regulations[5]. 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.

New drinking water regulations came into force in 2014[6], which revised the drinking water regulations that were introduced in 2007 to take account of the establishment of Irish Water.

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

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

[6] *European Union (Drinking Water) Regulations 2014*

Section 2: Public Supplies

This section of the report presents the EPA findings on the quality and management of **978** Public Water Supplies operating in 2013. This number is up 46 from the 932 public supplies covered in the report for 2012 as, due to an EPA instruction, local authorities registered 46 supplies with the EPA that had not been previously reported. These consisted of small public supplies, generally associated with current or former rural public authority housing schemes. The quality and disinfection at these small supplies is generally below the standard found at other public supplies.

Local authorities were entirely responsible for the supplies during 2013. Public supplies, since 1st January 2014, are the responsibility of Irish Water.

Further Information

The full data-set of 2013 data is available at http://erc.epa.ie/safer/iso19115/displayISO19115.jsp?isoID=3073.

Current information on drinking water monitoring results can be accessed via Irish Water's website at http://www.water.ie/about-us/environment-and-community/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

174,644 test results for public supplies were submitted to the EPA by local authorities for assessment. This monitoring was carried out as part of the annual monitoring programme and is designed to provide information on the quality of drinking water. Public water suppliers are required to ensure that the monitoring programmes meets 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 sample compliance, was **99.82 %** for Microbiological parameters, **99.51 %** for Chemical parameters and **98.81 %** for Indicator parameters. This compares to 2012 figures of 99.89 % for Microbiological parameters and 99.3 % for Chemical 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/epadrinkingwaterauditreports/parameterappendix.html.

Appendix 7 sets out the overall compliance rate for microbiological and chemical parameters by county.

926 supplies were fully compliant for *E. coli,* 11 samples (10 supplies) failed the *E. coli* standard and 11 samples (8 supplies) failed the *Enterococci* standard.

All supplies were 100% compliant for 15 of the 23[7] chemical parameters. Of the remaining parameters:

- 1 sample failed the chemical parameters Antimony, Arsenic and Bromate.
- 4 samples (3 supplies) failed the Copper standard[8].
- 8 samples (7 supplies) failed the Nitrate standard.
- 13 samples (11 supplies) failed the Lead standard.
- 33 samples (27 supplies) failed the Fluoride standard.
- 7 samples (6 supplies) failed the individual pesticide standard.
- 104 samples (61 supplies) failed the Trihalomethanes standard.

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.

44% of these test results were reported as **accredited** results. From 2016 all results submitted to the EPA should be accredited in accordance with the *Drinking Water Handbook on the Implementation of the Regulations for Public water Supplies*[9].

Compliance with Key Microbiological and Chemical Parameters

E. coli

98.9%	10	50%	81%
supplies complied with the standard in 2013.	supplies failed in 2013 up three from 2012.	of the 2013 supplies that failed were 'small supplies' in Co. Wicklow.	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. Johnstown South (Arklow) supply had the highest *E. coli* (70) count in a single sample. A boil notice was in place until UV treatment was installed.

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.

[7] The individual pesticide parameter is calculated separately.
[8] 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.
[9] available at http://www.epa.ie/pubs/advice/drinkingwater/publicwatersupplieshandbook/

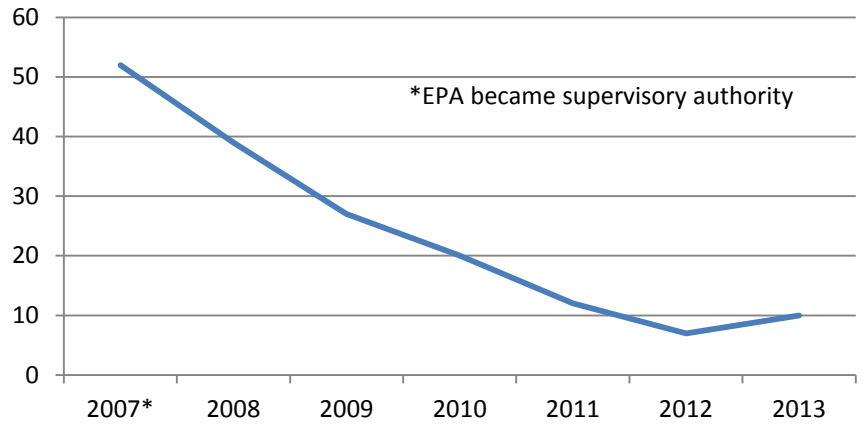


Figure 1: Trend in the number of public supplies where *E. coli* was detected.

Cryptosporidium *(non-mandatory parameter)*

105	8	172,241	4
tests submitted in 2013.	supplies on Boil Water Notice due to a risk from *Cryptosporidium*.	population on supplies listed on the RAL for risk from *Cryptosporidium* at the end of 2013.	directions issued for Roscommon supplies at risk from *Cryptosporidium*.

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 EPA Advice Note No. 9: *Cryptosporidium* Sampling and Monitoring[10] provided guidance on *Cryptosporidium* monitoring.

During 2013 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 detections of *Cryptosporidium* in the supply.

Trihalomethanes (THM)

90.3%	61	23	245µg/l
compliance with the Trihalomethanes standard.	supplies exceeded the 100 µg/l standard - the majority are in Donegal, Galway, Kerry, Roscommon and Wicklow.	of these 61 supplies had Trihalomethanes greater than 150 µg/l.	was the highest result found in the North East Regional Supply (Roosky), Co. Roscommon.

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.

Supplies on the Remedial Action List for THM exceedances should be prioritised for investment.

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

Fluoride

The local authority (and now Irish Water), on behalf of the HSE, implements the fluoridation of public water supplies. It is a legal requirement under the Health (Fluoridation of Water Supplies) Act and is a matter for the Department of Health and Children to legislate for. 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 role of the EPA is to enforce the legal standards in the *European Union (Drinking Water) Regulations 2014* and where the standard is breached to ensure that appropriate corrective action is taken. In the case of fluoride the Drinking Water Regulations set an upper limit of 0.8 mg/l. The standard in Ireland is more stringent that the EU Drinking Water Directive standard of 1.5 mg/l. In 2013, 33 samples (27 supplies) failed the national standard of 0.8 mg/l for Fluoride. One sample (Ardnapondra Reservoir, Co. Westmeath) failed the European standard of 1.5 mg/l.

Lead

98.5%	10µg/l	11	46
of supplies comply with the 2013 standard of 25µg/l.	is the new standard - reduced from 25µg/l on the 25/12/2013.	exceedances of the 25µg/l lead standard were reported in parts of supplies in 2013.	samples in 33 supplies taken during 2013 would have exceeded the new lead standard.

Lead pipes still exist in the distribution network. It is expected that compliance with the lower 10 µg/l standard will not improve unless works to replace lead pipes is undertaken. 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*"[11].

A national strategy is necessary to achieve compliance with the lead standard.

Pesticides

0.5µg/l	0.1µg/l	6	MCPA
is the standard for Total Pesticides and was not exceeded in the supplies tested	the standard for individual pesticides was exceeded in 7 samples	the number of supplies exceeding the individual pesticide standard	was the pesticide (herbicide) detected in each case

The individual pesticide limit was exceeded in 6 supplies in 2013; four supplies were in Cavan, one in Kerry and one in Limerick. In each case the herbicide MCPA was detected. There is a pattern of detection in June/July and again in September/October typically the times it is applied to grassland for ragwort, rush and thistle control.

Source protection measures should be implemented to protect drinking water sources from pesticide contamination; this requires a catchment based approach. Information leaflets and guidance on the safe use of pesticides is available at http://www.epa.ie/water/dw/sourceprotection/.

The standard for **nitrates** (50 mg/l) was exceeded in seven supplies. Five of these supplies are in County Waterford. Three of the Waterford supplies had a water restriction in place during 2013 for nitrates.

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

Compliance with Key Indicator Parameters

The **Aluminium** standard of 200 µg/l was exceeded in **40** supplies during 2013 compared to 46 in 2012. 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[12].

The **turbidity** limit of 1.0 NTU at the treatment plant was exceeded in **30** supplies. 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. However, it must be stressed that this value is for visual acceptability of the water. In practice turbidity levels need to be much lower and 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 Notices are 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.

During 2013 there were **57** boil water notices and **12** water restriction notices active in **16** counties affecting over **35,831** people. By comparison, in 2012 suppliers issued 42 boil water notices and water restrictions affecting approximately 50,000 consumers. By the end of 2013, 19 Boil notices and 8 Water Restriction Notices in 12 counties remained in place affecting over 17,000 people. 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. Also, several of the water restrictions relate to the presence of lead pipes. Appendix 5 provides a list of the notices in place during 2013.

As of 11 December 2014, there were 23 supplies on Boil Water Notices affecting a population of 23,297 and 15 supplies on Water Restrictions affecting a population of 4,071. The majority of the population affected by these current boil water notices are in County Roscommon and they relate to *Cryptosporidium* risk. An overview of Roscommon supplies and the action taken to restore drinking water quality is provided below.

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

Spotlight on Roscommon

21 public water supplies serve 48,800 people in County Roscommon. As of December 2014, there are 8 boil notices affecting 21,151 people on the Boyle, Boyle/Ardcarne, Castlerea Urban, Castlerea Regional, Northeast Strokestown/Elphin, Northeast Tarmonbarry, Northeast Roosky and South Roscommon Kileglan public water supplies. Over 90% of people on a boil notice in Ireland live in County Roscommon.

In County Roscommon the groundwater and in particular spring water is heavily influenced by surface water due to the highly karstified nature of the limestone. Monitoring for *Cryptosporidium* is a recent development in drinking water management. Roscommon supplies are particularly vulnerable to *Cryptosporidium* due to a combination of spring sources influenced by surface water, which were perceived to be clean sources that did not require extensive treatment, and the lack of barriers to *Cryptosporidium*. EPA guidance now requires vulnerable spring sources to have appropriate *Cryptosporidium* barriers[13].

As of December 2014 there are 11 Roscommon supplies on the EPA Remedial Action list – 10 for risk from *Cryptosporidium* and one for Trihalomethanes. The EPA has issued directions to either Roscommon County Council or Irish Water for each of the 10 supplies at risk from *Cryptosporidium* requiring either the installation of a barrier or an action programme to prevent the entry of *Cryptosporidium*.

For each of the 8 supplies on a boil water notice in County Roscommon, the EPA has issued directions requiring action to be taken to prevent the entry of *Cryptosporidium* into supply.

- **Boyle** and **Boyle/Ardcarne**: an EPA direction was issued in September 2013 to install a *Cryptosporidium* barrier by 31/8/14. An EPA audit in September 2014 found work 70% complete. By December 2014, the works were 92% complete.
- **South Roscommon Kileglan**: an EPA direction was issued in November 2013 to install a *Cryptosporidium* barrier by 28/11/14. By December 2014 the works were 83% complete and due to be completed in March 2015.
- **Castlerea Urban** and **Castlerea Regional**: an EPA direction was issued in June 2014 to install a *Cryptosporidium* barrier by 30/6/15. Irish Water has notified the EPA that the temporary plant will be in place by March 2015.
- **North East Regional (Stokestown/Elphin, Tarmonbarry** and **Roosky)**: an EPA direction was issued in June 2014 to install a *Cryptosporidium* barrier by 30/6/15. Irish Water has notified the EPA that the barrier will be in place by December 2016.

Construction works ongoing at Boyle and Boyle/Ardcarne treatment plant, September 2014

The EPA has identified a further 3 supplies at risk from *Cryptosporidium* and these supplies are on the EPA Remedial Action List – Ballyfarnon, Ballinlough/Loughglynn and South Roscommon Lisbrock.

- **Ballinlough/Loughglynn**: an EPA direction issued in August 2014 to prepare a *Cryptosporidium* action programme by 24/10/15. Irish Water is reviewing raw water quality and treatment options and has notified the EPA that a new treatment plant will be in place by 2016.
- **South Roscommon Lisbrock**: an EPA direction issued in August 2014 to prepare a *Cryptosporidium* action programme by 24/10/14. Irish Water is constructing a new treatment plant (75% complete) and has notified the EPA that it will be in place by May 2015.
- **Ballyfarnon**: an EPA direction issued in October 2014 to prepare a *Cryptosporidium* action programme by 30/10/15. Irish Water is constructing a new plant (39% complete) and has notified the EPA that it will be in place by mid-2015.

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

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 Water Safety Plan (WSP) 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 WSP for each public water supply facilitates continuous improvement in the security of the supply and protection of human health. The aim of a WSP is to ensure the safety and security of a water supply by identifying and managing risks. The EPA's *Advice Note No.8 – Developing Drinking Water Safety Plans*, provides guidance on the WSP approach and is available at http://www.epa.ie/pubs/advice/drinkingwater/epadrinkingwateradvicenote-advicenoteno8.html.

At the end of 2013 there were 66 Water Safety Plans in preparation and 2 completed.

The EPA recommends that a WSP 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 WSP approach that encompasses all potential hazardous events from the catchment to the consumer.

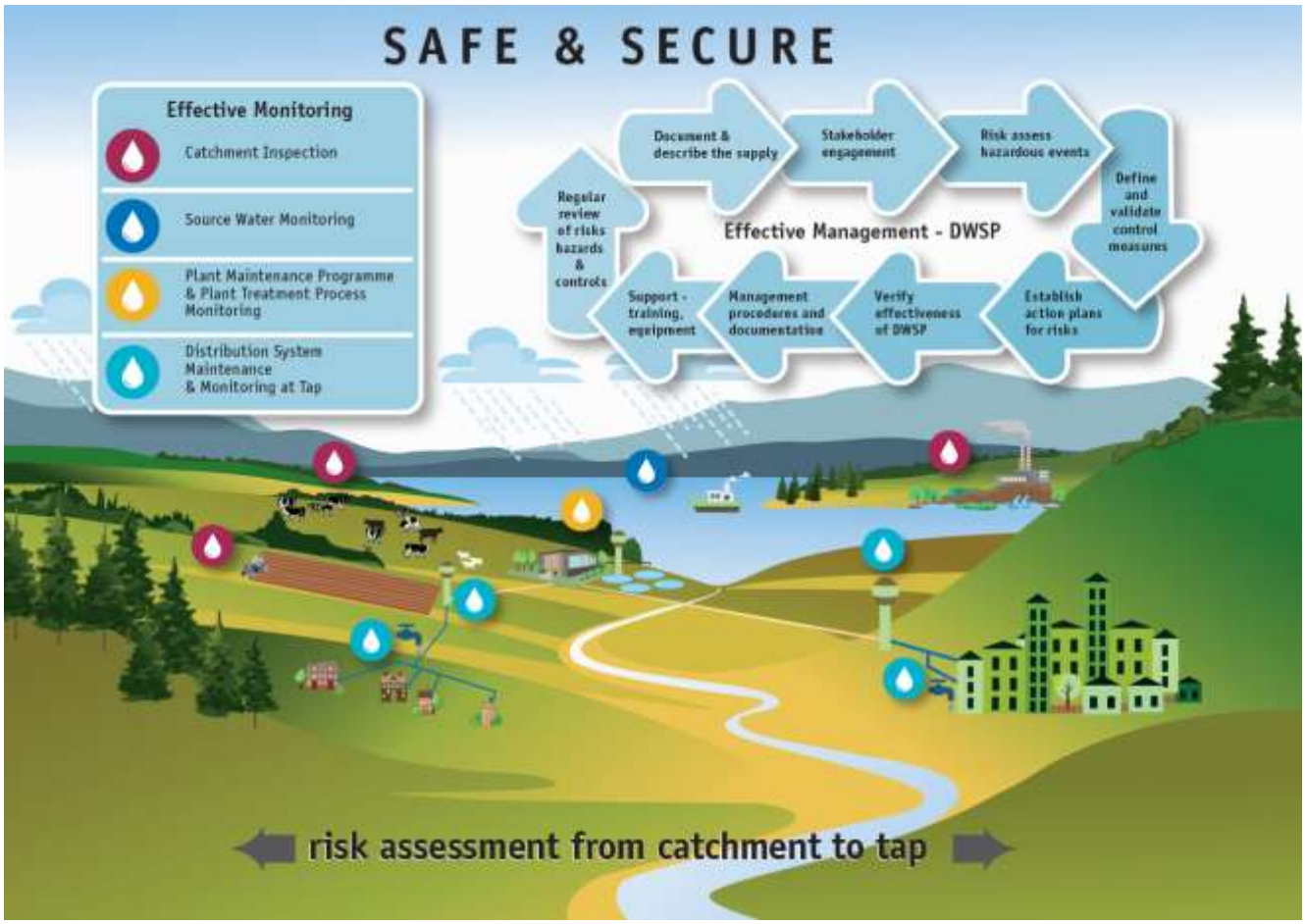


Figure 2: The Drinking Water Safety Plan Approach

Spotlight on Drinking Water Safety Planning

The EPA continues to encourage and support the development of WSPs as the most effective approach to securing and safeguarding Ireland's water services. In 2014, the EPA provided training on its WSP web tool to local authorities' water service staff and Irish Water. The EPA continues to progress WSP implementation through support, guidance and sharing information on the preparation and implementation of WSPs.

Irish Water submitted a "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 has committed to the EPA to have a complete DWSP for 135 water supply zones serving a population of 2,130,308 (57%) by the end of 2016. Figure 3 illustrates progress with the implementation of DWSPs (completed, in preparation or to commence). This is an improvement from 2013 where 2 WSPs were completed.

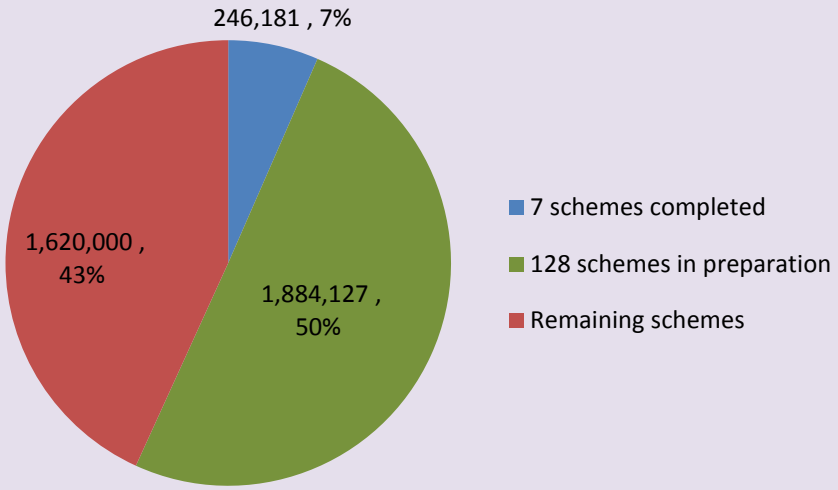


Figure 3: DWSP Implementation Progress in November 2014 (population coverage, %)

Financial and resource requirements of water safety plans need to be addressed at the outset. Proper implementation of the WSP approach can save money and better target resources in the longer term. The output of WSP risk assessments should inform the Capital Investment Programme 2017-2021, which will assist the targeting of investment towards priority (high risk) supplies.

Irish Water is now in a position to lead the WSP approach for public water supplies, in collaboration with stakeholders (e.g. agriculture and industry sectors, landowners, local government and customers working on catchment protection measures) and work with them on 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 WSP approach and providing relevant information on the WSP risk assessment will increase consumer and stakeholder confidence in the safety and security of water supplies.

Section 2.5: Enforcement of Public Supplies

A summary of the EPA's enforcement actions during 2013 is provided in this chapter. The drinking water regulations (S.I. 106 of 2007, since updated by S.I. 122 of 2014) provide the EPA with supervisory powers for public water supplies. The EPA can direct a public water supplier to improve the management or quality of a public water supply. Under the regulations a public water supplier must notify the EPA of drinking water non-compliances or risk to public health from a public water supply. The EPA has published a handbook on the implementation of the regulations to provide guidance to water suppliers. The EPA also publishes water treatment manuals and advice notes to provide practical guidance to water suppliers. All of these documents are available at http://www.epa.ie/pubs/advice/drinkingwater/.

Section 2.5.1 Exceedances of legal parametric limits

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*[14].

During 2013, the EPA received and assessed **429** notifications from local authorities in relation to public water supplies. A breakdown of the number of public water supplies in which a microbiological or chemical parameter exceeded the standards in 2012 and 2013 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 2012 and 2013.

Parameter	No. of PWS with Notifications in 2012	No. of PWS with Notifications in 2013	Change since 2012
Microbiological			
E. coli	25	14	↓ **11**
Enterococci	8	7	↓ **1**
Chemical			
Antimony	3	2	↓ **1**
Arsenic	0	1	↑ **1**
Benzene	0	0	**No change**
Benzo(a)pyrene	0	0	**No change**
Bromate	0	1	↑ **1**
Cadmium	0	0	**No change**
Copper	1	6	↑ **5**
Epichlorohydrin	0	0	**No change**
Fluoride	5	3	↓ **2**
Lead[15]	13	12	↓ **1**
Nickel	2	0	↓ **2**
Nitrate	6	8	↑ **2**
Nitrite (at tap)	1	1	**No change**
PAH	0	0	**No change**
Pesticides (individual)	16	17	↑ **1**
Pesticides (Total)	1	0	↓ **1**
Trihalomethanes(Total)	98	70	↓ **18**

↓ Improvement on 2012 ↑ Deterioration on 2012

[14] available at http://www.epa.ie/pubs/advice/drinkingwater/publicwatersupplieshandbook/

[15] Individual lead notifications may relate to more than one supply zone.

A trend of improved public water supply compliance across 8 parameters emerged during 2013. There was no change in public water supplies' performance in relation to 6 parameters and there was deterioration in relation to 5 parameters. 7 parameters were not exceeded at all, in any supply. Overall, year-on-year improvement from 2012 to 2013 was better than the previous 2011-2012 year-on-year assessment period.

The number of supplies where the detection of ***E. coli*** was notified to the EPA almost halved to **14** during 2013 compared to the numbers affected the previous year. Findings made during EPA audits in relation to disinfection systems, however, highlight that maintaining this trend of improvement relies on minimum disinfection criteria being met and on these disinfection systems being reliable and verifiable.

Chlorination is vital to make our water supplies safe from infectious microorganisms. However, the chlorination process can also produce trihalomethanes (THM), an undesirable by-product, 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 **70** 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*[16] is recommended to further manage THM formation in supplies towards achieving compliance. A position paper has been developed by the Health Service Executive and the Environmental Protection Agency on Trihalomethanes. This paper was published in 2011. It provides a summary of the issues in relation to trihalomethanes in drinking water including health, legislation and interventions. The conclusions in the paper are outlined in Appendix 8.

There were no **bromate** exceedances during 2012 but in 2013 **one supply** (Cleggan/ Claddaghduff, Co. Galway) had exceedances of the 10 µg/l limit. Bromate is also a disinfection by-product associated with the reaction of chlorine with bromide in the water. The water supplier determined that a reduction in the chlorine dose at this supply would assist in reducing bromate levels without compromising disinfection. This reduction in dose was undertaken and a follow-up sampling programme indicated a return to compliance. There were no further exceedances.

Nitrate levels above the parametric value of 50 mg/l were detected in **8** supplies in 2013, an increase of 2 from the previous year. 7 of these supplies were groundwater supplies located in Co. Waterford and the remaining supply was a spring supply in Co. Kerry. 3 of the 8 supplies were subject to restrictions on use following HSE advice. Nitrate in springs and groundwater is attributed largely to the impact of diffuse pollution from agricultural sources. At the time of publication of this report, 5 of the 8 supplies had been either replaced or nitrate removal installed whilst 3 supplies had ongoing issues with elevated levels of nitrate and were subject to investigation by Irish Water. A position paper has been developed by the Health Service Executive and the Environmental Protection Agency on nitrate. It was published in 2010 and the paper provides a summary of the issues in relation to nitrate in drinking water including health, legislation and interventions. The interventions are listed in Appendix 8.

The number of supplies affected by **lead** levels exceeding the limit of 25 µg/l reduced by 1 to **12** during 2013 compared to 2012. With the decrease of the statutory limit to 10 µg/l at the end of 2013 and many lead replacement programmes either incomplete or not yet begun, a significant increase in lead exceedances is expected. This has already been observed in 2014. A position paper has been developed by the Health Service Executive and the Environmental Protection Agency on lead. It was published in 2013 and provides a summary of the issues in relation to lead in drinking water including health, legislation and interventions. The key points in this paper are listed in Appendix 8.

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

In 2013, 6 supplies were affected by **copper** levels exceeding the 2.0 mg/l limit. This was an increase from just 1 supply the previous year. In all 6 supplies, the investigation undertaken by the local authority responsible at the time discovered that the exceedances were due to copper in the consumer's own plumbing system. The local authorities 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.

A trend of increase in the number of public water supplies affected by **pesticides** exceedances continued during 2013. As was observed during 2012, the herbicide MCPA prevailed in the notifications received. The Pesticides Working Group worked during 2013 to devise an awareness-raising campaign which was launched in the summer of 2014. The campaign will be repeated on a yearly basis as required. The EPA with other stakeholders collaborated in a joint initiative with farmers to facilitate the removal of farm hazardous waste including pesticides. Over a two year period approximately 31 tonnes of pesticides was removed for disposal.

The number of supplies with **Antimony** exceedances decreased from 3 in 2012 to 2 in 2013. The two supplies affected were in Meath and Louth and are of anthropogenic origin.

One supply was affected by elevated levels of naturally occurring **arsenic** during 2013. The supply is in Co. Waterford and has a filter for arsenic removal, however, the filter media required replacing by the water supplier at the time of the exceedance. All follow-up sampling results since the 2013 exceedance were compliant with the 10 µg/l limit for arsenic. On replacement of the media the issue was deemed resolved.

Section 2.5.2 Remedial Action List

The Remedial Action List, first prepared by the EPA in January 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 Advice Note Number 2 published in 2009 on *Action programmes to restore the quality of drinking water impacted by lead pipes and lead plumbing*[17].

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 local authorities (now Irish Water) and the effectiveness of the measures is demonstrated to the satisfaction of the EPA. In general, a supply will not be removed

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

from the list on the basis of monitoring results alone. Local authorities (now 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.

Remedial Action Progress

The first RAL collated by the EPA in January 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. At the end of 2013 there were **140** schemes on the RAL, serving **944,447 persons**. Appendix 6 contains progress of RAL supplies at the end of 2013 which is summarised as follows:

- 243 (72%) of the original 339 supplies were removed from the RAL by the end of 2013 (Figure 4).
- 66 supplies were added to the original RAL but have been subsequently removed.
- 44 supplies were added to the original RAL and remain on the current RAL.
- 140 supplies on the RAL at the end of 2013 supply water to 944,447 consumers (Figure 4).
- As of the end of 2013 completion dates were provided for the majority of supplies. Dates were not provided for 7 supplies (Figure 5).

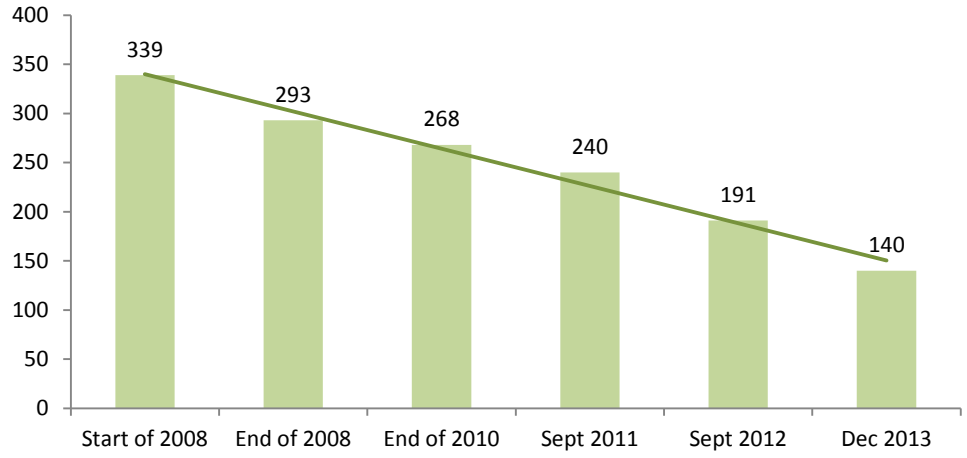


Figure 4: Reduction in the number of public water supplies on the Remedial Action List.

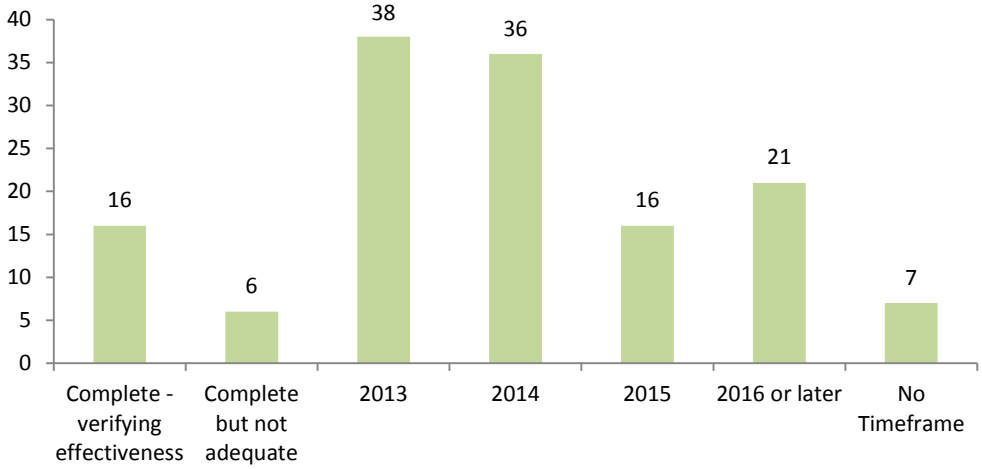
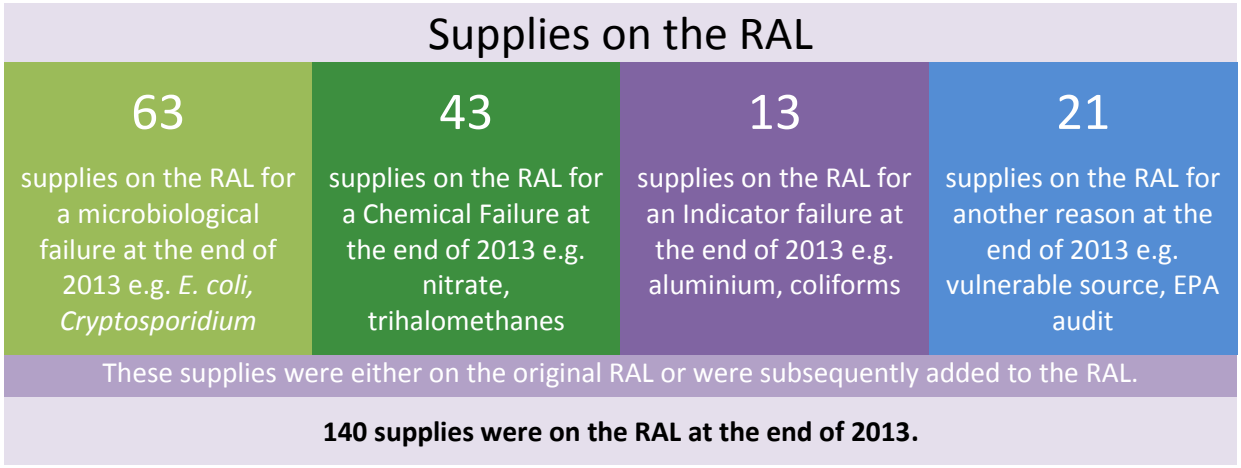


Figure 5: RAL completion dates provided by local authorities in December 2013.

Appendix 6 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 2014.



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. The Capital Investment Plan prepared by Irish Water should include as a priority, investment to address boil water notices/restrictions and all supplies on the RAL list. The Capital Investment Plan should include milestone dates for capital and minor investment projects, including expected start and finish dates for these projects. This should cover both those within the first price control period but also future planned works to give consumers certainty around the investment plans for their local supply. These milestone dates should be tracked and publically reported by Irish Water.

Section 2.5.3 Audits

During 2013 the EPA conducted **53 audits** (Appendix 7) of public drinking water supplies across 18 local authority areas; 34 were scheduled audits and 19 were reactive audits. Audits, particularly reactive audits, tend to be undertaken at problem supplies following notification of an exceedance or the identification of another supply issue. 15 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 53 audits completed is provided below, under the following headings:

Audit Findings: Source

Of the 53 audits undertaken during 2013, **19** of the supplies used surface water as their raw water source. **19** were groundwater-fed and **15** supplies sourced their water from springs only. 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 the 53 supplies audited were:

Audit Findings - Source (Total = 53)

26	16	8	5
supplies had inadequate source protection. 27 supplies 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.	supplies using spring or groundwater sources 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.

Where source protection was recorded as inadequate the EPA audit report issued subsequently to the Water Services Authority 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

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 53 audits completed during 2013, **2** supplies (Corofin and Birr) were found to be operating above 110% of their design capacity. A further **3** supplies (Corofin, Letterkenny, and Roscommon Central) were found to be by-passing part of the treatment process; filters were being bypassed in each case.

Enforcement Case Study – Roscommon Central Public Water Supply

Roscommon County Council notified the EPA of the detection of *Cryptosporidium* in the Roscommon Central Public Water Supply on Friday 26/04/2013. Consultation with the HSE confirmed 5 cases of illness in the community and a boil water notice was imposed the same day on 5,500 people. The EPA audited the supply. The main findings were:

- The two spring sources were heavily influenced by surface water and therefore required a treatment barrier to prevent *Cryptosporidium* entering the water supply.
- The existing treatment plants at the Ballinagard and Rockfield springs were not capable of treating raw water to give an appropriate degree of protection against *Cryptosporidium* and were therefore not fit for purpose.
- The construction of a new treatment plant to replace the two old plants was being tendered but was unlikely to be in place for 18 to 24 months.

The audit report was issued to Roscommon County Council. The EPA requested the Council to submit, within a month, an action plan to prevent the entry of *Cryptosporidium* and to ensure the supply is both safe and secure. Roscommon County Council submitted the action plan and the EPA directed the Council to implement the action plan.

Roscommon County Council completed the installation and commissioning of an interim water treatment plant to prevent the entry of *Cryptosporidium* into the water supply by 06/08/2013. An EPA audit the next working day confirmed that the interim treatment plant was operating satisfactorily. The boil water notice was subsequently lifted.

Temporary treatment operating at the Roscommon Central PWS

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. **22** of the supplies audited by the EPA during 2013 had chemical treatment in place.

Audit Findings – Chemical Treatment (Total = 22)

10	7	7	6
supplies had problems with the operation of filters.	supplies had turbidity > 1.0 NTU after filtration. A further 6 did not have a turbidity monitor on each filter.	supplies had inadequate chemical dosing. 1 supply was using unapproved or out-of-date chemicals.	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 June 2014 the EPA published an Advice Note on Optimisation of Chemical Coagulant Dosing at Water Treatment Works[18].

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

Enforcement Case Study – The Strand Public Water Supply, Co. Laois

The EPA audited the Strand public water supply, County Laois on 29/11/2013, to assess compliance with an EPA Direction requiring upgrade of the disinfection system. The main findings were:

- Upgrade of the disinfection system was partially complete. Dial-out alarms had yet to be commissioned and the chlorine monitor had yet to be linked to a recording device.
- There was no turbidity meter in place on the final water. An alarmed turbidity meter linked to a recording device was required.

Verification of adequate disinfection was, therefore, not being undertaken and there was no verification that turbidity levels were not exceeding the recommended limit.

The audit report was issued to Laois County Council. The EPA requested the Council to submit, within a month, a report on actions taken or proposed to address the audit recommendations. By the end of 2013, the Direction had not yet been complied with, however, in July 2014 Laois County Council and Irish water confirmed to the EPA that all the recommendations made in the audit report had been acted upon. The EPA was satisfied with actions taken and data submitted to verify these actions. The EPA's investigation file was closed.

New well constructed at The Strand PWS, Co. Laois.

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

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. **32** supplies audited during 2013 did not meet the minimum disinfection criteria set out by the EPA.

Audit Findings – Disinfection (Total = 53)

12	11	10	19
supplies did not have a chlorine monitor and alarm.	supplies had inadequate disinfection contact time. A further 11 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. **32 supplies** audited during 2013 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. **33** of the supplies audited during 2013 had treated water storage tanks as part of their infrastructure. **Ten** supplies' treated water storage tanks or reservoirs did not have adequately sealed vents to prevent animal access to treated water which can result in contamination.

Adequately sealed reservoir vents preventing animal access

Section 2.5.4 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 **16** legally binding Directions to **7** Local Authorities during 2013.

Directions Issued

6	5	4	1
issued for Quality of Treatment and Distribution equipment and materials (Regulation 13)	issued for Protection of Human Health (Regulation 9)	issued for other purposes deemed appropriate by EPA (Regulation 16)	issued for Remedial Action Programmes (Regulation 10)

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

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

The reasons for issue of 16 Directions during 2013 and the status of the Directions at the end of 2013 are tabulated below[19].

Table 2: Directions issued during 2013 – reason for issue and status at end of 2013.

WSA	Supply	Reason for Direction	Date issued	Status of 2013 Directions
Laois	Ballinakill 1	Inadequate disinfection system and unsuitable raw water source.	15/03/2013	Direction complied with.
Laois	Abbeyleix 2	Inadequate disinfection system.	08/04/2013	Direction complied with.
Laois	Roundwood	Inadequate disinfection system.	08/04/2013	Direction complied with.
Roscommon	Roscommon Central	Inadequate *Cryptosporidium* barrier.	28/06/2013	Direction complied with.
Clare	Kilkeedy	Inadequate disinfection system.	19/07/2013	Direction complied with.
Clare	Corofin	Inadequate disinfection system and turbidity monitoring.	19/07/2013	Direction complied with.
Sligo	Lough Talt	Inadequate source protection in the catchment.	23/07/2013	Direction complied with.
Roscommon	Boyle Ardcarne	Inadequate *Cryptosporidium* barrier-prepare action plan.	26/07/2013	Direction complied with.
Carlow	Carrigduff	Failure to notify EPA of an aluminium exceedance.	27/09/2013	Direction complied with.
Clare	Bridgetown	Inadequate disinfection.	27/09/2013	Direction complied with.
Westmeath	Ballany High Level Reservoir	Failure to notify EPA of a fluoride exceedance.	27/09/2013	Direction complied with.
Roscommon	SRRWSS Kileglan	Inadequate *Cryptosporidium* barrier.	26/11/2013	Direction deadline has not yet passed.
Sligo	Lough Gill (Cairns Hill)	Trihalomethane exceedances and inadequate *Cryptosporidium* barrier.	14/03/2013	Direction complied with. Action programme being implemented.
Roscommon	Boyle Ardcarne	Inadequate *Cryptosporidium* barrier-implement action plan.	05/09/2013	Deadline has passed-substantial progress made. EPA supervising ongoing works until complete.
Clare	O Brien's Bridge	Inadequate disinfection system.	27/09/2013	EPA enforcement action ongoing at the end of 2013.
Mayo	Treannagleeragh	Inadequate disinfection system and *Cryptosporidium* barrier.	08/10/2013	EPA enforcement action ongoing at the end of 2013.

[19] During 2014 legal proceedings were initiated in relation to three of these directions.

A number of Directions issued prior to 2013 remained open and were actively pursued by the EPA during 2013. A summary of these directions and an update on their status is provided in Table 3.

Table 3: Directions issued prior to 2013 - reason for issue and status at end of 2013.

WSA	Supply	Reason for Direction	Issue date	Status at end 2013
Sligo	North Sligo	Iron and Turbidity exceedances and inadequate disinfection system.	24-Sep-07	Action Programme being implemented by Local Authority
Mayo	L. Mask RWSS	Trihalomethanes exceedances.	21-Apr-09	WSA prosecuted for non-compliance with Direction. EPA supervising ongoing works until complete.
Roscommon	Castlerea Urban	No *Cryptosporidium* barrier in place and no action plan submitted	08-Nov-10	Direction not complied with. Further EPA enforcement action being considered.
Clare	Ennis PWS	No timeframe submitted for the removal of lead mains in the network	06-Jan-11	Direction not complied with. Further EPA enforcement action being considered.
Donegal	Letterkenny PWS	Trihalomethanes exceedances.	24-Mar-11	Direction not complied with.
Donegal	Fintown	Trihalomethane exceedances.	24-Mar-11	Direction not complied with. Further EPA enforcement action being considered.
Donegal	Cashilard	Trihalomethane exceedances.	24-Mar-11	Direction not complied with. Further EPA enforcement action being considered.
Donegal	Ballyshannon PWS	Trihalomethanes exceedances.	24-Mar-11	Direction complied with during 2013.
Donegal	Gortahork/ Falcarragh	Trihalomethane exceedances.	09-Sep-11	Direction not complied with. Further EPA enforcement action being considered.
Donegal	Rathmullen PWS	Trihalomethane exceedances.	09-Sep-11	Direction not complied with. Further EPA enforcement action being considered.
Donegal	Greencastle	Trihalomethane exceedances.	09-Sep-11	Direction not complied with. Further EPA enforcement action being considered.
Donegal	Portnoo Narin	Trihalomethane exceedances.	09-Sep-11	Direction not complied with. Further EPA enforcement action being considered.
Galway	Kilkerrin Moylough	No *Cryptosporidium* barrier.	26-Sep-11	Action programme is being implemented by the WSA
Kerry	Lisardboola and Lisloose	Replacement of WSA-owned lead pipework.	28-Sep-11	Direction deadline was the end of December 2013.
Cork	Mallow	Replacement of WSA-owned lead pipework.	28-Sep-11	Direction deadline was the end of December 2013.
Laois	The Strand	Inadequate disinfection system.	19-Oct-12	Action programme is being implemented by the WSA

No prosecutions were initiated by the EPA during 2013 for the failure of a WSA to comply with a Direction relating to provision of drinking water. In 2014, the EPA initiated **three** prosecutions in relation to Letterkenny Public Water Supply, Co. Donegal; Lissardboola and Lisloose Public Water Supply, Co. Kerry and at Treannagleeragh Public Water Supply, Co. Mayo.

Section 3: Private Supplies

Private supplies are operated, managed and are the responsibility of private individuals or organisations. Details of 2,853 Private supplies operating in 2013 were reported to the EPA by local authorities.

- 614 **Public Group Water Schemes** serving 104,584 people (2.3 % of population)
- 438 **Private Group Water Schemes** serving 193,380 people (4.2% of population)
- 1,801 **Small Private Supplies** serving 38,335 people (0.8% of population).

Section 3.1: Quality and Safety of Regulated Private Supplies

66,074 test results for private supplies were submitted to the EPA for assessment. The overall compliance rate for these regulated private supplies, based on sample compliance, was **97.53 %** for Microbiological parameters, **99.57 %** for Chemical parameters and **97.28 %** for Indicator parameters.

A summary of compliance with the parametric limits in the regulations is set out in Appendix 2 (Public Group Water Schemes), Appendix 3 (Private Group Water Scheme) and Appendix 4 (Small Private 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/epadrinkingwaterauditreports/parameterappendix.html.

2,070 supplies were fully compliant for *E. coli,* but 96 supplies had samples taken that failed.

All supplies were 100% compliant for 12 of the chemical parameters. For a further seven parameters, a single sample failed each. Of the remaining parameters, 2 samples (2 supplies) failed the Copper standard[20], 5 samples (5 supplies) failed the Fluoride standard, 11 samples (9 supplies) failed the nitrate standard and 34 samples (33 supplies) failed the Trihalomethanes standard. Two supplies (3 samples) failed the individual pesticide standard.

The majority of the failures set out in Appendices 2, 3 and 4 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.

34% of the private supply test results were reported as **accredited** results.

The number of supplies testing positive for ***E. coli*** decreased from 174 in 2012 to **96** in 2013. The majority of these supplies are small private supplies. For the group water sector, significant improvement has been achieved in compliance with the *E. coli* parameter in the past decade. *E. coli* compliance in the group water sector in 2013 was 98.7% compared to 85.5% in this sector in 2004. Further improvements are needed in small private supplies – *E.coli* compliance at 96.2% lags behind both public supplies (99.9%) and the group water sector (98.7%).

[20] 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.

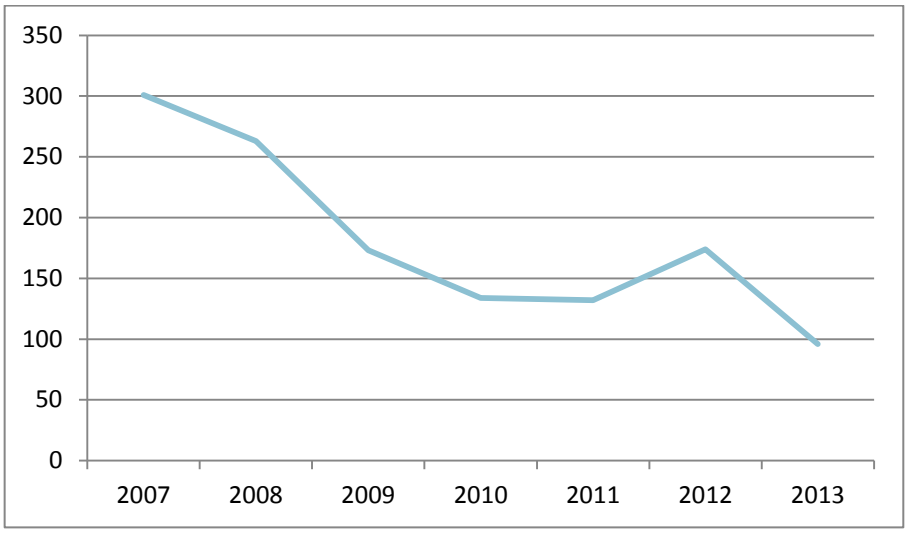


Figure 6: Trend in the number of private supplies where *E. coli* was detected.

Trihalomethanes, a by-product of the chlorination (disinfection) process, are undesirable in drinking water and their presence should be minimised while not compromising disinfection. Further details on Trihalomethanes is contained in Section 2.5.1 and Appendix 8. Compliance with the Trihalomethanes standard in private supplies remains low at **91.1 %.** The majority of supplies are in counties Cavan, Galway, Kerry, Longford and Mayo. **33** supplies exceeded the standard of 100 µg/l and **4** of these had levels of Trihalomethanes greater than 150 µg/l, with the highest result of 204 µg/l in the Brackloon / Spaddagh GWS, County Mayo.

The **lead** standard for drinking water changed on 25/12/2013 from 25 µg/l to 10 µg/l. Further details on lead is contained in Section 2.5.1 and Appendix 8. Results submitted for 2013 indicate only one supply with a lead exceedance (in County Tipperary). This high rate of compliance should be examined further by water suppliers and local authorities to determine the extent of lead piping in the private supply network and to ensure that the overall compliance rate does not reflect an incomplete lead monitoring programme for private supplies.

There are two standards for **pesticides** in the drinking water regulations. The standard for Total Pesticides (0.5 µg/l) was exceeded in one supply in Monaghan. The standard for individual pesticides (0.1 µg/l) was exceeded in 3 samples in Cavan (2 supplies).

The standard for **nitrates** (50 mg/l) was exceeded in nine supplies in Carlow, Cork, Kilkenny, Waterford and Wicklow. The highest nitrate result was 61.6 mg/l in County Cork. Further details on nitrates are contained in Section 2.5.1 and Appendix 8.

The **Aluminium** standard of 200 µg/l was exceeded in **22** supplies during 2013. 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[21].

The **turbidity** limit of 1.0 NTU at the treatment plant was exceeded in **48** supplies. 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. However, it must be stressed that this value is for visual acceptability of the water. In practice turbidity levels need to be much lower and 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*[22] and in the EPA *Advice Note No 5: Turbidity in Drinking Water*[23].

Section 3.2: Enforcement and Security of Regulated Private Supplies

Local authorities are the supervisory authorities for private water supplies. The results from 2013 demonstrate that there are compliance challenges in this sector. In particular improvements are needed in small private supplies. *E. coli* was detected in **63** small private supplies compared to detection in **33** group schemes (up from 27 in 2012). While the detections in small private supplies were down from 147 in 2012 the numbers found with *E. coli* are still not acceptable.

Water quality in the private water supply sector lags significantly behind the quality in the public network. Local authorities should use the powers available to them under the drinking water regulations to drive improvements in water quality.

Cryptosporidium results were not submitted for private supplies in 2013. *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 *EPA Advice Note No. 9: Cryptosporidium Sampling and Monitoring* provided guidance on *Cryptosporidium* monitoring. During 2013 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 water suppliers should notify their supervisory authority of any detections of *Cryptosporidium* in the supply.

The National Federation of Group Water Schemes (NFGWS) provides a key role in improving group water schemes and in the provision of guidance and training to the operators of these schemes. Recently the NFGWS have published a guide to the implementation of Quality Assurance (HACCP) System for the group water sector. This practical guidance provides essential advice to operators on managing and monitoring their supplies. The guide follows the principles of the Water Safety Plan approach.

Section 3.3: Exempted Private Supplies

Private water supplies providing water to individual private dwellings are exempt from regulation. It is estimated that **30%** of private wells in Ireland are contaminated by *E. coli* arising from animal or human waste. The HSE has reported a growing number of cases of VTEC – a pathogenic form of *E.coli.* Analysis of cases shows that patients are up to **four times** more likely to have consumed untreated water from private wells.

[21] Available at http://www.epa.ie/pubs/advice/drinkingwater/dwadvicenote15.html
[22] Available at http://www.epa.ie/pubs/advice/drinkingwater/watertreatmentmanualdisinfection.html
[23] Available at http://www.epa.ie/pubs/advice/drinkingwater/epadrinkingwateradvicenoteno5.html

Ireland has the highest incidence of VTEC in Europe. Since 2011, the HSE has reported a doubling of the number of VTEC cases in Ireland (284 in 2011, 554 in 2012 and 704 in 2013). Animals, particularly cattle are the main source of VTEC and infection is spread either from direct animal contact or through contaminated food and water. Person to person spread is also common. In other countries the most common source of infection is through food outbreaks.

In Ireland, rural families are commonly affected and much of this is because of contaminated private wells. Consumers of water from private wells at much greater risk of VTEC than those who drink water from mains supplies.

Disinfection kills all *E. coli* including VTEC and, while public water supplies are disinfected, not all private wells are. The EPA is providing easy to use information at http://www.epa.ie/water/dw/hhinfo/ explaining what well owners should do to protect their health. The information includes a short animation to explain the risks to well water quality and the simple things that can be done to reduce the risks.

A *'Protect your Well'* assessment app is now available at http://erc.epa.ie/water/wells/. Well owners can assess whether their wells are at risk in less than 10 minutes using this simple app. It provides well owners with tailored advice on how they can reduce the risk of contamination in their well.

Figure 7: EPA Infographic on Private Wells

Section 4: Recommendations

The recommendations presented in the report are based on the EPA's findings on drinking water quality during 2013, on findings from EPA audits and on the need to implement the requirements of the Drinking Water Regulations which implement the Drinking Water Directive in Ireland. Previous EPA reports will have contained similar recommendations and in some cases progress in implementing remedial measures and improvements has been slow, often delayed by underinvestment in water services.

Section 4.1: Public Water Supplies

The recommendations listed below cover public water supplies and are aimed at Irish Water.

Action needed

Remove Boil Water Notices by improving disinfection standards.
Implement a national lead strategy.
Optimise chemical dosing and reduce THM exceedances.
Prioritise RAL schemes for improvement / investment.
Protect sources and abstraction points.
Develop Drinking Water Safety Plans.

Source Protection

- Develop **catchment-based measures** (including water safety plans) aimed at improving the quality of drinking water sources including specific measures to **address risk from pesticide** use and excess **nitrate run-off** in drinking water catchments.
- Implement **raw water monitoring programmes** to inform treatment system design.

Treatment Plants

- **Elimination (and prevention) of supplies on long-term boil water notices and restrictions** as a matter of priority by fast tracking the necessary improvement works.
    - Provide ***Cryptosporidium* barriers** on all surface water or surface water-influenced groundwater supplies.
    - Meet the **disinfection criteria** as published by the EPA.
- Publish comprehensive programmes, with timeframes for key milestones, for **EPA Remedial Action List** supplies.
- Implement an **optimisation programme for chemical dosing** and review/upgrade of chemical dosing processes in supplies in order to **reduce trihalomethanes and aluminium exceedances**.
- Implement adequate **out of hours response** backed up by suitable, real-time monitoring of process parameters and alarms.
- Deliver **resilient treatment plants** able to cope with severe weather and changes in the nature of raw water sources.
- Develop a structure for **minimum qualification, training and experience standards** for water service employees in key operations positions (for example supervisors and plant operators).

Distribution Network

- Finalise and implement the **national lead strategy** to ensure compliance with the lead standard.
- Develop and implement a **national programme for reservoir protection** (including works to safeguard post-treatment water, inspection, cleaning and maintenance).
- Develop and implement a **national mains cleaning and maintenance** programme.
- Identification and **remediation of pipelines with regular bursts and colour issues**.

Management, Control and Communications

- Roll out the **Water Safety Plan approach** in all supplies and as a guide to future capital investment.
- National Drinking Water **Incident Response Plans** should be in place to cover emergency situations.
- Implement measures to **improve quality and consistency of management and operation** of water supplies.
- All public supplies should be **monitored for *E.coli*.**
- Monitoring results submitted to the EPA after the end of 2015 must be **accredited**.

Section 4.2: Private Water Supplies

The recommendations listed below cover private water supplies and are aimed at the water supplier and local authorities as the supervisory authority for these supplies.

- **All private supplies should be monitored for *E.coli*.**
- Failures to meet the microbiological, chemical and indicator parametric values in private water supplies must be **investigated** to ensure that the cause of the failure is identified and the appropriate corrective action is taken.
- Local authorities should **take the appropriate enforcement action** where there is evidence that such investigations and actions are not being undertaken.
- Group Water Schemes should **implement the guidance** developed by the National Federation of Group Water Schemes on Quality Assurance (HACCP) System.
- A programme of **monitoring for *Cryptosporidium*** and **lead** should be undertaken in private supplies to determine the extent of its presence.

Section 4.3: Exempted Supplies (individual private supplies)

The recommendations listed below cover exempted supplies and are aimed at the owners of individual supplies such as wells and boreholes.

- **Well owners should check their wells to ensure that their health is not at risk:** This includes checking that there are no sources of pollution entering the well and testing the water, at least once a year, ideally following heavy rain when the well is most at risk of contamination. The EPA has provided easy to use information at http://www.epa.ie/water/dw/hhinfo/ explaining what well owners should do to protect their health.

Figure 8: EPA Infographic on Private Wells

Section 5: Appendices

Appendices 1, 2, 3 and 4 list compliance results and percentages for four groups of regulated drinking water supplies:

- Public Water Supplies
- Public Group Schemes
- Private Group Schemes
- Small Private Supplies.

Appendix 5 lists the 69 Boil Notices and Water Restriction Notices in place on Public Water Supplies during 2013.

Appendix 6 lists, for each county or area the details of Remedial Action List supplies.

Appendix 7 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 8 contains extracts of the following joint HSE/EPA position papers:

- Trihalomethanes
- Nitrate
- Lead

Appendix 9 is an infographic of the Drinking Water Report 2013.

Appendix 1: Public Water Supplies – Zones Monitored and Samples Analysed in 2013

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	936	10	**98.9**	10159	11	**99.9**
Enterococci	671	8	**98.8**	2039	11	**99.5**
Chemical						
1,2-dichloroethane	583	0	**100**	1129	0	**100**
Antimony	503	1	**99.8**	997	1	**99.9**
Arsenic	520	1	**99.8**	1065	1	**99.9**
Benzene	584	0	**100**	1128	0	**100**
Benzo(a)pyrene	520	0	**100**	950	0	**100**
Boron	539	0	**100**	1054	0	**100**
Bromate	601	1	**99.8**	1094	1	**99.9**
Cadmium	573	0	**100**	1136	0	**100**
Chromium	573	0	**100**	1136	0	**100**
Copper	628	3	**99.5**	1326	4	**99.7**
Cyanide	439	0	**100**	865	0	**100**
Fluoride	677	27	**96.0**	3025	33	**98.9**
Lead	722	11	**98.5**	2134	13	**99.4**
Mercury	519	0	**100**	1028	0	**100**
Nickel	625	0	**100**	1205	0	**100**
Nitrate	763	7	**99.1**	4087	8	**99.8**
Nitrite (at tap)	693	0	**100**	4652	0	**100**
Nitrites (at WTW)	70	0	**100**	482	0	**100**
PAH	516	0	**100**	948	0	**100**
Pesticides - Total	574	0	**100**	1054	0	**100**
Selenium	509	0	**100**	1008	0	**100**
Tetrachloroethene & Trichloroethene	583	0	**100**	1124	0	**100**
Total Trihalomethanes	628	61	**90.3**	1319	104	**92.1**
Indicator						
Aluminium	707	40	**94.3**	7495	82	**98.9**
Ammonium	936	7	**99.3**	10151	11	**99.9**
Chloride	621	1	**99.8**	1201	1	**99.9**
Clostridium perfringens	681	19	**97.2**	8392	23	**99.7**
Coliform Bacteria	936	83	**91.1**	10158	128	**98.7**
Colony Count @ 22°C	623	17	**97.3**	1350	18	**98.7**
Colour	937	58	**93.8**	10315	144	**98.6**
Conductivity	927	0	**100**	10552	0	**100**
Iron	775	43	**94.5**	6480	116	**98.2**
Manganese	639	25	**96.1**	2284	38	**98.3**
Odour	910	57	**93.7**	10007	240	**97.6**
pH	937	194	**79.3**	10367	388	**96.3**
Sodium	620	1	**99.8**	1186	1	**99.9**
Sulphate	616	0	**100**	1162	0	**100**
Taste	815	10	**98.8**	9178	65	**99.3**
Total Organic Carbon	572	22	**96.2**	1102	24	**97.8**
Turbidity (at tap)	937	16	**98.3**	10398	16	**99.8**
Turbidity (at WTW)	159	30	**81.1**	1539	49	**96.8**
Radioactivity						
Total Indicative Dose	3	1	**66.7**	21	0	**100**
Tritium	3	0	**100**	24	0	**100**

Appendix 2: Public Group Water Schemes – Zones Monitored and Samples Analysed in 2013

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	572	1	**99.8**	1344	1	**99.9**
Enterococci	96	0	**100**	102	0	**100**
Chemical						
1,2-dichloroethane	64	0	**100**	67	0	**100**
Antimony	57	0	**100**	60	0	**100**
Arsenic	65	0	**100**	69	0	**100**
Benzene	64	0	**100**	67	0	**100**
Benzo(a)pyrene	77	0	**100**	80	0	**100**
Boron	68	0	**100**	71	0	**100**
Bromate	110	0	**100**	136	0	**100**
Cadmium	65	0	**100**	69	0	**100**
Chromium	65	0	**100**	69	0	**100**
Copper	90	0	**100**	95	0	**100**
Cyanide	54	0	**100**	57	0	**100**
Fluoride	167	4	**97.6**	304	4	**98.7**
Lead	119	0	**100**	151	0	**100**
Mercury	64	0	**100**	68	0	**100**
Nickel	90	0	**100**	94	0	**100**
Nitrate	187	0	**100**	419	0	**100**
Nitrite (at tap)	317	0	**100**	666	0	**100**
Nitrites (at WTW)	70	0	**100**	149	0	**100**
PAH	65	0	**100**	68	0	**100**
Pesticides - Total	75	0	**100**	78	0	**100**
Selenium	57	0	**100**	60	0	**100**
Tetrachloroethene & Trichloroethene	64	0	**100**	67	0	**100**
Trihalomethanes (Total)	89	19	**78.7**	94	19	**79.8**
Indicator						
Aluminium	442	10	**97.7**	998	11	**98.9**
Ammonium	572	10	**98.3**	1348	10	**99.3**
Chloride	75	0	**100**	83	0	**100**
Clostridium perfringens	525	2	**99.6**	1206	2	**99.8**
Coliform Bacteria	572	19	**96.7**	1346	20	**98.5**
Colony Count @ 22°C	75	1	**98.7**	78	1	**98.7**
Colour	572	9	**98.4**	1349	15	**98.9**
Conductivity	550	0	**100**	1302	0	**100**
Iron	369	12	**96.7**	772	15	**98.1**
Manganese	185	3	**98.4**	339	3	**99.1**
Odour	557	35	**93.7**	1317	46	**96.5**
pH	572	10	**98.3**	1348	12	**99.1**
Sodium	76	0	**100**	80	0	**100**
Sulphate	75	0	**100**	79	0	**100**
Taste	521	1	**99.8**	1202	1	**99.9**
Total Organic Carbon	75	4	**94.7**	81	4	**95.1**
Turbidity (at tap)	572	4	**99.3**	1348	4	**99.7**
Turbidity (at WTW)	73	3	**95.9**	177	4	**97.7**

Appendix 3: Private Group Water Schemes – Zones Monitored and Samples Analysed in 2013

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	417	32	**92.3**	1492	36	**97.6**
Enterococci	257	8	**96.9**	313	8	**97.4**
Chemical						
1,2-dichloroethane	166	0	**100**	178	0	**100**
Antimony	166	0	**100**	176	0	**100**
Arsenic	167	0	**100**	177	0	**100**
Benzene	166	0	**100**	178	0	**100**
Benzo(a)pyrene	167	0	**100**	176	0	**100**
Boron	238	0	**100**	249	0	**100**
Bromate	238	0	**100**	248	0	**100**
Cadmium	166	0	**100**	176	0	**100**
Chromium	167	0	**100**	177	0	**100**
Copper	243	1	**99.6**	267	1	**99.6**
Cyanide	165	0	**100**	174	0	**100**
Fluoride	237	0	**100**	293	0	**100**
Lead	245	0	**100**	364	0	**100**
Mercury	166	0	**100**	175	0	**100**
Nickel	239	0	**100**	250	0	**100**
Nitrate	336	1	**99.7**	750	3	**99.6**
Nitrite (at tap)	323	0	**100**	847	0	**100**
Nitrites (at WTW)	8	0	**100**	15	0	**100**
PAH	167	0	**100**	176	0	**100**
Pesticides - Total	228	1	**99.6**	238	1	**99.6**
Selenium	166	0	**100**	176	0	**100**
Tetrachloroethene & Trichloroethene	166	0	**100**	178	0	**100**
Trihalomethanes (Total)	238	14	**94.1**	268	15	**94.4**
Indicator						
Aluminium	328	7	**97.9**	1000	7	**99.3**
Ammonium	417	7	**98.3**	1490	15	**99.0**
Chloride	243	1	**99.6**	262	1	**99.6**
Clostridium perfringens	335	16	**95.2**	1137	17	**98.5**
Coliform Bacteria	417	68	**83.7**	1496	87	**94.2**
Colony Count @ 22°C	239	5	**97.9**	248	5	**98.0**
Colour	417	26	**93.8**	1496	38	**97.5**
Conductivity	417	0	**100**	1489	0	**100**
Iron	335	7	**97.9**	917	8	**99.1**
Manganese	291	10	**96.6**	565	10	**98.2**
Odour	408	15	**96.3**	1442	22	**98.5**
pH	417	27	**93.5**	1493	42	**97.2**
Sodium	241	1	**99.6**	253	1	**99.6**
Sulphate	237	0	**100**	249	0	**100**
Taste	390	0	**100**	1371	0	**100**
Total Organic Carbon	238	5	**97.9**	272	5	**98.2**
Turbidity (at tap)	417	4	**99.0**	1502	4	**99.7**

Appendix 4: Small Private Supplies – Zones Monitored and Samples Analysed in 2013

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	1177	63	**94.6**	1705	65	**96.2**
Enterococci	503	30	**94.0**	703	30	**95.7**
Chemical						
1,2-dichloroethane	16	0	**100**	19	0	**100**
Antimony	54	1	**98.1**	63	1	**98.4**
Arsenic	83	1	**98.8**	92	1	**98.9**
Benzene	17	0	**100**	20	0	**100**
Benzo(a)pyrene	17	0	**100**	19	0	**100**
Boron	68	0	**100**	77	0	**100**
Bromate	17	1	**94.1**	20	1	**95.0**
Cadmium	172	0	**100**	186	0	**100**
Chromium	172	0	**100**	186	0	**100**
Copper	348	1	**99.7**	364	1	**99.7**
Cyanide	14	0	**100**	16	0	**100**
Fluoride	23	0	**100**	26	0	**100**
Lead	545	1	**99.8**	636	1	**99.8**
Mercury	15	0	**100**	17	0	**100**
Nickel	173	0	**100**	187	0	**100**
Nitrate	780	8	**99.0**	1058	8	**99.2**
Nitrite (at tap)	875	1	**99.9**	1212	1	**99.9**
PAH	17	0	**100**	19	0	**100**
Pesticides - Total	27	0	**100**	38	0	**100**
Selenium	68	0	**100**	77	0	**100**
Tetrachloroethene & Trichloroethene	18	0	**100**	21	0	**100**
Trihalomethanes (Total)	17	0	**100**	20	0	**100**
Indicator						
Aluminium	335	5	**98.5**	594	5	**99.2**
Ammonium	1128	18	**98.4**	1615	25	**98.5**
Chloride	218	5	**97.7**	226	5	**97.8**
Clostridium perfringens	518	27	**94.8**	713	31	**95.7**
Coliform Bacteria	1177	234	**80.1**	1704	257	**84.9**
Colony Count @ 22°C	108	22	**79.6**	111	22	**80.2**
Colour	1164	24	**97.9**	1679	35	**97.9**
Conductivity	1122	2	**99.8**	1596	2	**99.9**
Iron	837	60	**92.8**	1187	67	**94.4**
Manganese	561	67	**88.1**	672	77	**88.5**
Odour	1113	20	**98.2**	1582	20	**98.7**
pH	1167	208	**82.2**	1682	259	**84.6**
Sodium	82	15	**81.7**	97	16	**83.5**
Sulphate	15	0	**100**	17	0	**100**
Taste	480	1	**99.8**	737	1	**99.9**
Total Organic Carbon	12	1	**91.7**	14	1	**92.9**
Turbidity (at tap)	1166	41	**96.5**	1683	46	**97.3**
Radioactivity						
Tritium	1	0	**100**	1	0	**100**

Appendix 5: Boil Notices and Water Restrictions in place on Public Water Supplies during 2013

Area/ County	Scheme Name	Reason	Boil Notice (BN)/Water Restriction (WR)	Population Affected	Affecting Full or Part of Supply	Date Notice Issued	Date Notice Lifted
Cavan	Corgreagh, Poles	Coliform Bacteria	BN	10	Full	21/11/2013	19/12/2013
Cavan	Swanlinbar	Ammonium	WR	315	Full	12/04/2013	19/04/2013
Clare	Ennis	Lead	WR	252	Part	07/10/2008	
Cork	An Faithin Est. Tarelton	E. coli	BN	30	Full	01/07/2008	01/08/2014
Cork	Cluin Court Allihies	Coliform Bacteria	BN	30	Full	30/01/2013	01/08/2014
Cork	Conna Regional	Free Chlorine	BN	2,732	Full	10/04/2013	12/04/2013
Cork	Glashaboy (Little Island)	Lead	WR	150	Part	11/11/2008	
Cork	Glashaboy (Cobh)	Lead	WR	666	Part	28/07/2010	
Kerry	An Ceapaigh Thiar 021d	Inadequate Disinfection	BN	9	Part	06/05/2010	01/08/2013
Kerry	An Clochán 028d	Inadequate Disinfection	BN	9	Part	16/07/2010	01/08/2013
Kerry	An Fheothanach	Inadequate Disinfection	BN	50	Part	05/08/2009	12/04/2013
Kerry	An Mhuiríoch/ Baile Breach 063d	Inadequate Disinfection	BN	3	Part	05/08/2009	01/08/2013
Kerry	Central Regional Sheheree 408f*	Precautionary - no exceedance	BN	50	Part	25/01/2013	29/01/2013
Kerry	Central Regional Lough Guitane (H) 400f	Inadequate Disinfection	BN	30	Part	05/08/2009	22/01/2013
Kerry	Kenmare 045A	Inadequate Disinfection	BN	20	Part	28/07/2009	15/01/2014
Kerry	Kilgarvan 046A	Inadequate Disinfection	BN	5	Part	05/08/2009	01/08/2013
Kerry	Mountain Stage 062a	Inadequate Disinfection	BN	9	Part	28/07/2009	
Laois	Arles 2	Precautionary - no exceedance	BN	80	Full	29/03/2013	26/08/2013
Laois	Camross	Precautionary - no exceedance	BN	36	Full	08/10/2013	18/12/2013
Laois	Coolanaugh	Precautionary - no exceedance	BN	39	Full	29/03/2013	26/08/2013
Laois	Mountmellick 1	Lead	WR	33	Part	14/11/2012	
Laois	The Strand	E. coli	BN	9	Full	11/01/2007	19/12/2013
Limerick	Ballingarry	Cryptosporidium	BN	562	Full	19/03/2013	20/03/2013
Limerick	Bruff	Lead	WR	18	Part	03/01/2008	
Limerick	Bruree	Cryptosporidium	BN	660	Full	19/03/2013	20/03/2013
Limerick	Carrigeen	Precautionary - no exceedance	BN	50	Full	08/06/2012	22/03/2013
Longford	Newtowncashel	Free Chlorine	BN	120	Part	05/09/2011	06/12/2013
Mayo	Kiltimagh	Coliform Bacteria	BN	1,555	Full	01/08/2013	08/08/2013
Mayo	Treannagleeragh	E. coli	BN	80	Full	06/09/2013	10/12/2014
Offaly	Birr	E. coli	BN	3,912	Full	04/07/2013	12/07/2013
Offaly	Birr	E. coli	BN	72	Part	06/07/2013	15/07/2013
Offaly	Dunkerrin	Precautionary - no exceedance	BN	12	Part	12/04/2013	26/04/2013
Offaly	Dunkerrin	E. coli	BN	21	Part	13/06/2013	25/07/2013
Roscommon	Boyle	Cryptosporidium	BN	4,300	Full	13/05/2013	
Roscommon	Boyle/Ardcarne	Cryptosporidium	BN	1,700	Full	13/05/2013	
Roscommon	Castlerea Regional	Precautionary - no exceedance	BN	3,443	Full	04/07/2012	
Roscommon	Roscommon Central	Cryptosporidium	BN	5,500	Full	25/04/2013	09/08/2013

Area/ County	Scheme Name	Reason	Boil Notice (BN)/Water Restriction (WR)	Population Affected	Affecting Full or Part of Supply	Date Notice Issued	Date Notice Lifted
Roscommon	SRRWSS - Killeglan	Cryptosporidium	BN	6,000	Part	24/10/2013	
South Dublin	Sd_Zone2	E. coli	WR	4	Part	07/11/2013	28/11/2013
Sligo	Killaraght	Cryptosporidium	BN	128	Full	14/05/2013	
Tipperary	Ahenny	Inadequate Disinfection	BN	100	Full	12/09/2013	30/06/2014
Tipperary	Ballinver	Inadequate Disinfection	BN	100	Full	12/09/2013	30/06/2014
Tipperary	Burncourt Regional	E. coli	BN	178	Part	01/09/2009	
Tipperary	Cloran Regional	E. coli	BN	9	Part	22/10/2008	
Tipperary	Gortnapisha Regional	E. coli	BN	9	Part	22/10/2008	
Tipperary	Templetney Borehole	Inadequate Disinfection	BN	20	Part	03/05/2012	
Waterford	Ballydermody	Nitrate	WR	2	Full	12/12/2013	
Waterford	Ballyduff\Ballylemon	Cryptosporidium	BN	75	Part	17/10/2013	29/10/2013
Waterford	Glenawillin	Nitrate	WR	60	Full	24/05/2010	11/06/2014
Waterford	Knockalisheen	Precautionary - no exceedance	BN	168	Full	05/11/2013	21/11/2013
Waterford	LCB Cappoquin	Nitrate	WR	1,500	Full	06/07/2013	09/07/2013
Waterford	Moores Well	Precautionary - no exceedance	BN	65	Full	21/10/2013	01/11/2013
Wexford	Castledockrell	Nitrate	WR	80	Full	16/07/2012	31/07/2013
Wexford	Enniscorthy	Coliform Bacteria	BN	20	Part	16/10/2013	27/01/2014
Wicklow	Ballyclogh	Precautionary - no exceedance	BN	7	Full	10/07/2013	31/07/2013
Wicklow	Ballyhenry	Precautionary - no exceedance	BN	14	Full	22/07/2013	02/08/2013
Wicklow	Ballykilmurray	E. coli	BN	18	Full	14/08/2013	06/12/2013
Wicklow	Ballyknockan Valleymount	Enterococci	BN	353	Full	07/03/2013	22/03/2013
Wicklow	Ballymorris (Fort Faulkner)	Coliform Bacteria	BN	12	Full	12/08/2013	06/12/2013
Wicklow	Ballymorris	E. coli	BN	12	Full	28/01/2013	21/02/2013
Wicklow	Enniskerry	Enterococci	BN	80	Part	14/02/2013	08/03/2013
Wicklow	Grangecon	Precautionary - no exceedance	WR	50	Full	12/07/2012	27/08/2013
Wicklow	Johnstown South (Arklow)	Coliform Bacteria	BN	6	Full	21/08/2013	25/02/2014
Wicklow	Knoxstershill	E. coli	BN	12	Full	14/08/2013	06/12/2013
Wicklow	Monument Lane	Coliform Bacteria	BN	30	Full	20/08/2013	03/02/2014
Wicklow	Mullans North	Coliform Bacteria	BN	6	Full	28/08/2013	23/12/2013
Wicklow	Roscath	Enterococci	BN	6	Full	14/08/2013	19/12/2013
Wicklow	Stranakelly	Coliform Bacteria	BN	9	Full	28/08/2013	23/12/2013
Wicklow	Thomastown	Precautionary - no exceedance	BN	126	Part	11/02/2013	21/02/2013

This is a list of 69 boil notices and water restrictions that are / were the responsibility of Water Services Authority to resolve. Additional notices are in place in certain areas that are the responsibility of the property owner to resolve. See section 2.2 for general information on boil notices and water restrictions.

Appendix 6: Details of Remedial Action List Supplies for each WSA (as of December 2014)

	No. of Supplies on RAL		Progress on Completion of Remedial Works				
	Original RAL	Current RAL	Works Completed	To be completed in 2013	To be completed in 2014	To be completed in or after 2015	No Timeframe for Completion
Kerry	41	35	11	4	15	5	0
Wicklow	22	13	1	3	1	8	0
Galway	34	12	8	4	0	0	0
Waterford	18	11	0	6	3	2	0
Roscommon	10	10	0	0	2	8	0
Donegal	33	10	0	0	2	2	6
South Tipperary	14	9	0	3	2	4	0
Cork	38	7	0	2	5	0	0
Meath	8	5	0	4	0	1	0
Sligo	8	4	0	0	1	3	0
Mayo	15	4	1	1	1	0	1
Dublin City	1	3	0	2	0	1	0
Dun Laoghaire Rathdown	0	3	0	2	0	1	0
Louth	3	2	0	1	1	0	0
Kilkenny	7	2	0	0	0	2	0
Monaghan	12	2	0	1	1	0	0
Cavan	10	2	0	2	0	0	0
Longford	5	1	0	1	0	0	0
Cork City	1	1	0	0	1	0	0
Laois	8	1	0	0	1	0	0
Leitrim	2	1	0	1	0	0	0
Limerick	12	1	0	1	0	0	0
Wexford	4	1	1	0	0	0	0
Carlow	4	0	n/a	0	n/a	n/a	n/a
Clare	9	0	n/a	0	n/a	n/a	n/a
Fingal	0	0	n/a	0	n/a	n/a	n/a
Galway City	1	0	n/a	0	n/a	n/a	n/a
Kildare	0	0	n/a	0	n/a	n/a	n/a
Limerick City	1	0	n/a	0	n/a	n/a	n/a
North Tipperary	6	0	n/a	0	n/a	n/a	n/a
Offaly	8	0	n/a	0	n/a	n/a	n/a
South Dublin	0	0	n/a	0	n/a	n/a	n/a
Waterford City	1	0	n/a	0	n/a	n/a	n/a
Westmeath	3	0	n/a	0	n/a	n/a	n/a

Appendix 7: Quality and enforcement information for public supplies by county/area for 2013

	Public Supplies[1]		Parameter Compliance (%)[2]		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 (end 2013)	Number Issued	Number
Carlow	16	47,804	100	99.7						1	1
Cavan	18	25,025	100	99.6	1	10	1	315	2		1
Clare	21	79,913	100	100			1	252		4	6
Cork	179	340,261	99.9	100	3	2816	2	816	7		2
Cork City	1	125,230	100	100					1		
Dun Laoghaire Rathdown	8	207,350	100	100					3		
Donegal	33	136,294	100	99.1					10		2
Dublin City	6	524,000	100	99.8					3		1
Fingal	2	271,999	100	100							
Galway	38	106,824	99.8	99.4					12		3
Galway City	1	75,415	100	100							
Kerry	72	113,645	100	98.5	9	185			35		7
Kildare	13	190,658	100	100							
Kilkenny	22	61,588	100	99.7					2		
Laois	28	62,900	100	99.7	4	164	1	33	1	3	8
Leitrim	8	16,406	100	99.3					1		
Limerick	44	121,167	100	99.9	3	1272	1	18	1		
Longford	6	14,852	100	95.2	1	120			1		
Louth	15	99,575	100	99.6					2		
Mayo	24	77,956	99.5	99.5	2	1635			4	1	3
Meath	64	147,475	100	100					5		5
Monaghan	10	31,712	100	99.4					2		1
Offaly	23	44,267	99	100	4	4017					3
Roscommon	21	48,807	100	98.8	5	20943			10	4	4
Sligo	9	53,551	100	99	1[7]	128			4	2	1
South Dublin	4	257,600	100	100			1	50			
Tipperary	54	124,347	100	99.4	6	416			9		
Waterford	115	82,279	99.7	99.2	3	308	3	1562	11		2
Westmeath	15	62,325	100	99.7						1	
Wexford	41	100,373	100	99.7	1	20	1	80	1		1
Wicklow	67	111,274	97.6	98.9	14	691	1	50	13		2

[1] Full list of public supplies available at http://www.epa.ie/pubs/advice/drinkingwater/publicdrinkingwatersupplies/; [2]Further information in Section 2.2; [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]Served by a supply in County Roscommon

Appendix 8: Extracts of HSE/EPA Joint Position Papers on Trihalomethanes, Nitrate and Lead

Extract of HSE/EPA Position Paper on Trihalomethanes (Recommendations)

Trihalomethanes are formed when chlorine, the most commonly used disinfection agent in Ireland, reacts with naturally occurring organic matter in raw water. Overall the situation is improving and the downward trend is expected to continue with the completion of remedial works on supplies on the Remedial Action List. However, exceedances in THM levels continue to be notified. Studies examining the association between THMs and drinking water show that there may be associations with cancer. These associations are weak, are not consistently demonstrated in scientific studies and are unlikely to be large. However, the possibility that they exist remains. When uncertainty such as this emerges in environment and health, a precautionary approach is needed. EU and WHO drinking water standards are precautionary in that they include a substantial safety factor and are set at a level that protects the most vulnerable over a lifetime of consumption. The precautionary approach, however, must be proportional to the risk and should be balanced with other more immediate and known serious risks.

The approach in Ireland should therefore be as follows:

1. Great effort should be made to minimise THMs in drinking water.

2. Comprehensive risk assessment of all breaches of the total THM parametric value should take place.

3. All regulated drinking water supplies with persistent or intermittent exceedances should go on the EPA Remedial Action List and the WSA should have an agreed plan of works in place with a precise timescale.

4. The real risk of inadequate chlorination, which can occur as a reaction to breaches of the parametric value, outweighs the risk associated with THMs and should be avoided. A balance must be struck between an uncertain, small and long-term risk associated with elevated THMs and the significant, large, immediate and serious risk associated with inadequate chlorination e.g. E. coli O157 outbreak.

5. Optimising the removal and treatment of organic matter in raw water is paramount to reducing THMs in drinking water.

6. The Water Safety Plan approach, which identifies hazards to drinking water quality from catchment to consumer, should be adopted to ensure that the drinking water supply is safe and secure. Implementation of this approach will lead to a reduction in the levels of THMs in drinking water.

Extract of HSE/EPA Position Paper on Nitrate (Interventions)

Protecting the drinking water supply is paramount. This may require Local Authority inspection and enforcement of compliance with the Nitrates Directive and proper management and treatment of sewage and waste water discharges. Where trends show an increasing concentration of nitrate in raw water, action may be necessary. Where nitrate levels repeatedly exceed recommended values in drinking water, intervention is required. In the short term, an alternative supply or blending/diluting with another supply may be needed. It is possible to remove nitrate from water but treatment is difficult and expensive. There are generally three methods of removing or reducing nitrate in water; reverse osmosis, ion exchange or blending. Reverse osmosis forces water under pressure through a membrane to filter out contaminants. Ion exchange involves replacing nitrate with chloride ions as it passes through an ion exchange resin. Simple household treatment procedures such as boiling, filtration, disinfection, and water softening do not remove nitrate from water. Boiling may increase the nitrate concentration of the remaining water. Where the nitrate level in a water supply persistently exceeds the parametric value of 50 mg/litre, an advisory notice may be issued by the Water Services Authority (in consultation with the HSE) stating that children under 6 months of age should not consume the water and that nobody should consume the water if levels persistently exceed 100 mg/litre, as this will exceed the ADI [acceptable daily intake]. For non-breastfed infants an alternative water supply or bottled water should be used to

prepare infant feeds. The legal limit for sodium (Na) in drinking water is 200 mg per litre. Most bottled water is well below this level but the label should be checked. Commercial bottled water is not sterile and should be boiled once and cooled. Ready-to-use formula that does not require re-constitution with water can also be used.

Extract of HSE/EPA Position Paper on Lead (Key Points)

1. People should try to drink water with as little lead as possible, especially those who are most vulnerable, such as babies and young children. Consistent consumption of low levels of lead in drinking water can have adverse health effects.

2. The main source of lead in drinking water is old lead pipes and plumbing, especially service connection pipes and internal plumbing.

3. The removal of lead in drinking water presents more challenges than the removal of lead in fuel or paint, due to issues such as old infrastructure, incomplete pipe-laying records and costs to property owners.

4. The responsibility for actions to reduce the level of lead in drinking water is collective and requires actions on behalf of the Water Services Authorities, property owners (public or private) and water suppliers or personnel installing or carrying out works on drinking water supply pipes.

5. Consumers in properties built before around the 1970s should check whether lead has been used in the pipework of service connections or internal plumbing. This can be done with the assistance of a suitably qualified plumber and/or by testing the water for lead. See 'Drinking Water Consumer Advice Note – Lead' at www.drinkingwater.ie.

6. The legal parametric value for lead in drinking water will be set at 10µg/l from 25th December 2013.

7. Where a lead exceedance above the parametric value of 10µg/l has been identified, flushing the cold water tap before consumption may reduce the level of lead. However, the effectiveness of flushing should be verified by testing the water.

8. If the drinking water lead level remains above 10µg/l, an alternative source of potable drinking water should be used, especially by formula-fed infants, young children and pregnant women. See 'Frequently Asked Questions – Lead in Drinking Water' at:

http://www.lenus.ie/hse/bitstream/10147/304727/8/HSE_FAQsLeadinDrinkingWater_April2014.pdf

9. Replace identified lead distribution mains and any newly identified lead distribution mains as soon as they are identified.

10. All lead pipes and plumbing in public and private ownership should be replaced over time.

11. Water suppliers and personnel installing or carrying out works on drinking water supply pipes should ensure that all materials that come in contact with drinking water are on the list of approved products and processes.

Appendix 9: Infographic of Drinking Water Report 2013

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 Aeráide, Ceadúnaithe agus Úsáide Acmhainní
- An Oifig Forfheidhmithe i leith cúrsaí Comhshaoil
- An Oifig um Measúnú Comhshaoil
- 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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