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Office of
Environmental
Enforcement

The Provision and Quality of Drinking Water in Ireland

A Report for the Year 2011

Environmental Protection Agency

The Environmental Protection Agency (EPA) is a statutory body responsible for protecting the environment in Ireland. We regulate and police activities that might otherwise cause pollution. We ensure there is solid information on environmental trends so that necessary actions are taken. Our priorities are protecting the Irish environment and ensuring that development is sustainable.

The EPA is an independent public body established in July 1993 under the Environmental Protection Agency Act, 1992. Its sponsor in Government is the Department of the Environment, Community and Local Government.

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- large scale industrial activities (e.g., pharmaceutical manufacturing, cement manufacturing, power plants);
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- the contained use and controlled release of Genetically Modified Organisms (GMOs);
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The organisation is managed by a full time Board, consisting of a Director General and four Directors.

The work of the EPA is carried out across four offices:

- Office of Climate, Licensing and Resource Use
- Office of Environmental Enforcement
- Office of Environmental Assessment
- Office of Communications and Corporate Services

The EPA is assisted by an Advisory Committee of twelve members who meet several times a year to discuss issues of concern and offer advice to the Board.

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Contents

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EXECUTIVE SUMMARY

This report provides an overview of drinking water quality in Ireland for 2011, based on monitoring data from 34 Water Services Authorities (WSAs) and the regulation of public supplies by the EPA.

In Ireland, 80% of the population is served by 939 WSA operated public water supplies. The remaining 20% is served by 643 public group water schemes (serving 2.3% of the population), 486 private group water schemes (serving 4.7%), 1,429 small private supplies (serving 0.7%) and private wells that are exempt from the regulations (serving 12.3%). (Appendix II).

QUALITY OF SUPPLY

The safety of water supplies in Ireland is determined by comparing the results of almost 250,000 monitoring tests against the parametric limits set out in the Regulations. Analysis of three groups of parameters - microbiological, chemical and indicator is carried out by WSAs. Microbiological parameters are the most important as their presence can indicate a potential risk to health. Prolonged exposure to chemical parameters can also pose a potential risk to health. Indicator parameters are not normally a risk to health, but indicate that investigations are warranted before it becomes a potential risk to health.

Overall the drinking water quality in Irish **public water supplies** serving 80% of the population continued to improve in 2011. In 2011, the EPA found that, *E. coli* was detected in 12 (1.3%) public water supplies. Figure E-1 illustrates the 86% reduction observed in the number of public water supplies where *E. coli* was detected since 2005. This is due to improvements by WSAs to the security of disinfection systems, including for the first time the provision of chlorine monitors and alarms at all public water supplies. In addition, on-going improvements such as the installation of duty/standby disinfectant dosing arrangements and flow proportional/residual dosing are taking place.

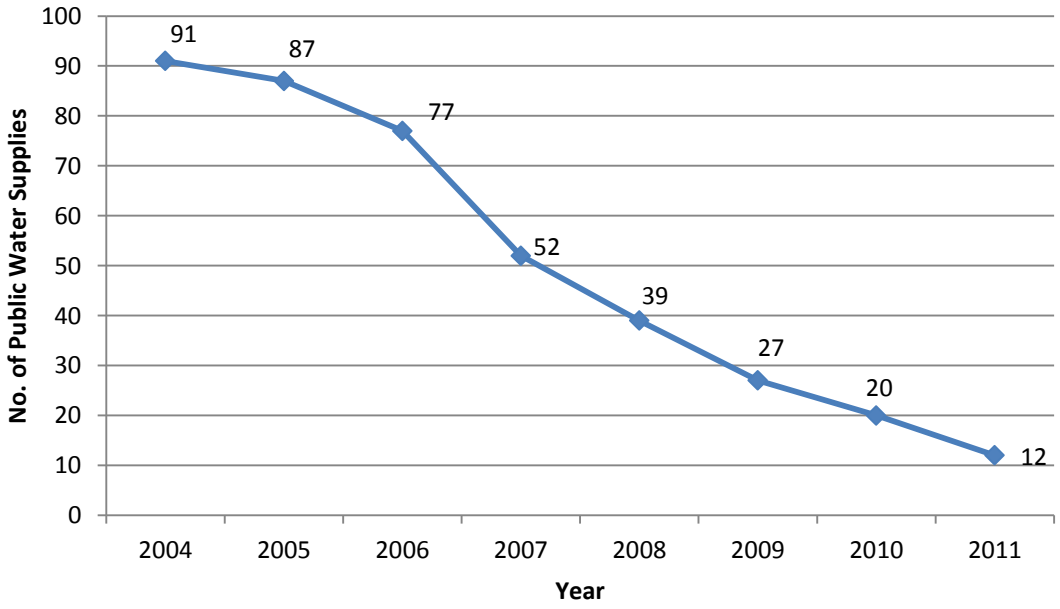


Figure E-1: Number of public water supplies in which *E. coli* was detected in compliance monitoring at least once from 2004 to 2011.

Chemical standard compliance in public water supplies improved from 99.2% in 2010 to 99.5% in 2011. Trihalomethanes (THMs) compliance improved as compared to 2010 but nonetheless at 90.1%, remains an area for improvement. THM exceedances can be eliminated by reducing organic matter in the raw water, optimising treatment to remove organic matter and optimising chlorination. Care is needed not to reduce chlorination to such an extent so as to compromise the microbial safety of drinking water.

Compliance with indicator parameters improved significantly in 2011. There has been a 70% reduction in aluminium non-compliance since 2005. This can be attributed to better management of the treatment plant and distribution network by WSAs.

The microbiological quality of **private group water schemes** remains inferior to public water supplies. The number of private group water schemes where *E. coli* was detected in 2011 was 46 (10.2%), down from 56 (11.6%) in 2010.

Small private supplies showed a small increase in level of supplies with *E. coli* exceedances, from 7.4% of supplies in 2010 to 7.7% of supplies in 2011. The level of *E.coli* non-compliance in private supplies is higher than that of public supplies.

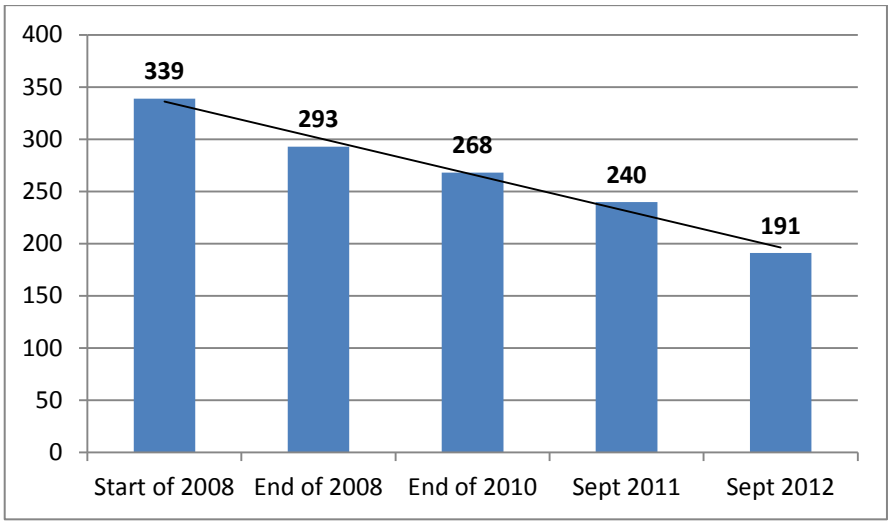
There has been an improvement in the availability of drinking water information provided by WSAs to the public. While this report is based on monitoring results for 2011, up to date monitoring results and exceedances for 2012 are now available on WSA websites, allowing consumers to gain timely access to information on the quality of their drinking water. Even though some improvements in website details are still required, all 34 WSA websites have substantive information in 2012, up from 19 in 2011.

REGULATION and REMEDIATION (PUBLIC WATER SUPPLIES)

The EPA continues to adopt a risk based outcome-driven approach to the enforcement of the Drinking Water Regulations – focusing on issues that present the greatest risk to health, such as contamination with *E. coli* and *Cryptosporidium*. The EPA continues to track and report the number of supplies on the Remedial Action List (RAL); drinking water exceedance notifications received; active boil water notices on public water supplies; supplies served by surface water that do not have *Cryptosporidium* barriers in place, training of WSA staff and implementation of water safety plans.

In 2008, the EPA prepared a list of public water supplies where remedial action was required to ensure compliance with drinking water standards. The list, called the “Remedial Action List for Public Drinking Water Supplies” (RAL), is used to focus attention on resolving any deficiencies in public water supplies. The primary issues addressed by the RAL include disinfection for *E. coli*, *Cryptosporidium* barriers, adequate treatment for trihalomethanes and operational controls for managing aluminium, and turbidity levels. Since 2008, 59% (200) of supplies have been removed from the original list because the necessary remedial actions were completed. Remedial works in a further 99 supplies are scheduled for completion by the end of 2012. Three WSAs have not provided a timeframe for the completion of remedial works, Donegal (10 supplies), Galway County Council (1 supply) and Leitrim County Council (1 supply). These supplies are the subject of on-going enforcement action.

Additional supplies have also been added to the original RAL, and as of September 2012, 191 public water supplies remain on the RAL. Progress made to reduce the number of supplies on the RAL is shown in Figure E-2.



The EPA issued 23 legally binding Directions to eight WSAs in 2011. The Directions require specific actions to be undertaken to improve the security of the relevant public water supply.

WSAs issued 26 new boil water notices and five new water restrictions (serving approximately 40,000 persons) in 2011, a reduction on 2010 figures. In 2011, 42 boil notices and water restriction notices serving approximately 95,000 persons were lifted.

WATER SAFETY PLANS

In 2011, the EPA developed a Water Safety Plan tool to allow WSAs to assess and manage risks associated with individual drinking water supplies. Water Safety Plans set out the risks and any operational, maintenance or infrastructural improvements required along the supply chain to manage the risks identified. A Drinking Water Safety Plan Working Group was established by the EPA to trial and improve the Water Safety Plan tool. The EPA focus is on the eight largest public water supplies, however 45 Water Safety Plans are currently in preparation and three Water Safety Plans are complete. The EPA will continue to work with WSAs in the development and implementation of water safety plans over the coming years.

EMERGING ISSUES

While drinking water quality continued to improve in 2011, there are indications that the resilience of both public and private water treatment plants was significantly challenged in 2012. In relation to public supplies, the heavy rainfall in the summer of 2012 and the occurrence of sudden changes in raw water quality arising from the subsequent flooding compromised a number of water supplies. This led to a rise in the number of failures to meet both the microbiological and chemical (in particular THM) standards during this period.

There has been a significant increase in the number of VTEC infections in the community reported by the HSE this year. There were 535 VTEC notifications up to 21/11/2012 compared with 251 for the same period last year and 194 for the same period in 2010. VTEC *E. coli* strains produce a powerful toxin and can cause severe illness. Between 5 and 8% of people who contract this illness develop the more serious haemolytic uraemic syndrome (HUS).

VTEC can be transmitted in a number of ways, e.g. person to person, waterborne, foodborne. The second most common transmission route reported by the HSE this year so far is waterborne transmission. The HSE reported in July 2012 that two private supplies had been contaminated with the same VTEC strain that affected individuals. The increase in VTEC infections is partly due to the heavy rainfall during the summer. However, part of the increase is due to better diagnosis.

NEXT STEPS

The resilience of public and private water supplies to extremes of weather needs to improve to avoid our drinking water being compromised. Making public supplies more resilient to such challenges will improve their compliance with microbiological and chemical standards. This will happen by completing the remedial action programmes (RAL); and improving controls on chemical dosing, source protection and compliance with the Good Agricultural Practice Regulations. In addition, applying the water safety plan approach will provide an integrated way to manage risks associated with drinking water supplies from catchment to consumer into the future.

As well as regulating public supplies, the EPA continues to work with WSAs and the HSE, providing advice and assistance to improve the management and operation of vulnerable private water supplies. WSAs should focus on further identifying small private supplies and exempted supplies and providing advice to owners to protect human health. Advice on small supplies is available on the EPA website (e.g. EPA advice Note 12: *Exempted Drinking Water Supplies*).

Owners of private wells should ensure that they are designed, located, installed and maintained properly. Wells should be tested regularly, particularly after a prolonged period of heavy rainfall, since this is when the well may be overwhelmed and contaminated. Depending on the integrity of the well, the quality of the water and the results of previous testing, owners may need to consider taking other appropriate measures such as restricting or boiling water for cooking and drinking. This is particularly the case if vulnerable people such as children, the elderly or immunocompromised persons are drinking the water and if the householder notices a change in the character of the water (e.g. colour/taste/odour).

1.

The Safety and Security of Drinking Water in Ireland

1. The Safety and Security of Drinking Water in Ireland

1.1 INTRODUCTION

This report covers the quality of drinking water in Ireland in 2011. Issues identified by the Environmental Protection Agency (EPA) during compliance checking on the safety and security of water supplies are also presented along with the enforcement actions taken by the EPA in 2011.

In Ireland the majority of drinking water originates from surface water (81.9%) and the remainder originates from groundwater (10.5%) and springs (7.6%). Public Water Supplies (PWS) are particularly reliant on surface water sources. The numbers of Small Private Supplies reported have increased in the past year. This may be because of more comprehensive reporting by WSAs. The owners of Small Private Supplies are subject to the requirements of the Drinking Water Regulations and WSAs have an enforcement role with regard to these supplies, which is set out in the Regulations.

1.2 Quality of Drinking Water in Ireland

The Regulations set out the required standard for each of the 48 parameters. Compliance is assessed by comparing the results of the analysis of samples taken from supplies with the required standard set out in the Regulations.

Table 1-1 lists the level of compliance with seven key water quality parameters of the 48 parameters to be monitored under the Regulations. These parameters are *E. coli, Enterococci*, lead, nitrate, trihalomethanes, aluminium and turbidity (at the water treatment plant). Appendix IV provides the compliance levels of each supply category against the 48 parameters set out in the Regulations.

Table 1-1: Non-compliance with Drinking Water Standards by Supply Category for samples taken in 2011[1].

	Public Water Supplies		Public Group Water Schemes		Private Group Water Schemes	
Parameter	**No. of non-compliant samples**	**% of non compliant samples**	**No. of non-compliant samples**	**% of non compliant samples**	**No. of non-compliant samples**	**% of non-compliant Samples**
Microbiological Parameters						
E. coli	↓ 12	0.1	↓ 4	0.3	↓ 56	3.3
Enterococci	↓ 3	0.1	↓ 0	0	↑ 13	4.1
Chemical Parameters						
Lead	↓ 14	0.6	↔ 0	0	↔ 0	0
Nitrate	↓ 7	0.2	↓ 0	0	↓ 2	0.2
Trihalomethanes (Total)	↓ 127	9.0	↓ 15	12.9	↓ 17	6.4
Indicator Parameters						
Aluminium	↓ 88	1.2	↓ 13	1.2	↔ 17	1.5
Turbidity (at WTW)	↓ 72	4.5	↑ 5	2.6	↓ 1	3.0

↓ Improvement on 2010 ↑ Disimprovement on 2010 ↔ Similar to 2010

[1]This assessment of compliance is based on results submitted.

1.3 The Safety of Drinking Water in Ireland

1.3.1 Compliance with the Microbiological Standards

The most important health indicators of drinking water quality in Ireland are the microbiological parameters and, in particular, *E. coli*. These parameters are present in very high numbers in human or animal faeces and are rarely found in the absence of faecal pollution in surface waters or groundwaters. As such, the presence of *E. coli* in drinking water indicates that the treatment process at the water treatment plant is not operating adequately or that contamination has entered the water distribution system after treatment. The World Health Organisation (2008[2]) states that: "*the presence of E. coli provides evidence of recent faecal contamination, and detection should lead to consideration of further action, which could include further sampling and investigation of potential sources such as inadequate treatment or breaches in the distribution system integrity*".

Similar to *E. coli*, *Enterococci* bacteria are present in large numbers in sewage and water environments polluted by sewage or wastes from humans and animals. They are generally present in numbers lower than *E. coli* but they survive longer than *E. coli* and thus can indicate pollution that has occurred in the past.

1.3.1.1 E. coli

The majority of the population (80.1%) receive their water from public water supplies. There has been a further reduction in the percentage of public water supplies and private group water schemes contaminated with *E. coli* during 2011. Since 2005, there has been an 86% reduction in the number of public water supplies contaminated with *E. coli*. However, the percentage of private group water schemes exceeding the *E. coli* parametric value remains unacceptably high at 10.2% (Table 1-2). The number of private group water schemes contaminated with *E. coli* during 2011, as a proportion of the total number of schemes, is shown in Fig 1-1.

Table 1-2: Summary of Water Supply Zones (WSZs) where *E. coli* was detected at least once in 2011.

	No. of WSZs monitored in 2011	No. of WSZs with exceedances in 2011
Public Water Supplies	931	12 (1.3%)
Public Group Water Schemes	602	4 (0.7%)
Private Group Water Schemes	453	46 (10.2%)
Small Private Supplies	1059	82 (7.7%)
Total:	**3045**	**144 (4.7%)**

Small private supplies were the only supply category that did not show an improvement in *E. coli* compliance in 2011. That said, there was an increase in the number of small private supplies monitored (1,059 (74%) supplies monitored in 2011, up from 972 (76%) in 2010). A total of 144 supplies (out of 3,045 supplies) failed to meet the standard for *E. coli* at one time or more during 2011 (Table 1-2), down from 154 in 2010. Overall, *E. coli* was detected at least once in 4.7% of water supplies during 2011, an improvement from 5.1% in 2010. The majority of supplies where *E. coli* was detected were private group water schemes and small private water supplies.

[2] World Health Organisation (2008). WHO - Guidelines for Drinking-water Quality – third edition incorporating the first and second addenda, Volume 1, Recommendations (see Appendix IV).

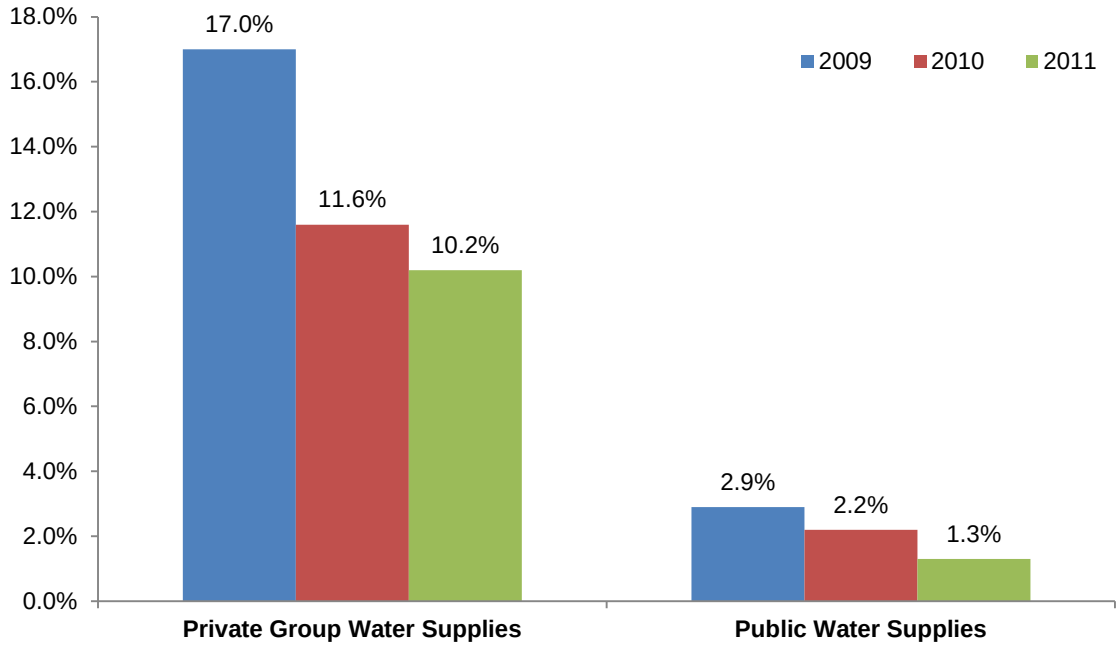


Figure 1-1: Percentage of supplies where *E. coli* was detected, 2009 to 2011.

1.3.1.2 Enterococci

The total number of supplies where *Enterococci* was detected in 2011 was 56 compared to 61 in 2010. There was an improvement in the number of public water supplies, public group water schemes and small private supplies meeting the *Enterococci* parametric value. The level of compliance with the *Enterococci* parametric value in private group water schemes disimproved from 8 in 2010 to 13 in 2011.

Table 1-3: Summary of Compliance with the *Enterococci* Parametric Value, 2011 and 2010.

	No. of WSZs monitored in 2011	No. of WSZs with Exceedances in 2011	No. of WSZs monitored in 2010	No. of WSZs with Exceedances in 2010
Public Water Supplies	685	3 (0.4%)	683	5 (0.7%)
Public Group Water Schemes	116	0 (0.0%)	134	3 (2.2%)
Private Group Water Schemes	249	13 (5.2%)	261	8 (3.1%)
Small Private Supplies	531	40 (7.5%)	467	45 (9.6%)
Total:	**1,581**	**56 (3.5%)**	**1,545**	**61 (3.9%)**

1.3.2 Compliance with the Chemical Standards

The Regulations set out the required quantitative standard for each of the 26 chemical standards. Table 1-4 provides a complete list of the chemicals monitored under the Regulations. Chemicals monitored include; metals (e.g. lead), naturally occurring trace elements (e.g. boron), chemicals originating from organic and inorganic sources (e.g. nitrate) and disinfection by-products (e.g. trihalomethanes). Of the 26 chemical parameters, 100% sample compliance was reported for 10 parameters in 2011, while compliance levels in excess of 99% were reported for a further 11 parameters (Table 1-4). Compliance for 2 parameters was less than 99% in 2011 (fluoride and trihalomethanes). Overall, chemical compliance levels improved from 99.3% in 2010 to 99.5% in 2011. Three additional parameters (acrylamide, epichorohydrin and vinyl chloride)[3] do not require to be directly monitored but are controlled by product specification.

Table 1-4: Total Number of Water Supply Zones (WSZs) Monitored and Samples Analysed for Chemical Parameters, 2011.

Parameter	No. of WSZs Monitored	No. of WSZs with Exceedances	% of WSZs Complying	No. of Samples Analysed	No. of Samples Exceeding	% of Samples Complying
Chemical Parameters						
Benzene	958	0	**100**	1566	0	**100**
Benzo(a)pyrene	947	0	**100**	1449	0	**100**
Boron	931	0	**100**	1544	0	**100**
Cadmium	1087	0	**100**	1774	0	**100**
Chromium	1084	0	**100**	1771	0	**100**
Cyanide	854	0	**100**	1364	0	**100**
Nitrite (at tap)	2208	3	**99.9**	8003	4	**100**
PAH	937	0	**100**	1436	0	**100**
Pesticides - Total	925	0	**100**	1442	0	**100**
Selenium	934	0	**100**	1554	0	**100**
1,2-dichloroethane	941	1	**99.9**	1551	1	**99.9**
Bromate	992	2	**99.8**	1554	2	**99.9**
Mercury	957	2	**99.8**	1576	2	**99.9**
Nickel	1121	2	**99.8**	1807	2	**99.9**
Tetrachloroethene & Trichloroethene	952	1	**99.9**	1561	1	**99.9**
Antimony	911	3	**99.7**	1503	3	**99.8**
Copper	1303	5	**99.6**	2167	5	**99.8**
Nitrites (at WTW)	186	2	**98.9**	804	2	**99.8**
Nitrate	2128	17	**99.2**	6378	19	**99.7**
Arsenic	1020	5	**99.5**	1695	6	**99.6**
Lead	1518	13	**99.1**	3353	15	**99.6**
Fluoride	1147	34	**97.0**	4139	45	**98.9**
Trihalomethanes(Total)	1002	99	**90.1**	1826	160	**91.2**

[3]Compliance with the acrylamide, epichlorohydrin and vinyl chloride parametric values is to be determined by product specification and not by laboratory analysis.

1.3.2.1 Lead

The Regulations impose a parametric value of 25 μg/l lead until 24 December 2013, after which the parametric value reduces to 10 μg/l. The results for 2011 are examined in the context of compliance with the current standard of 25 μg/l Pb, as well as the future standard of 10 μg/l Pb.

Table 1-5: Compliance with the Lead Parametric Value in 2011.

	Current Standard (25 μg/l)		2013 Standard (10 μg/l)	
	% of Samples Complying	No. of Non-Compliant WSZs	% of Samples Complying	No. of WSZs with >10 μg/l
Public Water Supplies	99.4	12	97.8	38
Public Group Water Schemes	100	0	100	0
Private Group Water Schemes	100	0	100	0
Small Private Supplies	99.8	1	99.3	4
Overall:	**99.6**	**13**	**98.4**	**42**

A total of 13 supplies reported lead exceedances during 2011 (23 in 2010); however, 42 supplies have reported levels of lead in excess of the 2013 parametric value of 10 μg/l (61 in 2010). The majority of these are public water supplies.

Reduction of the plumbosolvency[4] can be implemented by correcting pH. Implementation of this measure can assist the WSAs in achieving a higher level of compliance, but the best means of assuring full compliance is to initiate a programme for removing all lead pipes from the distribution network. Owners of dwellings where lead pipes are used should be informed of the risks and given advice by the water supplier on their safe replacement.

In the past, many samples tested for lead tend to have been fully flushed before sampling. However, this does not meet the requirements of the current Regulations and it is recommended that the random daytime sampling[5] method be used. All WSAs should move to implement this sampling method, if they have not already done so. The EPA *Advice Note No.1* (‘*Lead compliance monitoring and surveys*’) should be followed by each WSA to determine the extent of lead in the distribution network of each water supply. EPA *Advice Note No.2* (“*Action programme to restore the quality of drinking water impacted by lead pipes and lead plumbing*”) outlines a risk-based strategy for dealing with lead pipes.

[4] Plumbosolvency is the ability of a solvent, notably water, to dissolve lead.

[5] Random daytime sampling is defined as taking water directly from the tap normally used for consumption without any prior water abstraction, flushing or cleaning of the tap prior to sampling. The sample should be chosen randomly during the day but during normal office hours.

1.3.2.2 Nitrate

Exceedances of the nitrate parametric value were reported in 17 supplies in 2011 (down from 19 in 2010). There was a reduction in the number of public water supplies with elevated levels of nitrates. The population affected by nitrate exceedances also decreased, 23,153 in 2010 to 7,673 in 2011 (Table 1-6).

Table 1-6: Summary of Water Supply Zones (WSZs) Non-Compliant with Nitrate Parametric Value, 2011 and 2010.

	No. of WSZs with Exceedances in 2011	Population Affected in 2011	No. of WSZs with Exceedances in 2010	Population Affected in 2010
Public Water Supplies	5	3,293	8	22,738
Public Group Water Schemes	0	0	0	0
Private Group Water Schemes	2	4,380	3	415
Small Private Supplies	10	N/A	8	N/A
Overall:	**17**	**7,673**	**19**	**23,153**

1.3.2.3 Trihalomethanes – Total

Trihalomethanes (THMs) are formed in drinking-water primarily as a result of chlorination of organic matter present naturally in raw water supplies. The rate and degree of THM formation increases as a function of the chlorine and humic acid concentration, temperature, pH and bromide ion concentration.

There were 1,826 samples analysed for trihalomethanes in 1002 water supply zones in 2011. The Regulations impose a parametric value of 100 μg/l. The results, as shown in Table 1-7, show that the trihalomethanes parametric value was exceeded in 9.9% of all water supplies during 2011, an improvement from 12.9% in 2010. Trihalomethanes compliance in public water supplies improved from 86.5% in 2010 to 89.1% in 2011. Public water supplies are sampled more frequently than other supply types for trihalomethanes. A more detailed discussion of THM exceedances notified to the EPA is provided for in Section 2.4.3.

Table 1-7: Compliance with the Trihalomethanes (Total) Parametric Value in 2011.

	No. of WSZs Monitored	No. of Non-compliant WSZs	No. of Samples Analysed	No. of Non-compliant Samples
Public Water Supplies	644	70 (10.9%)	1,417	127 (9.0%)
Public Group Water Schemes	105	13 (12.4%)	116	15 (12.9%)
Private Group Water Schemes	234	15 (6.4%)	264	17 (6.4%)
Small Private Supplies	19	1 (5.3%)	29	1 (3.4%)
Overall:	**1002**	**99 (9.9%)**	**1826**	**160 (8.8%)**

1.3.2.4 Fluoride

Naturally elevated levels of fluoride are quite rare in Ireland and thus any exceedances reported are almost entirely due to public water supplies being dosed with fluoride at levels in excess of the legally permitted dose. There has been an improvement on the previous year for the number of public water supplies, 31 in 2011, down from 51 in 2010 failing to meet the fluoride parametric value. The number of public group water schemes failing to meet the fluoride parametric value also improved, 3 in 2011, down from 11 in 2010. There was no fluoride exceedances reported for private group water schemes and small private supplies in 2011. It is important to note that the Irish standard of 0.8 mg/l is more stringent than the EU Drinking Water Directive Standard of 1.5 mg/l. One public water supply exceeded the 1.5 mg/l standard in 2011.

Table 1-8: Compliance with the Fluoride Parametric Value, 2011.

	No. of WSZs Monitored in 2011	% of Samples Complying in 2011	No. of non-Compliant WSZs in 2011
Public Water Supplies	674	98.8	31
Public Group Water Schemes	186	98.9	3
Private Group Water Schemes	232	100	0
Small Private Supplies	55	100	0
Total:	**1115**	**98.9**	**34**

1.3.3 Compliance with the Indicator Parametric Values

The indicator group of parameters is a diverse group of parameters designed to provide information on the management of the treatment process and the organoleptic (perception by sensory organs) and aesthetic quality of drinking water. As such, several parameters do not have quantitative standards but are dependent on acceptability to consumers. Others are based on practical consideration, for example, the iron parametric value is set at a level that will ensure that water is acceptable to consumers rather than that which is a risk to public health. In this regard, comparing the indicator parameter monitoring results to the parametric values should be given less importance than comparing the microbiological or chemical monitoring with their respective parametric values. In other words, a value reported above the indicator parametric value should not, *de facto*, be considered a cause for concern but a guide for the WSA to initiate an investigation into the cause of the elevated level of the particular parameter. In many cases, it is not the indicator parameter that is of concern, rather, it is what the presence of that parameter may imply. For example, elevated levels of indicator parameters may indicate that the treatment plant is not operating adequately, that the plant is operating above its design capacity, or that the plant is not capable of providing a treatment barrier. A summary of compliance with the indicator parameters is provided in Table 1-9.

Table 1-9: Total Number of Water Supply Zones (WSZs) Monitored and Samples Analysed for the Indicator Parameters, 2011.

Parameter[6]	No. of WSZs Monitored	No. of WSZs with Exceedances	% of WSZs Complying	No. of Samples Analysed	No. of Samples Exceeding	% of Samples Complying
Indicator Parameters						
Conductivity	2978	2	**99.9**	15357	2	**100**
Oxidisability	4	0	**100**	4	0	**100**
Sulphate	891	1	**99.9**	1470	1	**99.9**
Chloride	1137	5	**99.6**	1819	6	**99.7**
Ammonium	3005	40	**98.7**	14912	52	**99.7**
Taste	1850	15	**99.2**	10504	45	**99.6**
Turbidity (at tap)	2982	74	**97.5**	15156	79	**99.5**
Clostridium Perfringens	2126	99	**95.3**	11873	105	**99.1**
Aluminium	2044	83	**95.9**	10630	126	**98.8**
Odour	2832	93	**96.7**	14103	200	**98.6**
Sodium	1055	24	**97.7**	1710	25	**98.5**
Colony Count @ 22Â°C	701	32	**95.4**	1403	32	**97.7**
Colour	3041	228	**92.5**	15122	411	**97.3**
Iron	2366	171	**92.8**	9956	274	**97.2**
Total Organic Carbon	881	41	**95.3**	1560	44	**97.2**
Manganese	1655	105	**93.7**	4018	123	**96.9**
Turbidity (at WTW)	261	43	**83.5**	1820	78	**95.7**
Coliform Bacteria	3047	625	**79.5**	15124	793	**94.8**
pH	3045	463	**84.8**	15256	804	**94.7**
Radioactivity						
Tritium	29	0	**100**	80	0	**100**
Total Indicative Dose	2	0	**100**	23	0	**100**

Most failures to meet the indicator parametric values are caused by:

i. Poor performance of a water treatment plant, for example, elevated levels of turbidity indicate poor treatment of water in the filters.

ii. Poor disinfection efficiency, for example, regrowth of coliform bacteria can occur in an inadequately disinfected water supply.

[6] For several of the indicator parameters there are no specific standards in the Regulations. Therefore, for comparison purposes arbitrary levels have been assigned above which the WSA may be concerned about the quality of the water and should investigate further.

iii. Naturally present substances, for example, iron and manganese may be naturally present in groundwater.

1.3.3.1 Aluminium

The level of compliance with the aluminium parametric value rose to 98.8% in 2011 from 97.8% in 2010 and since 2005, compliance levels have improved by 70%. Compliance has been poor in a number of supplies in Ireland due to inadequate control over addition of treatment chemicals. Failure to meet the aluminium parametric value can be due to several reasons, including naturally elevated levels of aluminium in the raw water, operation of the treatment plant above design capacity, poor management of the treatment plant or inadequate management of the distribution network. While a small number of water supply zones have naturally elevated levels of aluminium, the majority of aluminium non-compliances in 2011 are due to operational management and design, in particular, poor control over pH.

The compliance rates in the different types of water supplies are presented in Table 1-10.

Table 1-10: Summary of Aluminium Monitoring, 2011.

	No. of WSZs Monitored	% of Samples Complying	No. of Non-Compliant WSZs
Public Water Supplies	708	98.8	51
Public Group Water Schemes	489	98.8	13
Private Group Water Schemes	337	98.5	11
Small Private Supplies	510	99.0	8
Total:	**2044**	**98.8**	**83**

1.3.3.2 Coliform Bacteria

There was an improvement in the number of public water supplies failing to meet the coliform bacteria standard, 124 in 2011, down from 150 in 2010. The number of private group water schemes failing to meet the coliform bacteria parametric value also improved, 113 in 2011, down from 149 in 2010.

Table 1-11: Summary of Coliform Bacteria Monitoring, 2011.

	No. of WSZs Monitored	% of Samples Complying	No. of Non-Compliant WSZs
Public Water Supplies	931	98.1	124 (13.3%)
Public Group Water Schemes	602	97.0	43 (7.1%)
Private Group Water Schemes	453	90.9	113 (24.9%)
Small Private Supplies	1061	75.9	345 (32.5%)
Total:	**3047**	**94.8**	**625 (20.5%)**

These non-compliances are caused by a combination of poor-quality water being supplied into the distribution network and by poor management of the distribution mains. There should be a regular programme of flushing and cleaning to ensure that there is no contamination in the network.

1.3.3.3 Turbidity

Operators of water treatment plants should strive for a turbidity value of 1.0 NTU (nephelometric turbidity units) at the plant. Turbidity at the tap indicates a very different problem to turbidity at the treatment plant. Elevated levels of turbidity at the tap may indicate sediment in the mains or ingress into the distribution network while turbidity at the treatment plant may indicate poor performance of filters and inadequate treatment barriers.

Table 1-12: Percentage of Samples in Compliance with the Turbidity Parametric Values in 2011.

Parameter	Overall	PWS	PuGWS	PrGWS	SPS
Turbidity (at the tap)	**99.5**	99.9	99.7	99.1	97.1
Turbidity (at WTW)	**95.7**	95.5	97.4	97.0	N/A

[A parametric value of 4.0 NTU at the tap is used for comparative purposes as this was the parametric value in the 1988 Drinking Water Regulations].

Measuring turbidity at the plant is a useful tool to determine whether *Cryptosporidium* is being removed adequately. Although limited monitoring was reported, the number of supplies monitored at the water treatment works reporting results in excess of the turbidity parametric value improved from 27% (55 of 202) in 2010 to 16% (43 of 261) in 2011 (see Appendix IV). Despite this, turbidity compliance at the plant requires further improvement. Elevated levels of turbidity have been shown to be associated with outbreaks of *Cryptosporidium* (Carlow in 2006 and Galway City in 2007) and as such emphasises the importance of monitoring turbidity at the plant.

Photograph 1-1: Nenagh Water Treatment Plant (Co. Tipperary)

1.3.4 Group Water Schemes and Private Water Supplies

Although capital investment reduced from €70 million in 2010 to €57 million in 2011, the rural water investment programme continued to deliver improving levels of compliance with the drinking water quality standards in the group water scheme (GWS) sector during 2011. Nonetheless, microbiological water quality in a significant proportion of group water schemes continues to be inferior to that in public water supplies. Whereas, the quality of drinking water in publicly-sourced group water schemes is broadly similar to that of the public water supplies themselves, the same cannot be said for the microbiological quality of water supplied by many privately-sourced group water schemes.

The results for 2011 shows that 46 schemes or 10.2% (down from 11.6% in 2010) of all privately-sourced group schemes monitored were contaminated with *E. coli* at least once during 2011. The percentage of supplies contaminated with *E. coli* from 2009 to 2011 is illustrated in Fig. 1-1 and shows a year on year decrease in *E. coli* contamination in this period. Figure 1-2 shows the number of schemes contaminated with *E. coli* as a proportion of the total number of schemes. As with previous years, chemical compliance amongst many privately-sourced group water schemes remained high.

A substantial number of privately sourced schemes were upgraded in 2011 through completion of DBO projects. 23 former schemes are now part of the Roscommon/Leitrim DBO bundle, having amalgamated into just 4 new schemes. Clew Bay GWS, completed early in 2011 as part of the second Mayo DBO bundle, includes 2 former schemes, while Bohola GWS was connected to the upgraded Callow Lake GWS supply. Completion of the second Galway DBO bundle saw 37 schemes rationalise into 15 group schemes, while a further two privately-sourced schemes (as well as several publicly sourced schemes) are included in the Clonbur/Cor na Móna PWS upgrade, which is part of the same bundle.

Photograph 1-2: The Cappataggle Group Water Scheme treatment plant was opened in 2011 as part of the second Galway DBO bundle upgrade project.

A total of 12 schemes that were formerly privately sourced were linked to public supplies in 2011. This is an increase from 11 in 2010. Three of these, in addition to a further 42 publicly sourced group schemes, were taken-in-charge during the year.

WSAs (as supervisory authorities for the Group Water Schemes) have issued Directions in cases where schemes were failing to agree a viable upgrade strategy. Where a potential danger to human health exists, WSAs have an obligation under the Drinking Water Regulations to take the steps necessary to remedy the situation.

The sourcing and provision of relevant training continues as a key role for the National Federation of Group Water Schemes (NFGWS). Throughout 2011, the NFGWS provided training to members in Quality Assurance, Reducing Daily Water Demand, GWS Management and Performance Management Systems for schemes. There was a continued high uptake of the Quality Assurance System training course, which was completed by 71 schemes in 2011, bringing the total to 374 schemes. In addition to the above courses, three operational training courses, designed by the Water Services Training Group in association with the NFGWS, were also rolled out during 2011. These include training in Sampling & Monitoring, Disinfection & Basic Filtration and Distribution System Management.

Figure 1-2: Number of Private Group Water Schemes contaminated with *E. coli* during 2011[7] as a proportion of the total number of schemes

[7] There are no group water schemes serving >50 persons in any of the four Dublin WSA areas.

1.4 Security of Drinking Water Supplies

For Ireland's drinking water supplies to be deemed secure, every WSA should profile and manage the risks to the supply using the water safety plan approach. While there is no legal requirement for WSAs to complete water safety plans, the EPA will continue as a priority to support the development of water safety plans by WSAs with the emphasis in 2012 being on the larger public water supplies.

The EPA's safe and secure model (see Figure 1-3) for the provision of drinking water supply is consistent with the World Health Organisation's water safety plan approach and is the most effective means of consistently ensuring the safety of a drinking water supply. This is done through the use of a comprehensive risk assessment and risk management approach that encompasses all steps from the catchment to the consumer. A drinking water safety plan 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. A plan should:

- Create and protect value for the security of the water supply;
- Be an integral part of all organisational processes of the water supply chain;
- Be part of the decision making process at every level of the water supply chain;
- Be dynamic, iterative and responsive to change;
- Explicitly address uncertainty;
- Facilitate the continual improvement of the security of the water supply.

In Ireland, responsibility for the development and implementation of water safety plans for public water supplies rests with the WSA. The EPA Advice Note No.8 – Developing Drinking Water Safety Plans, provides guidance on the WSP approach and is available on the EPA website. In 2011 the EPA developed a WSP tool and in 2012, with the assistance of Galway City Council and the WSTG, training was rolled out to WSA staff on its use to assist WSAs on the implementation of their plans.

A Drinking Water Safety Plan Working Group (DWSP WG) was also established; this is made up of representatives from the EPA and representatives from seven WSAs who provide drinking water to the largest populations in Ireland. This working group provides support and guidance to each other and other WSAs on the preparation and implementation of WSPs. The DWSP WG also has a webpage on NIECE (Network for Ireland's Environmental Compliance and Enforcement). The primary aim of this site is to provide a forum whereby information and experience can be exchanged between WSAs in their implementation of WSPs and to provide a mechanism of feedback to the EPA on the practicalities of the WSP process. The DWSP working group webpage on NIECE will be accessible to all WSA staff involved in the preparation of water safety plans by the end of 2012.

For the first time WSAs were required to provide feedback to the EPA on their progress in implementing WSPs for their PWSs in their 2011 Drinking Water Returns. The data returned showed that 45 WSPs are in preparation and 3 WSPs are complete. The EPA plan to use this information to track progress on the management of risks associated with drinking water supplies.

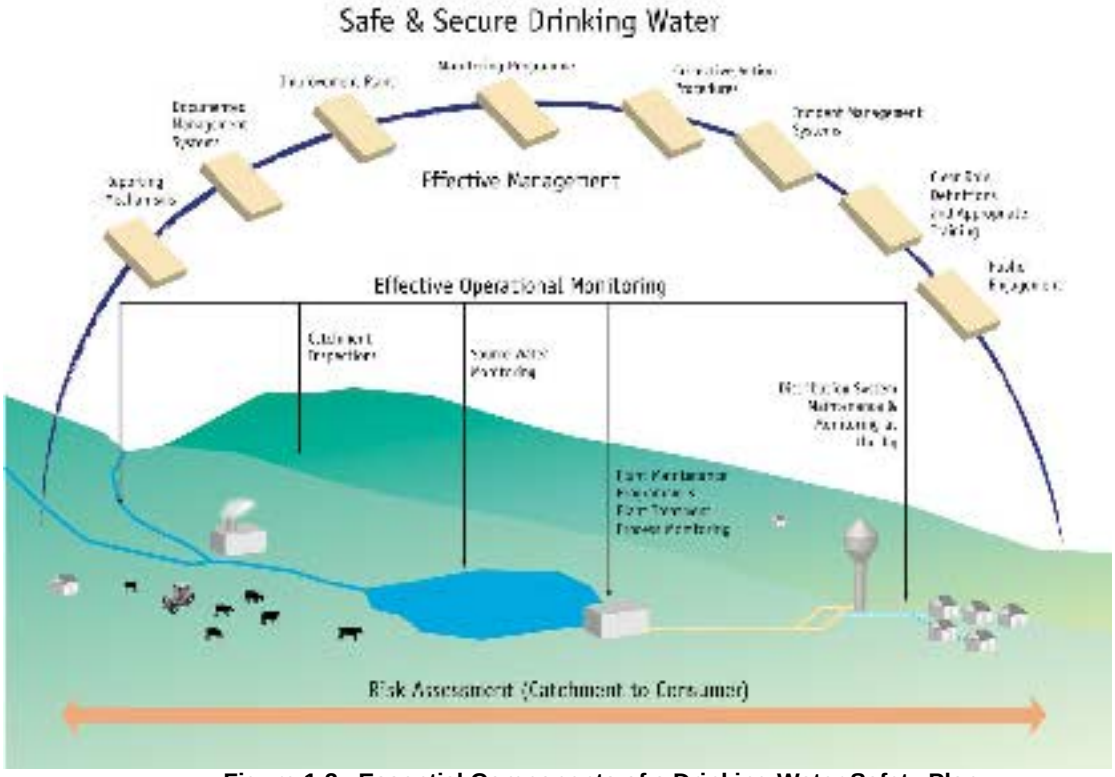


Figure 1-3. Essential Components of a Drinking Water Safety Plan.

1.5 Access to Information on Drinking Water Quality

The annual drinking water report provides a snapshot of the quality of drinking water and the outcomes of enforcement work by the EPA. Access to up-to-date monitoring results allows consumers to gain timely information on the quality of their drinking water. To this end, the Minister for Environment, Community and Local Government (DECLG) issued a circular on 20th July 2009, requesting WSAs to provide up to date information on the quality of drinking water on their respective websites. The Minister directed that all WSAs should publish the results and that access to the data should be made available in a prominent position on each WSA website homepage. During 2012, the EPA carried out an assessment of compliance with the requirements of the Ministerial circular letter and notes the following findings, based on information available at that time:

- 33 out of 34 WSAs were publishing exceedances of the legal standards online.
- 28 out of 34 were publishing *E. coli*, Enterococci, Lead, Nitrate, Trihalomethane, Aluminium, and Turbidity results but only 19 were publishing *Cryptosporidium* results. 32 were publishing other parameters.
- WSA websites are being used to communicate supplies where there is a risk to human health (e.g. boil water notices). Further information on the location of affected areas is required to enable consumers to easily determine if they are in an affected area.
- The monitoring results published were not always up to date and further effort is required to ensure WSAs publish the data within one month of the receipt of the results from laboratories.

The circular also makes a number of recommendations about additional information that the WSAs should publish on their websites. In particular, it recommends that the following information be published on the WSA websites:

- Details of any notifications sent to the EPA;
- The relevant WSA drinking water summary report from the most recent EPA Drinking Water Report;
- EPA Drinking Water Audit Reports;
- The Remedial Action List of supplies in each WSA's functional area.

The findings show that only 15 WSAs published details of notifications sent to the EPA; 28 WSAs published the most recent drinking water summary report; only 18 WSAs published the EPA's drinking water audit reports[8] online and only 18 WSAs published the Remedial Action List.

The provision of drinking water monitoring data and associated information to the public has improved. In 2011 only two WSAs were reported as being in substantive compliance with the Ministerial Circular letter. In 2012, six WSAs (Galway City Council, Galway County Council, Kilkenny County Council, Limerick County Council, Meath County Council and North Tipperary County Council) are in full compliance with all of the requirements and recommendations in the circular letter. A further 27 are in substantial compliance with the requirements of the circular letter.

[8] All EPA Drinking Water Audit Reports from 2012 are available to view on www.epa.ie

2.

Enforcement

2. Enforcement

2.1 Introduction

The EPA regulates public water supplies and WSAs are responsible for the regulation of private water supplies. As the supervisory authority over public supplies the EPA has been assigned a number of significant legislative powers – to direct that a water supply complies with quality standards, to oversee actions taken by WSAs to meet the quality standards, to oversee monitoring of supplies, to audit treatment plants and to publish guidance. As the supervisory authority over private supplies (including group water schemes) WSAs have been assigned similar powers and responsibilities to the EPA in relation to private supplies.

The Regulations require WSAs to notify the EPA of failures to meet the quality standards. The EPA has the power to issue a Direction to a WSA to take corrective action to improve a drinking water supply. The EPA may prosecute a WSA if it fails to comply with an EPA Direction. It is not an offence for a water supplier to supply water to consumers that is not clean and wholesome.

2.2 Remedial Action List

As part of its supervisory role under the Regulations, the EPA prepares a list of public water supplies where remedial action or management action is required to ensure compliance with the requirements of these Regulations into the future. This list is called the "Remedial Action List for Public Drinking Water Supplies" (RAL). The EPA uses the RAL to focus attention on resolving any deficiencies in public water supplies and to ensure that WSAs prepare and implement an action programme for each public water supply on the list.

2.2.1 Criteria for inclusion on the RAL

Public water supplies were included on the original RAL in 2008 for one or more reasons:

- The supply had reported 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
- The supply had 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 indicate a lack of operational control at the supply's treatment plant.
- The supply was 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.

2.2.2 Adding to and removing supplies from the RAL

At quarterly intervals, additional supplies may be added to the RAL as further information is gathered from EPA audits, notifications of exceedances or information gathered from WSAs, the Health Service Executive and the Department of Environment, Community and Local Government. Supplies are removed from the list at each quarterly update when sufficient corrective action is taken by the WSA and the effectiveness of the measures is demonstrated to the satisfaction of the EPA. In general, a supply will not be removed from the list on the basis of monitoring results alone, the WSA must

demonstrate that appropriate actions have been taken (e.g. new infrastructure, procedures or training) to ensure that compliance is secured and the risks of failure have been minimised.

In 2009, the EPA published revised guidance (Guidance Booklet No.3) to outline the purpose of the RAL and the actions that must be taken before a supply can be removed from the RAL. This guidance has subsequently been incorporated into the *European Communities (Drinking Water) Regulations (No.2) 2007: A Handbook on the Implementation of the Regulations for WSAs for Public Water Supplies,* available to download at www.epa.ie

2.2.3 Numbers of supplies on the RAL

The first RAL collated by the EPA in January 2008 identified 339 public water supplies representing 36% of public drinking water supplies that require detailed profiling to ensure that the supply is providing clean and wholesome drinking water. The progress of supplies on the original RAL is as follows:

1. 200 (59%) of the original 339 supplies have been removed from the RAL.
2. Remedial works will be complete in a further 99 supplies on the original RAL by the end of 2012.
3. 54 supplies were added to the original RAL but have been subsequently removed.
4. 52 supplies were added to the original RAL and remain on the current RAL.
5. 191 supplies in total were on the RAL as of the end of September 2012 (see Fig. 2-1).
6. There have been significant delays with some WSAs in submitting information to verify the effectiveness of the remedial works. 14 supplies have been identified by the EPA where the initial remedial works have been complete but have not been successful. Further remedial works are required in these supplies.

The population served by supplies where the necessary remedial works have been completed and have been removed from the RAL is over 670,000. However, the remaining supplies on the RAL collectively supply water to a population of 1,014,864 persons though the majority of this population (511,135 persons) is served by one of three supplies remaining on the RAL, Vartry Reservoir (Dublin City), Lee Road (Cork City) and Staleen (East Meath and Drogheda). Remedial works have been completed on a further 42 water supplies serving 82,178 persons and WSAs are in the process of verifying the effectiveness of these remedial works while remedial works in an additional 57 are scheduled for completion before the end of 2012.

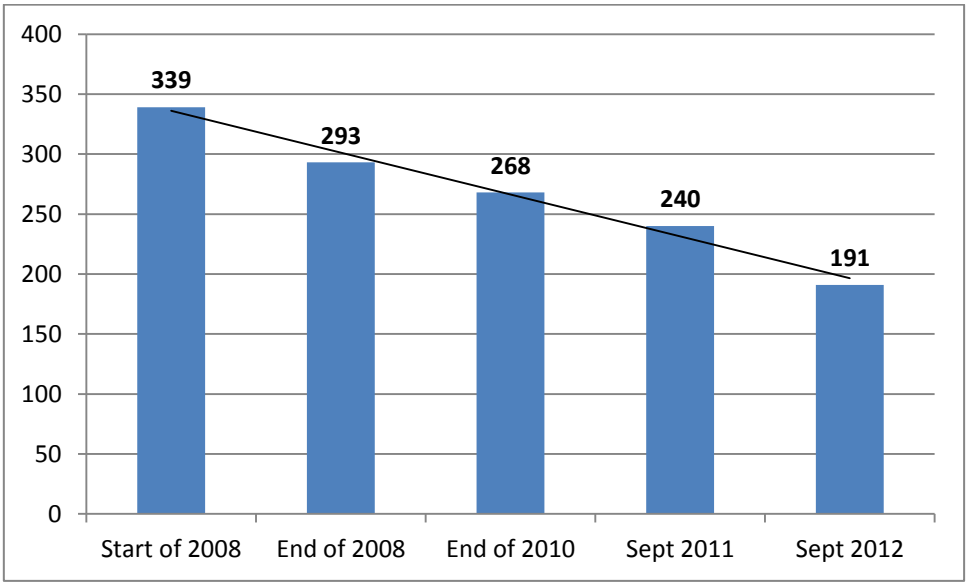


Figure 2-1: Progress with the number of public water supplies on the Remedial Action List.

Table 2-1 gives a summary of the supplies added or removed from the original RAL.

Table 2-1: Summary of Supplies Added or Removed from the Remedial Action List.

	No. of water supplies
Supplies added to the original RAL that are still on the RAL	
Table A: Microbiological failure e.g. *E. coli, Cryptosporidium*	12
Table B: Chemical Failure e.g. nitrate, trihalomethanes	7
Table C: Indicator Failure e.g. aluminium, coliforms	2
Other[9]	31
Total No. of Supplies Added	**52**
Supplies removed from the original RAL	
Abandoned or Replaced	63
Upgraded	83
Improved Operations	43
Other[14]	11
Total No. of Supplies Removed from the Original RAL	**200**

2.2.4 Progress with Remedial Actions

WSAs with supplies on the RAL were requested by the EPA to put in place a programme of remedial actions to ensure water supplies were made safe and secure. Each action programme involves the profiling of the water supply from catchment to consumer, the identification of risks to the safety and security of the water supply and the management measures to address the risks identified. These measures could include abandoning or replacing the source, upgrading the treatment facilities or improving operational and maintenance arrangements. Each WSA was required to submit a report to the EPA by 30 November 2009 outlining the remedial actions proposed and an estimate of the timeframe for the completion of these remedial actions. A brief summary of the proposed actions is available on the RAL summary which is available to download from the EPA website (www.epa.ie) while Table 2-2 gives an overview of the actions proposed.

Table 2-2: Summary of Actions to be taken for the 191 Current RAL Supplies
(to end September 2012).

	No. of Water Supplies
To be Abandoned or Replaced:	22
To be Upgraded:	151
To Improve Operations:	18
Total No. of Supplies:	**191**

[9] Other includes supplies identified as having lack of operational control or improvements required, as identified by the EPA or HSE.

Since its initial publication in January 2008, a number of large public water supplies (200 from the original list) have been removed from the RAL. In particular, the major water supplies to Galway, Limerick and Waterford cities have all been upgraded to the satisfaction of the EPA, such that they have been removed from the RAL. To ensure the security of these supplies WSAs should implement a water safety plan approach such that the objective of the supply of clean and wholesome water is not hindered. The EPA has provided training on water safety plans and is working with WSAs to implement these plans.

Three water treatment plants that provide water directly and indirectly (e.g. mixed with other sources prior to supply) to 18 water supplies zones on the RAL collectively supply water to a population of 511,135 persons. These plants are the Vartry Reservoir (supplying 335,135 persons in Dublin and Wicklow), Lee Road (supplying 123,000 persons in Cork City), and Staleen (supplying 55,000 persons in Meath and Louth). Progress with the remedial measures in the first two of these supplies has been slow and the actions required are summarised below:

- Vartry Reservoir – this plant is on the RAL due to the vulnerability of the Callow Hill tunnel. Replacement of this unlined tunnel (which is over 150 years old) is not scheduled to take place until the end of 2022 at the earliest. This water also feeds into the Stillorgan Reservoir. UV treatment will be installed at Stillorgan in 2013 which will allow all 4 water supply zones (supplying water to 219,850 persons) subsequent to the reservoir to be removed from the RAL.

- Lee Road – an upgrade of the Lee Road water treatment plant is required to address the operational limitations of the current plant. This is not scheduled to be completed until the end of 2014.

- Staleen – this plant is currently being upgraded to improve the existing level of treatment. Louth County Council had previously reported to the EPA that these works would be complete by September 2012, however planning issues have delayed the commencement of works and the upgrade will now not be complete until the end of 2013.

Table 2-3: Number of Supplies on the Original RAL and Timeframes for the Completion of Remedial Action Plans for each WSA

WSA	No. of Supplies on RAL		Progress on Completion of Remedial Works			
	Original RAL	Current RAL	Works Completed	To be completed in 2012	To be completed in or after 2013	No Timeframe for Completion
Kerry County Council	41	49	14	15	20	0
Galway County Council	34	27	20[10]	6	0	1
Cork County Council	38	14	12	1	1	0
Donegal County Council	33	14	0	2	2	10
Wicklow County Council	22	13	2	3	8	0
Waterford County Council	18	12	0	7	5	0
South Tipperary County Council	14	11	0	4	7	0
Roscommon County Council	10	8	1	6	1	0
Mayo County Council	15	5	2	1	2	0
Meath County Council	8	5	0	0	5	0
Cavan County Council	10	4	2	0	2	0
Sligo County Council	8	4	0	3	1	0
Dublin City Council	1	3	0	0	3	0
Dun Laoghaire Rathdown Co. Co.	0	3	0	0	3	0
Longford County Council	5	3	0	2	1	0
Louth County Council	3	3	0	1	2	0
North Tipperary County Council	6	3	0	3	0	0
Kilkenny County Council	7	2	0	1	1	0
Limerick County Council	12	2	1	1	0	0
Monaghan County Council	12	2	1	0	1	0
Cork City Council	1	1	0	0	1	0
Laois County Council	8	1	0	1	0	0
Leitrim County Council	2	1	0	0	0	1
Wexford County Council	4	1	1	0	0	0
Carlow County Council	4	0	n/a	n/a	n/a	n/a
Clare County Council	9	0	n/a	n/a	n/a	n/a
Fingal County Council	0	0	n/a	n/a	n/a	n/a
Galway City Council	1	0	n/a	n/a	n/a	n/a
Kildare County Council	0	0	n/a	n/a	n/a	n/a
Limerick City Council	1	0	n/a	n/a	n/a	n/a
Offaly County Council	8	0	n/a	n/a	n/a	n/a
South Dublin County Council	0	0	n/a	n/a	n/a	n/a
Waterford City Council	1	0	n/a	n/a	n/a	n/a
Westmeath County Council	3	0	n/a	n/a	n/a	n/a

[10] Remedial works in 14 of the 20 supplies in Galway County have not been successful and further remedial works are needed on these supplies.

A timeframe for the completion of the remedial actions for each supply on the RAL has been submitted to the EPA by each WSA. A summary of the completion dates for the remedial actions is illustrated in Fig. 2-2.

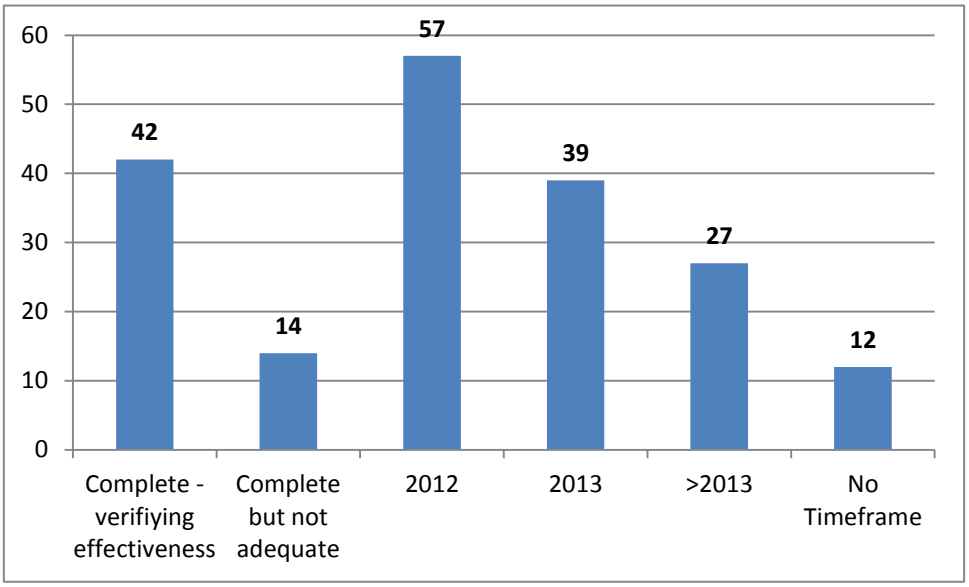


Figure 2-2: Timeframes for completion of Remedial Action Plans.

The WSAs have reported that remedial works will be complete in 99 supplies currently on the RAL by the end of 2012. Many of these supplies will be removed from the RAL once the appropriate monitoring has been carried out in the supply to verify that the actions taken have been successful in improving drinking water quality. To date, however, there has been a delay in the submission of this data by the WSAs and the EPA is prioritising the collation of this data to assess whether the remedial works have been successful or if additional works are required.

Three WSAs did not provide an estimation of the timeframe for the completion of the remedial actions for one or more of the supplies within their functional area (12 supplies in total). The majority of these supplies are located in Donegal (10). The EPA has issued legally binding Directions in respect of the majority of the supplies where no dates have been submitted by the WSAs. These Directions require the completion of remedial works by specified dates in 2012 and 2013. The EPA will examine progress in compliance with these Directions in due course and may take further enforcement action in the event of non-compliance with the Directions.

The complete list of public water supplies currently on the RAL, including details of the proposed remedial measures and associated timeframes, is available to download from www.epa.ie .

2.3 EPA Audits of Public Water Supplies

The Regulations provide for the auditing of water supplies. The EPA audits plants supplying public schemes and the WSAs audit plants supplying private schemes. The EPA conducts targeted campaigns of audits to review a particular issue at a national level, targeted audits of WSAs that are performing poorly and reactive audits to follow up on issues as they arise during the year.

The EPA conducted 118 audits of WSA drinking water treatment plants during 2011. 27 of these were reactive audits and 91 were campaign audits. The reactive audits were carried out in response to specific issues that occurred during the year e.g. the imposition of a boil notice on a supply while the campaign audits related to groundwater supplies where issues such as source protection, disinfection and suitability of treatment were assessed. Audits of groundwater supplies identified 24 supplies (26%) where source protection measures were inadequate and 50 supplies (55%) without automatic shutoff if chlorine levels fell too low. Table 2-4 provides an overall summary of issues identified during EPA audits of WSA drinking water treatment facilities in 2011.

The main compliance issues identified are discussed in the following sections of this report:

a. Inadequate protection of the source;
b. Inadequate clarifier operation and management; and
c. Inadequate filter operation and management.

Overall there has been an improvement in the infrastructure, operation and management of treatment plants across a range of key indicators noted during EPA audits (see Table 3-4). However, the proportion of supplies with floc carryover from clarifiers and poorly operating and managed filters is disappointing. Optimal performance of clarifiers and filters is crucial in the effective treatment of drinking water. While improvements are notable in eleven key indicators, further improvements are required such as improvements in source protection, well head protection and final water turbidity.

Table 2-4. Issues Identified by EPA Audits of Drinking Water Treatment Plants during 2011.

	Issue	No. of Water Supplies where issues were confirmed during Audit
1	**Inadequate source-protection measures in place.** *Reason: Potential sources of pollution could be present to contaminate the supply.*	33
2	**No chlorine monitor and alarm.** *Reason: Chlorine monitors and alarms alert the operator of the plant to inadequate treatment of the supply even when the plant is unattended.*	5
3	**Inadequate disinfection contact time.** *Reason: Inadequate contact time may result in micro-organisms posing a risk to human health.*	5
4	**No duty and standby chlorine pumps.** *Reason: If a pump fails undisinfected water may enter the water supply and pose a risk to human health.*	12
5	**Problems in the operation of the filters** *Reason: Poor filtration indicates inadequate treatment of the water which may result in contaminants not being removed.*	9
6	**No turbidity monitors on each filter.**	

	Issue	No. of Water Supplies where issues were confirmed during Audit
	Reason: Turbidity monitors are critical for controlling the quality of treated water post filtration.	11
7	**Final water turbidity >1.0 NTU[11].** *Reason: Excessive levels of turbidity indicate 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.*	14
8	**Floc carryover from the clarifier.** *Reason: Floc carryover indicates poor control over chemical dosing and may result in excessive chemicals in treated water or inadequate treatment of water.*	5
9	**Inadequate chemical dosing arrangements.** *Reason: Failure to dose correctly will result in excessive chemicals in treated water or inadequately treated water.*	3
10	**Unapproved/inappropriate chemicals used.** *Reason: Unapproved/inappropriate chemicals may pose a risk to health.*	1
11	**Treatment process partially or fully bypassed.** *Reason: Bypassing treatment processes reduces the protection to the supply that these treatment processes provide and increase the likelihood of contamination.*	3
12	**Plant operating >10% above design capacity.** *Reason: Excessive loading on plant places stresses on treatment processes making them vulnerable to failure.*	1
13	**Reservoir/clearwater tank not covered.** *Reason: Direct contamination of treated water by animals or malicious intent may occur and may pose a risk to human health.*	0
14	**Reservoir/clearwater tank not secure.** *Reason: Uncovered vents or unlocked access points can allow unauthorised human or animal access to treated water resulting in contamination.*	6
15	**Surface water ingress into a groundwater source.** *Reason: Surface water ingress can lead to the contamination of source water.*	4
16	**Microbiological contamination of source.** *Reason: Microbiological contamination of the source poses risks to human health.*	18
17	**Spring uncovered or wellhead poorly protected.** *Reason: Poorly protected wells and springs are at risk of contamination from the ingress of contaminating material.*	15

2.3.1 Inadequate Protection of the Source

Source protection is the first barrier for the production of safe drinking water. By improving source protection, the quality of the source water may also be improved. This in turn, can lead to a reduction in the production of treatment by-products and minimise operational costs.

[11] Nephelometric Units

Audits conducted by the EPA on public water supplies during 2011 found that:

- Inadequate protection of the source (e.g. landspreading too close to source, inadequate borehole protection etc.) was noted in 33 audits compared to 46 in 2010.

- Ingress of surface water into boreholes was observed in four of the 96 groundwater supplies examined.

The main issues identified included:

- Inadequate or poor borehole construction;
- Evidence of ingress of surface water into boreholes (e.g. unsealed boreholes);
- Animal access to surface waters in the vicinity of abstraction points;
- Inadequate security.

2.3.2 Disinfection

As a minimum, all drinking water supplies should be disinfected to ensure the safety of the final water for drinking. The disinfection system should be reliable (e.g. flow-proportional/residual based dosing, adequate contact time and with duty and standby dosing pumps) and verifiable (i.e. should have a chlorine monitor and an alarm). Chlorination is the most common disinfection technology used in the treatment of drinking water in Ireland though UV is increasingly being used as a primary disinfectant in many supplies (usually with chlorination as a secondary disinfectant).

In 2011, the Agency audited 118 public water supplies on the adequacy of disinfection systems and found that:

- 12 plants audited did not have a duty and standby disinfectant dosing arrangements in place. Consumers supplied by these plants may be vulnerable to receiving water that is not adequately disinfected in the event of the failure of one chlorine dosing pump.

- Five plants audited did not have a chlorine monitor and alarm in place; an improvement from seven for the previous reporting period. In the absence of a chlorine monitor and alarm, the adequacy of chlorination cannot be verified and it is also not possible to rapidly detect and respond to a reduction below the required chlorine level. However, WSAs reported that all public water supplies had chlorine monitors and alarms in place at the end of 2011.

- Five plants audited had inadequate disinfection contact time; an improvement compared to the previous period.

- Of the 113 drinking water treatment plants audited that had chlorine monitors and alarms in place, 12 were found to be either without a dial-out facility or had a dial out facility but alarms were not being responded to when triggered. Response to alarms is inadequate in some WSAs and in particular out of hours response needs to be addressed in these cases.

Photograph 2-1: Sodium Hypochlorite Disinfection System.

2.3.3 Treatment Barriers

As a minimum, two barriers are required to ensure that drinking water is treated to the required standard. In the case of groundwater, the natural geology typically acts as one barrier and disinfection acts as the second. In the case of surface water supplies, a treatment system acts as the first barrier and disinfection as the second. This requirement is to ensure that water is wholesome and clean and to prevent the entry of *Cryptosporidium* into the water supply. When a WSA detects *Cryptosporidium* in a drinking water supply, it must consult with the Health Service Executive to establish if there is a risk to human health. There was an increase in the number of cases of cryptosporidiosis reported to the Health Protection Surveillance Centre (HPSC) in 2011 (430 in 2011 up from 292 in 2010) (www.hpsc.ie).

The adequacy of installed barriers at drinking water treatment plants was examined during audits conducted by the EPA in 2011. The main findings in relation to barriers were that:

- 14 plants audited had a final water turbidity reading that exceeded 1.0 NTU; an improvement from the previous reporting period. Final water turbidity leaving the plant should be below 1 NTU and supplies with a high risk of *Cryptosporidium* contamination should strive for 0.25 NTU.
- Inadequate maintenance of filters was observed at nine plants audited (with filters in place as a barrier). This compares with 15 in the previous reporting period. Greater effort and attention is required in this important aspect of the drinking water treatment process.
- 11 plants audited with filters in place in 2011 did not have individual turbidity monitors on each filter which is up from eight plants in 2010. Such monitors facilitate an assessment of the performance of individual filters and optimisation of the filtration process.
- Five plants audited that had clarifiers in place displayed floc carryover, representing a disimprovement from the previous reporting period. This indicates poor control over chemical dosing and may compromise filter operation.

2.3.4 Integrity of treated water storage tanks:

There are a number of hazards[12] which can occur after treated water enters the distribution system; these have the potential to compromise drinking water security and, consequently, its safety. Drinking water storage tanks or service reservoirs that are poorly constructed or inadequately sealed increase the risk of contamination of treated water by animals or those with malicious intent. The integrity of treated water storage (clearwater) tanks and reservoirs was examined during EPA audits in 2011. The main finding was that:

- Six clearwater tanks/storage reservoirs inspected during audits were found to have inadequately sealed vents or were not secured. This is an improvement from 22 in 2010.

2.3.5 Management and Control Vulnerabilities

Verification of the effectiveness of each treatment process is essential to assure drinking water security. The main findings in 2011 were that:

- 11 plants audited did not have individual turbidity monitors on each filter.
- Three plants audited where chemical dosing (i.e. coagulation and flocculation) was used, need to improve their dosing arrangements. For one plant the EPA issued the WSA with a Direction requiring them to upgrade the plant. At a second plant, the EPA recommended that automatic pH correction prior to chemical dosing be introduced. At the final plant, the EPA recommended that the coagulation process be operated at all times during production.
- One plant audited that had chemical treatment in place was found to be using inappropriate chemicals. This incident related to the use of a chemical for the remediation of a hydrocarbon spill in the source. There was no documentation available at the time to verify that the chemical being used was approved and suitable for use in contact with drinking water.
- One plant audited was operating more than 10% above its design capacity and works are in progress to meet capacity requirements by 2014.

Photograph 2-2: Chlorine monitor

[12] The WHO defines a **hazard** as 'any biological, chemical, physical or radiological agent that has the potential to cause harm' (e.g. *Cryptosporidium* is a water quality hazard, a potential danger to public health).

2.4 Notifications of Failures to meet Parametric Values

Where a water supply has failed to meet the standard specified in the Regulations, the WSA must consult with the Health Service Executive. Where a WSA, in consultation and agreement with the HSE consider that a supply constitutes a potential danger to human health, they are required to ensure that the use of such water is restricted or other actions are taken to protect human health and that consumers are informed. As part of the determination of the potential danger to human health, the WSA/HSE may consider the concentrations found in the supply, the anticipated duration of the non-compliance, the history of the supply and the remedial works that are being undertaken or planned to be undertaken.

The consultation and agreement with the HSE determines whether the EPA is notified under Regulation 9 or Regulation 10 of the 2007 Drinking Water Regulations. Regulation 9 deals with circumstances where there may be a potential danger to human health while Regulation 10 deals with circumstances where there is an exceedance of the drinking water standards but there is not a potential danger to human health. Where there is a potential danger to human health a boil water notice or water restriction may be imposed on consumers of the supply.

The Drinking Water Regulations require WSAs to ensure that any failure to meet the limits set in the Regulations is immediately investigated to determine the cause of such a failure. The WSA must notify the EPA of any failure, be it from operational[13] or compliance[14] monitoring and also the results of its investigations in accordance with the *Drinking Water Handbook on the Implementation of the Regulations for WSAs for Public Water Supplies.*

The EPA assesses each notification of the failure to meet the parametric values and the corrective actions proposed by the WSA within one working day of receipt. Priority is given to notifications received under Regulation 9, where the WSA has indicated there is a risk to human health. Where the corrective action is not deemed satisfactory the EPA may carry out an audit of the treatment plant to assess the actions taken or it may issue a legally binding Direction. Where the investigation indicates that the risk cannot be resolved quickly and is due to the water treatment plant, the supply may be added to the Remedial Action List. The WSA is then required to prepare a corrective action programme outlining what remedial measures are to be undertaken and to submit a timeframe for the completion of these remedial measures to the EPA.

During 2011, the EPA received and assessed notifications in relation to public water supplies. There was a general reduction in the number of supplies in which key microbiological and chemical parameters were detected in 2011 compared to 2010. A breakdown of the number of public water supplies in which a microbiological or chemical parameter exceeded the standards in 2010 and 2011 and was subsequently notified to the EPA is provided in Table 2-5.

Table 2-5. No. of Public Water Supplies where the detection of a microbiological or chemical parameter was notified to the EPA during 2011 and 2010.

Parameter	No. of PWSs with Parameter Exceeded in 2010	No. of PWSs with Parameter Exceeded in 2011	Change since 2010
Microbiological			
E. coli	45	24	⇩ 21
Enterococci	9	3	⇩ 6

[13] Compliance monitoring is carried out to determine if water supplies are complying with the standards and indicator values in the Regulations.

[14] Operational monitoring is carried out to check that treatment works and distribution works are operating effectively.

Chemical			
Antimony	0	3	↑ 3
Arsenic	0	2	↑ 2
Benzene	0	0	**No Change**
Benzo(a)pyrene	0	0	**No Change**
Bromate	1	1	**No Change**
Cadmium	1	0	↓ 1
Copper	7	4	↓ 3
Epichlorohydrin	0	0	**No Change**
Fluoride	3	4	↑ 1
Lead	22	23	↑ 1
Nickel	6	4	↓ 2
Nitrate	6	5	↓ 1
Nitrite (at tap)	0	0	**No Change**
PAH	0	1	↑ 1
Pesticides	5	10	↑ 5
Trihalomethanes(Total)	79	70	↓ 9

↓ Improvement on 2010 ↑ Disimprovement on 2010

A more detailed assessment of the supplies where there was a potential danger to human health (i.e. a boil water notice or water restriction was in place) or where notifications were received for the four key parameters, *E. coli*, trihalomethanes, lead and nitrate is provided in the section below.

2.4.1 Boil Water Notices/Water Restrictions

In certain circumstances, the Health Service Executive (HSE) may advise the WSA that there is a potential danger to human health. The WSA must implement the advice provided by the HSE which may be to either prohibit the supply of water, boil the water prior to consumption, or to restrict the use of water. In some cases, a boil water notice or water restriction notice does not apply to all of the supply. For example, the notice may apply to only those areas of a distribution network using lead piping, or to water used for consumption by vulnerable groups such as infants, pregnant women, the elderly and immunocompromised patients.

During 2011, 26 new boil water notices and five water restriction notices were put in place. 73 individual boil water or water restriction notices were active at some stage during the 2011, representing a decrease from the 82 notices active during 2010 (see Table 2-6).

Table 2-6: Summary of New Boil Notices / Water Restrictions during 2011.

Restriction Type	No. of Notices	No. of Supplies Affected
Boil Water Notices active during 2011:	50	49
Water Restrictions active during 2011 :	23	22
Total No. of Boil Notices / Water Restrictions:	**73**	**71**

The number of boil water notices active during 2011 decreased from 60 in 2010 to 50 in 2011. Nine of the 50 boil water notices and two of the 23 water restriction notices issued in 2011 were precautionary and affected 18,960 persons. In summary, 31 BWN and WR affecting approximately 40,000 were

issued during 2011 while 42 BWN and WR affecting approximately 95,000 were lifted. Further details of the public water supplies affected by boil water notices or water restriction notices during 2011 are provided in Appendix III.

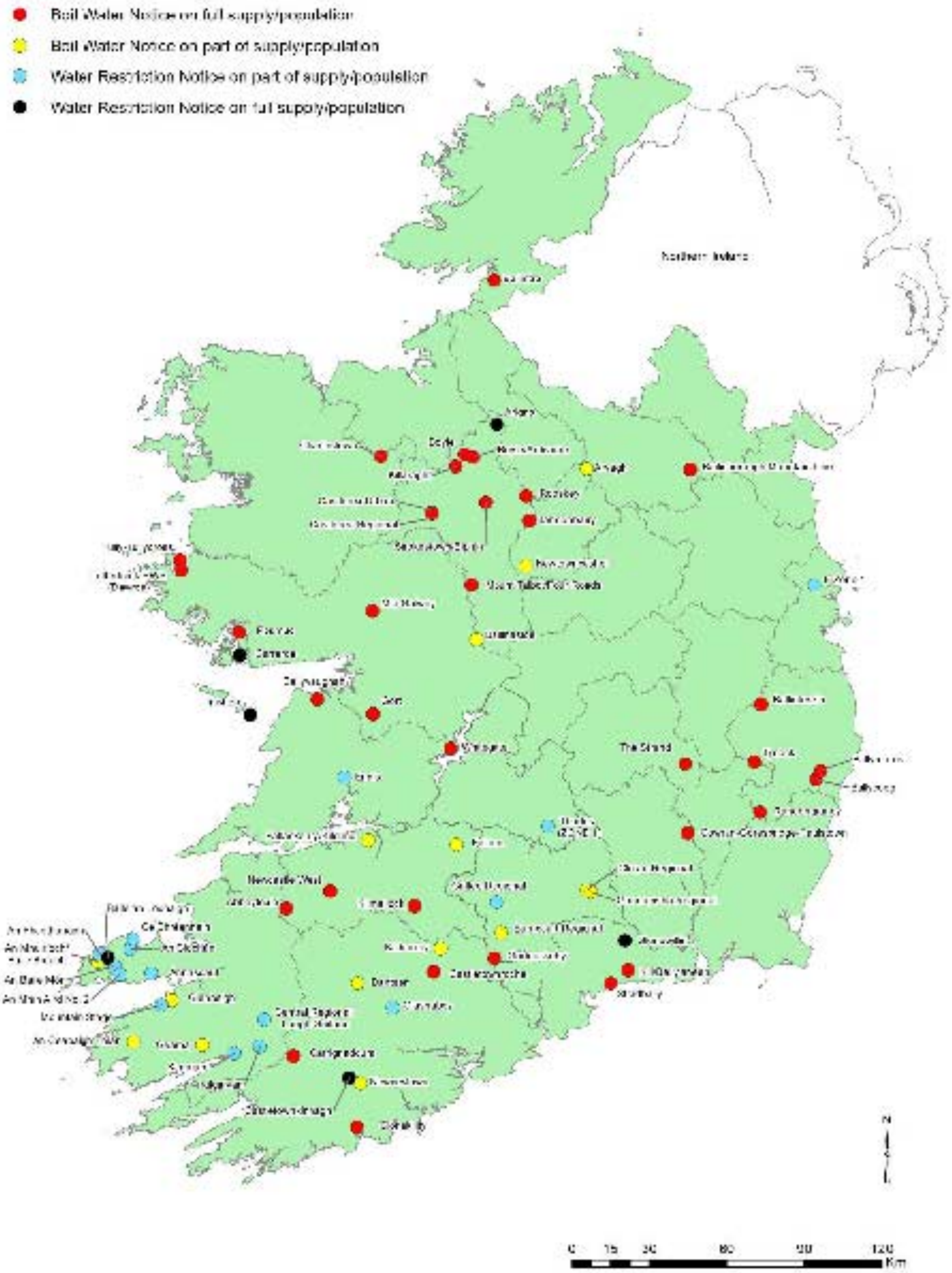


Figure 2-3: Map of Boil Water Notices/Restrictions of Use Placed or Active in Public Water Supplies during 2011.

2.4.2 E. coli Notifications

As outlined in Section 1.2, *E. coli* is a key health indicator of drinking water quality in Ireland. The EPA was notified of the detection of *E. coli* in public water supplies on 26 occasions in 2011 down from 46 occasions in 2010. The number of public water supplies in which *E. coli* was detected was 24 in 2011 which is down from 45 in 2010. This reduction in the detection of *E. coli* contamination in public water supplies is a welcome trend that affords better protection to consumers. In 2010 only one public water supply in which *E. coli* was detected, found *E. coli* on more than one occasion whereas in 2011 two supplies detected *E. coli* on more than one occasion (Table 2-7).

Table 2-7: Summary of *E. coli* Notifications.

	2011	2010
No. of PWS in which *E. coli* was detected	24	45
No. of times the detection of *E. coli* notified to the EPA	26	46

A detailed analysis of the likely cause of the *E. coli* failures is shown on Figure 2-4. This analysis shows that the number of incidents caused by pollution of the source reduced to zero in 2011 from 4 in 2010. Although the number of incidents caused by network related issues (e.g. contamination at the tap or in the distribution network) has remained essentially the same, there has been a dramatic drop in the number of failures attributed to inadequate treatment at the plant (down from 13 failures to three) and chlorination process breakdown (down from 13 to five). This is undoubtedly due to the improvements to the security of disinfection systems such as the installation of chlorine monitors and alarms, duty/standby dosing arrangements and flow proportional/residual based dosing. It also highlights that if the number of *E. coli* incidents is to drop further a twin track approach of further improving and maintaining treatment and disinfection systems will be required in tandem with improvements in the distribution network.

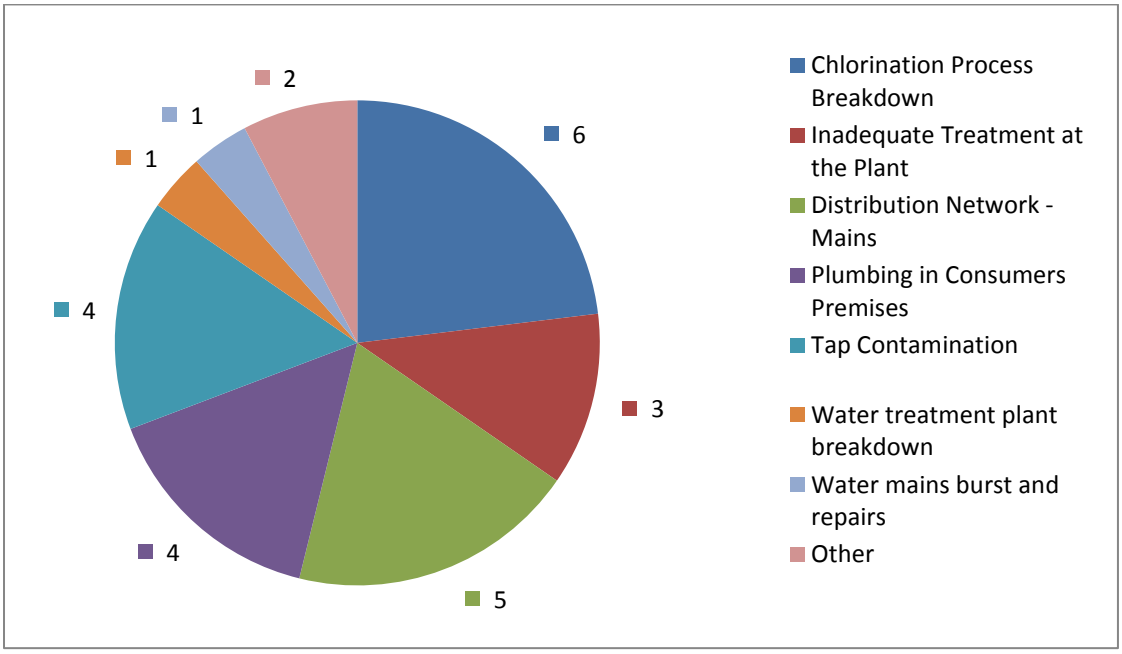


Figure 2-4. The Main Causes of *E. coli* Notifications in Public Water Supplies in 2011.

2.4.3 Trihalomethanes Notifications

There has been a drop in the number of public water supplies where the detection of trihalomethanes was notified to the EPA from 79 in 2010 to 70 in 2011. A breakdown of the main causes of the THM notifications is shown on Table 2-8. This shows that the majority of THM failures are caused by the absence of adequate treatment to remove organic matter (THM precursors).

Trihalomethanes are formed when chlorine reacts with naturally occurring organic matter in raw water. Chloroform and bromodichloromethane (two of the four THMs) are classified by the International Agency for Research on Cancer (IARC) as a 'possible carcinogen'. The Committee on the Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) (UK) systematically reviewed the evidence with regard to THMs and cancer in 2008 and stated "*Problems remain in the interpretation of published studies. These include the small relative risks recorded, the possibility of residual confounding, and the problems with exposure assessment."* They concluded *"the evidence for a causal association between cancer and exposure to chlorination by-products is limited and any such association is unlikely to be strong*". Although these associations are weak and are not consistently demonstrated in scientific studies, the possibility that they exist remains. Where evidence with regard to the environment and health is uncertain, the approach should be precautionary (reduce exposure to the hazard) and proportional (actions should not be disproportionate to the likely benefits and potential harms). THM exceedances can be eliminated by reducing organic matter in the raw water, optimising treatment to remove organic matter and optimising chlorination. However, care must be taken not to reduce chlorination in such a way as to compromise the microbial safety of drinking-water. A balance should 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. Notwithstanding this, efforts to reduce and remove organic matter before chlorination should continue. The EPA and the HSE has prepared a position paper summarising the issues in relation to THMs in drinking water including health, legislation and interventions. This paper is available on the EPA and HSE websites.

The public should be reassured that all exceedances of the standards are examined to determine if there is a potential danger to human health. In determining this, the WSA and the HSE consider the concentration of THMs in the sample, the concentration over time, the history of the supply and the remedial works that are being undertaken and their timescale. Where there is a potential danger to human health, the WSA must, in consultation with and subject to the agreement of the Health Services Executive (HSE) take follow up action and must inform consumers. To date the results of these assessments have not led to any water restrictions arising from any failure to meet the THM parametric value.

The elimination of all THMs exceedances is a priority of the EPA and it is for this reason that all supplies with persistent or intermittent THM exceedances have been included on the EPA's Remedial Action List. The majority of these supplies have action programmes in place and the EPA expects remedial works in these supplies to be completed before 2014. However, where no action programmes have been received by the EPA, it has issued legally binding Directions in 2011 to require that appropriate actions are taken to eliminate THM exceedances.

Of the 191 supplies on the RAL, 88 supplies, providing water to over 400,000 persons, have reported THM exceedances at least once. In other words, THM exceedances have been reported in approximately 10% of public water supplies. Considerable work is being undertaken by WSAs to improve such supplies.

Table 2-8: Summary of Causes of THM Failures, 2011.

Reason for the Failure	No. of Public Water Supplies
Inadequate treatment at the plant	56
Abnormal contamination of the raw water source	4
Distribution network	3
Chlorination process breakdown	2
Structural faults or maintenance in reservoirs	2
Water Treatment Plant operating above design capacity or under stress	1
Other	2

2.4.4 Nitrate Notifications

Elevated levels of nitrate above the parfive public water supplies in 2011. The five supplies in 2011 were located in Carlow (one supply), Kilkenny (one supply) and Waterford (three supplies). The exceedances were attributed to abnormal contamination of the raw water source (one supply) and diffuse pollution (four supplies). Of the six supplies reporting elevated levels of nitrate in 2010, one has been resolved by installation of a nitrate removal system, one has been resolved by blending, one has been brought back into compliance by enforcement of GAP Regulations with a further three being addressed by a combination of GAP Regulations enforcement and source replacement.

2.4.5 Lead Notifications

There has been a rise in the number of public water supplies where lead failures were notified to the EPA from 22 public water supplies in 2010 to 23 in 2011. In the majority of cases lead exceedances were due to either lead in the consumers plumbing or lead service pipes in the ownership of the WSA in conjunction with lead in consumers plumbing. In four of the 23 public water supplies, the lead exceedances were due to the presence of lead mains.

2.5 Directions and Prosecutions

Following an exceedance of a parametric value, the EPA may issue a Direction under the Drinking Water Regulations, if it is not satisfied that the actions taken by the WSA are adequate.

The EPA issued 23 legally binding Directions to 8 WSAs during 2011, requiring specific actions to be undertaken to improve the security of the supply in question. A full list of all Directions issued by the EPA is included in Table 2-9 with details of the reason associated with each provided in Appendix I.

Table 2-9: Summary of EPA Enforcement Actions, 2011.

Action	Received / Issued under:	2011
Directions Issued:	Under Regulation 9:	6
	Under Regulation 10:	4
	Under Regulation 13	1
	Under Regulation 16[15]:	12
Prosecutions:	Under the DW Regulations 2007:	0

Of the 23 Directions issued by the EPA during 2011, 4 have been complied with by the WSAs and these Directions were closed by the EPA. The remaining 19 are in the process of being complied with by the WSAs. Table 2-10 provides a further breakdown on the Directions issued in 2011.

Table 2-10: Breakdown of Directions Issued to WSAs in 2011.

WSA	Supply	Reason for Direction	Date	Enforcement Status[16]	Status of Open Directions
Clare	Ennis PWS	No timeframe submitted for the removal of lead mains in the network	06-Jan-11	Open	Action programme is being implemented by the WSA
Kerry	Glenderry PWS	No Chlorine Monitor or Alarm	07-Jan-11	Open	Action programme is being implemented by the WSA
Wexford	Wexford Town PWS	Deficiencies in disinfection procedures were identified	03-Mar-11	Closed	N/A
Donegal	Letterkenny PWS	Trihalomethanes exceedances and inadequate action plan submitted	24-Mar-11	Open	Action programme is being implemented by the WSA
Donegal	Fintown PWS	Trihalomethanes exceedances and inadequate action plan submitted	24-Mar-11	Open	Action programme is being implemented by the WSA

[15] Regulation 16 enables a supervisory authority to issue such binding directions as it considers appropriate for the purposes of fulfilling its functions.

[16] The Enforcement Status is listed as Closed if the WSA has complied with the Direction. It is listed as Open if there are outstanding issues that must be actioned by the WSA.

WSA	Supply	Reason for Direction	Date	Enforcement Status[16]	Status of Open Directions
Donegal	Cashilard PWS	Trihalomethanes exceedances and inadequate action plan submitted	24-Mar-11	Open	Action programme is being implemented by the WSA
Donegal	Ballyshannon PWS	Trihalomethanes exceedances and inadequate action plan submitted	24-Mar-11	Open	Action programme is being implemented by the WSA
Galway	Carraroe PWS	Hydrocarbon spillage	12-Apr-11	Closed	N/A
Wexford	Gorey Region PWS	No Chlorine Monitor or Alarm	21-Apr-11	Closed	N/A
Wexford	Sow Region PWS	Deficiencies identified in plant operation and management.	27-Jul-11	Closed	N/A
Donegal	Gortahork/ Falcarragh PWS	Trihalomethanes exceedances and inadequate action plan submitted	09-Sep-11	Open	Upgrade works to be completed by June 2013
Donegal	Rathmullen PWS	Trihalomethanes exceedances and inadequate action plan submitted	09-Sep-11	Open	Upgrade works to be completed by September 2013
Donegal	Greencastle PWS	Trihalomethanes exceedances and inadequate action plan submitted	09-Sep-11	Open	Upgrade works to be completed by September 2013
Donegal	Portnoo Narin PWS	Trihalomethanes exceedances and inadequate action plan submitted	09-Sep-11	Open	Upgrade works to be completed by September 2013
Wicklow	Avoca Ballinaclash PWS	Trihalomethanes exceedances and no action plan submitted	09-Sep-11	Open	Action programme is being implemented by the WSA
Galway	Kilkerrin Moylough PWS	No *Cryptosporidium* barrier in place and no action plan submitted	26-Sep-11	Open	Action programme is being implemented by the WSA
Cork	Mallow PWS	No timeframe submitted for the removal of lead mains in the network	28-Sep-11	Open	Works to be completed by December 2013
Kerry	Lisardboola PWS	No timeframe submitted for the removal of lead mains in the network	28-Sep-11	Open	Works to be completed by December 2013
Longford	Granard PWS	No timeframe submitted for the removal of lead mains in the network	28-Sep-11	Open	Action programme is being implemented by the WSA
Longford	Longford Central PWS	No timeframe submitted for the removal of lead mains in the network	28-Sep-11	Open	Action programme is being implemented by the WSA
Kerry	Brandon PWS	Inadequate disinfection contact time and inadequate action plan submitted	15-Nov-11	Open	Works to be completed by November 2013
Kerry	Annascaul PWS	Inadequate disinfection contact time and inadequate action plan submitted	15-Nov-11	Open	Works to be completed by November 2013

WSA	Supply	Reason for Direction	Date	Enforcement Status[16]	Status of Open Directions
Kerry	Lough Guitane,	Inadequate disinfection contact time and inadequate action plan submitted	15-Nov-11	Open	Works to be completed by November 2013

2.6 Removal of Lead Distribution Mains

In order to address the issue of lead in drinking water, the EPA regularly surveys WSAs to identify any remaining lead distribution mains still in place. The results of the most recent assessment indicate that approximately 4,000 m of lead mains remain in place in five public water supplies. The full list and location of these mains and also the length of mains removed in these supplies since 2010, is included in Table 2-11. It is possible that other lead mains are present but have not yet been identified (e.g. such mains may have been laid a long time ago and records may be inadequate to determine the exact location).

Table 2-11. Locations of Remaining Lead Distribution Mains

Water Services Authority	Name of Water Supply	Mains removed since 2010	Length of Main(s)
Clare County Council	Ennis	40 m	290 m
Cork County Council	Mallow	0 m	1557 m
Kerry County Council	Lough Guitane	1071 m	1339 m
Longford County Council	Longford Central	535 m	685 m
Longford County Council	Granard	120 m	145 m

The EPA has issued Directions to Cork County Council and Clare County Council in respect of the removal of lead mains in Mallow and Ennis, respectively. The action plans submitted by the two WSAs require that the lead mains are replaced by Dec 2013 in the case of Mallow and by September 2011 in the case of Ennis. Clare County County is currently in the process of removing the lead mains from the Ennis supply.

In 2011, three further Directions were issued in respect of the Lough Guitane (Kerry), Longford Central and Granard (both Longford) supplies, requiring the identification of all remaining lead mains and the submission of action programmes to ensure that all such lead mains are removed before 2013 (i.e. when the more stringent standard of 10 µg/l becomes effective).

While the replacement of lead mains in these areas will reduce lead concentrations that consumers are exposed to, this alone will not deal with the main cause of lead exceedances nationally. A large number of properties built prior to 1970 have internal lead plumbing or a lead service connection pipe to the WSA distribution main. While the lead communication pipe may be in the ownership of the WSA, replacement of this part of the pipe in the absence of the replacement of the property owners lead pipework may not reduce lead levels below safe levels. Thus, where the homeowner is willing to replace their lead pipework the WSA should replace their part of the lead communication pipe. However, the WSA must replace all lead communication pipes (as well as the internal plumbing) in local authority housing stock.

2.7 Emerging Issues in Drinking Water

There has been a rise in the number of VTEC *E.coli* O157 infections notified to the Health Protection Surveillance Centre (HPSC) in Ireland in 2012. There were 535 VTEC notifications up to 21/11/2012 compared with 251 for the same period last year and 194 for the same period in 2010. VTEC *E. coli* strains produce a powerful toxin and can cause severe illness. Between 5 and 8% of people who contract this illness develop the more serious haemolytic uraemic syndrome (HUS). Part of the increase in 2012 is explained by improved sensitivity of laboratory testing methods. Most cases have occurred in rural areas. Some private water supplies were found to be contaminated with the same VTEC strain that affected individuals and this was likely to be due to heavy rainfall during the summer of 2012.

Heavy rainfall also affected compliance levels in public water supplies. During the summer of 2012, the frequency of notified exceedances of the parametric limits in public water supplies increased. WSAs reported that these exceedances were due to heavy and intense rainfall. Improved source protection and robust treatment processes are required to cope with such weather events. WSAs should have an operational Drinking Water Incident Response Plans (DWIRP) in place, in accordance with the requirements of the Department of the Environment, Community and Local Government (DEHLG) Circular letter L4/09 issued in April 2009 to deal with suchadverse weather conditions.

The identification and management of small private supplies by WSAs needs to be improved to ensure the provision of safe and secure drinking water from these supplies. WSAs are also required to identify exempted supplies and provide advice to owners to protect human health in accordance with EPA advice note 12: *Exempted Drinking Water Supplies.*

Despite an overall improvement in THM compliance levels, THM reduction remains an important area for improvement. To further improve compliance, WSAs should examine the cause of trihalomethanes exceedances and should optimise plant operation and management of the distribution network to reduce the levels of THMs in supply. However, the efficiency of the disinfection system must never be compromised in an attempt to reduce THM levels. WSAs should have regard to the recently published EPA Advice note on disinfection by-products in drinking water.

As stated in section 2.6, approximately 4,000 m of lead distribution mains remain in five public water supplies. WSAs should remove all lead distribution mains as a priority and no later than 25th Dec 2013. WSAs should have regard to EPA Advice Note No. 2: *Action programmes to restore the quality of drinking water impacted by lead pipes and lead plumbing.*

3.

Findings and Recommendations

3. Findings and Recommendations

The main recommendations presented in this chapter are based on an assessment of monitoring results for 2011 and EPA enforcement of the Drinking Water Regulations in 2011. While some of the recommendations are similar to previous years they are still considered relevant and in need of implementation by WSAs. New recommendations have been added where issues have been identified and remedial actions are needed. Recommendations are aimed at all WSAs and should be adopted for all public water supplies, public group water schemes, private group water schemes, and private supplies, as applicable.

Findings – Water Supply in Ireland

1. The majority of the population of Ireland (80.0%) is supplied with drinking water from one of the 939 WSA operated public water supplies. The remainder of the population is served by public group water schemes (643 supplies serving 2.3%), private group water schemes (486 supplies serving 4.7%), small private supplies (1,429 supplies serving 0.7%) and exempted supplies (single house private wells serving 12.3%).

Findings – Public Water Supplies

1. 200 (59%) of the original 339 public water supplies placed on the EPA Remedial Action List (RAL) have completed the necessary action programmes and have been either replaced, upgraded or have improved operations. Three WSAs did not provide an estimation of the timeframe for the completion of remedial actions for 12 supplies, 10 of which were in Donegal.

2. There are now 191 supplies on the EPA Remedial Action List. The WSAs have indicated that remedial works in a further 99 supplies will be complete by the end of 2012.

3. There are 60 supplies identified as high risk where appropriate barriers to *Cryptosporidium* need to be installed. Remedial works are complete in 20 of these supplies (monitoring to verify the effectiveness of the treatment is being undertaken) and a further 14 are scheduled for completion before the end of 2012. Of the remaining 26 supplies, most have remedial works scheduled for completion in 2013.

4. *E. coli* was detected in 12 (1.3%) public water supplies during compliance monitoring in 2011 as compared to 20 (2.2%) supplies in 2010. The number has reduced from 87 in 2005, representing an 86% reduction in the past six years.

5. At the end of 2011, all public water supplies had a chlorine monitor and alarm in place. However, systems for out-of-hours response to chlorine alarms had not been implemented by all WSAs at the end of 2011.

6. Nitrate exceedances were reported in five public water supplies in 2011, down from eight in 2010. The population affected by nitrate exceedances decreased from 22,738 in 2010 to 3,293 in 2011.

7. Public water supply compliance with the chemical standards improved from 99.2% in 2010 to 99.5% in 2011.

8. The number of public water supplies failing to meet the trihalomethanes parametric value improved from 13.5% in 2010 to 10.9% in 2011.

9. Compliance with the indicator parameters aluminium (98.8%) and turbidity (95.5% at the water treatment plant) showed significant improvement in 2011.

10. 26 new boil water notices and five new water restrictions (serving approximately 40,000 persons) were put in place by 15 WSAs in 2011.

11. EPA audits in 2011 found a general improvement across the range of key areas examined. The number of supplies with inadequate source protection measures improved from 46 in 2010 to 33 in 2011.

12. The 2011 drinking water returns showed that 45 Water Safety Plans are in preparation and three are complete.

13. All WSAs were found to be publishing some or all of the microbiological, chemical and indicator monitoring data as required by the Ministerial Direction on the publication of drinking water results. However, many WSAs are not publishing this information within one month as required. Six WSAs (Galway City Council, Galway County Council, Kilkenny County Council, Limerick County Council, Meath County Council and North Tipperary County Council) were found to be in full compliance with all of the requirements and recommendations of the circular letter.

Findings – Public Group Water Schemes, Private Group Water Schemes and Small Private Supplies

1. The percentage of Small Private Supplies that were monitored for E. coli in 2011 was 74%, compared to 76% in 2010.

2. The microbiological quality of **public group water schemes** improved in 2011 with 0.7% of supplies contaminated with *E. coli,* down from 0.9% in 2010.

3. The level of non-compliance with the trihalomethanes parametric value in **public group water schemes** improved from 25.3% in 2010 to 12.4% in 2011. The incidence of failure to meet the trihalomethanes parametric value was higher than the parent public water supplies (10.9%) from which the water is taken, indicating that management of the networks needs to be improved.

4. There has been an improvement in microbiological quality of the **private group water schemes** in 2011. Nonetheless, 46 schemes (10.2%) were found to be contaminated with *E. coli* at least once during 2011, down from 56 (11.6%) in 2010. The quality of drinking water in private group water schemes remains inferior to that in public water supplies.

5. There has been a slight disimprovement in the microbiological quality of **small private supplies** in 2011. 82 supplies (7.7%) were found to be contaminated with *E. coli* at least once during 2011, up from 72 (7.4%) in 2010.

6. A total of 71 group water schemes completed the National Federation of Group Water Scheme's Quality Assurance course in 2011, bringing the total number that have completed the course at the end of 2011 to 374.

Recommendations - Public Water Supplies

1. WSAs should prioritise improvement works on supplies with a boil water or water restriction notice in place on all or part of the supply in order to have the required works completed as a matter of urgency. Following completion of the works, the WSA should liaise with the Health Service Executive in order to determine whether the completed works allow the removal of the boil water notice or restriction.

2. WSAs should ensure that all failures to meet the microbiological, chemical and indicator parametric values are investigated to ensure that the cause of the failure is identified and the appropriate corrective action is taken. Lessons learnt and corrective measures should be implemented in other supplies in the county.

3. WSAs should implement the World Health Organisation (WHO) Water Safety Plan approach to the management of water supplies. The EPA recommends that, in the first instance, Water Safety Plans should be prepared by the seven WSAs who provide drinking water to the largest populations in Ireland (Drinking Water Safety Plan Working Group members). WSAs should also commence the preparation of Water Safety Plans for selected small supplies.

4. WSAs should prioritise remedial works in supplies that are on the Remedial Action List of Public Water Supplies. The actions outlined to the EPA should be completed as soon as possible and within the timeframe specified to the EPA. WSAs responsible for one or more of the 12 supplies for which no timeframe has been submitted should prepare an action programme with associated timeframes and submit this plan to the EPA. Where the necessary works are complete, the WSA should collate and submit monitoring data without delay, so the EPA can verify the effectiveness of the remedial works to enable the supply to be removed from the RAL.

5. WSAs should review the management of chlorine monitors and alarms and ensure that such monitors are managed correctly (i.e. in the correct location and with an appropriate alarm setting) and that documented response protocols are in place for dealing with activations of the alarm. Where issues are outstanding in relation to the response to out of hours alarm remain these should be resolved without delay.

6. WSAs should carry out chlorine residual monitoring in the network at a frequency which allows WSA personnel to respond quickly to any deviation in chlorine levels in the network.

7. WSAs should ensure that all disinfection systems are operated in such a way that undisinfected water does not enter the distribution mains at any time. WSAs should have regard to EPA Advice Notes and the EPA Water Treatment Manual on Disinfection and should optimise the operation and management of the disinfection system to minimise disinfection byproduct formation.

8. WSAs should ensure that sources of drinking water supplies are adequately protected against potential sources of contamination. Potential sources of pollution should be identified and managed so as to reduce risk of contamination in line with the Water Safety Plan approach.

9. Where public water supplies are using surface water or water influenced by surface water as their source, WSAs should ensure that a *Cryptosporidium* treatment barrier is in place. If these barriers are not in place, WSAs should implement an appropriate improvement plan without delay which may involve upgrading, replacing or closing the plant. *Cryptosporidium* risk assessments should be carried out on all supplies to assist in the identification of high risk supplies and the actions that are necessary to reduce this risk.

10. WSAs should examine the cause of trihalomethanes exceedances and should optimise plant operation and management of the distribution network to reduce the levels of THMs in supply. The formation of THMs can be minimised by effective coagulation, sedimentation and filtration by removing organic precursors prior to final disinfection or by additional treatment to slow sand filters. However, the efficiency of the disinfection system must never be compromised in an attempt to reduce THM levels. WSAs should have regard to the recently published EPA Advice note on disinfection by-products in drinking water.

11. When conducting a lead survey, WSAs should have regard to the current lead parametric value of 25 µg/l (which will decrease to 10 µg/l from 25th December 2013) and to the EPA Advice Note No. 1: *Lead Compliance Monitoring and Surveys*.

12. WSAs should remove lead distribution mains as a priority in accordance with EPA Advice Note No. 2: *Action programmes to restore the quality of drinking water impacted by lead pipes and lead plumbing*. Such works should be completed no later than 25 December 2013 (i.e. when the more stringent parametric value of 10 µg/l becomes effective.

13. WSAs should review the type and format of information provided to the public and as a minimum should implement the requirements of Ministerial Direction WSP6/09.

14. WSAs should have in place operational Drinking Water Incident Response Plans (DWIRP) in accordance with the requirements of the Department of the Environment, Community and Local Government (DEHLG) Circular letter L4/09 issued in April 2009 (including for adverse weather conditions). An annual review and rehearsal of the DWIRP procedures should be carried out so that all personnel involved understand and are familiar with exactly what they have to do when an incident or emergency occurs.

15. Prolonged heavy rainfall events experienced during the summer of 2012 put pressure on many treatment processes in public water supplies. WSAs should ensure that treatment process are capable of operating adequately during such periods of extreme weather to produce water that meets the standards set in the Drinking Water Regulations.

16. All drinking water operators should undergo appropriate training in the provision of drinking water such as that delivered by the Water Services Training Group (www.wsntg.ie). As a minimum, each operator should be trained for each treatment process for which they are required to operate at the plant.

Recommendations - Public Group Water Schemes, Private Group Water Schemes and Small Private Supplies

1. WSAs should ensure that the level of *E. coli* monitoring in Small Private Supplies is improved as a matter of priority and that the monitoring frequencies are in line with those set out in the Regulations.

2. WSAs should ensure that all failures to meet the microbiological, chemical and indicator parametric values in private water supplies are investigated to ensure that the cause of the failure is identified and the appropriate corrective action is taken. WSAs should take the

appropriate enforcement action where there is evidence that such investigations and actions are not being undertaken.

3. WSAs should focus on the private group water schemes that are not being upgraded as part of a planned design build operate (DBO) bundle. Where a group water scheme has not prepared a corrective action programme in accordance with the requirements of Regulation 10 of the Regulations and where there is little evidence of action being taken to improve the quality of the water supply, the WSA should use enforcement powers under the 2007 Regulations to bring the supply into compliance.

4. WSAs should ensure that operators of public group water schemes clean and maintain the distribution networks regularly so that the quality of the water supplied by the WSA does not deteriorate in the group water schemes distribution network.

4.

Appendices

APPENDIX I - SUMMARY REPORTS FOR ALL WSAS.

CARLOW COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Carlow County Council is responsible for the operation of 14 Public Water Supplies (PWS) serving a population of 47,786.

Microbiological compliance levels in PWSs in Carlow decreased from 100% in 2010 to 99.0% in 2011. Chemical compliance levels marginally increased from 99.4% in 2010 to 99.5% in 2011.

	Micro	Chemical
2011	99.0	99.5

Microbiological Parametric Values:

A summary of the PWS with microbiological non-compliances during 2011 is as follows:

Parameter	2011 Name of PWS
E. coli	Tynock (1)
Enterococci	Tynock (1)
Total No.:	**2**

Carlow County Council suspected that both microbiological exceedances were due to tap contamination.

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Nitrate	Ballinkillen (3)
Trihalomethanes	Carlow Central Regional (1)
Fluoride	Tullow (1)
Total No.:	**5**

The nitrate non-compliances were attributed to agricultural practices in the vicinity of the source whilst the trihalomethanes non-compliance was primarily due to the chlorination of water with elevated levels of organic matter present. The fluoride non-compliances were due to elevated levels of fluoride above the Irish standard. However, all samples were below the EU fluoride standard of 1.5 mg/l.

Boil Water Notices & Water Restrictions

A summary of boil water notices (BWN) and water restriction (WR) notices issued to consumers by Carlow County Council or active during 2011 is as follows (full details in Appendix III):

Date Issued	Date Lifted/ Active	BWN/ WR[1]	Name of PWS	Reason
Oct-11	Oct-11	BWN	Tynock	*E. coli*

One new boil water notice was issued to consumers by Carlow County Council during 2011. No boil water notices or water restrictions remained active from previous years.

[1] In some instances the boil notice or water restriction only applies to part of the supply.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	2
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	0

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, no public water supplies were removed or added to the RAL. For full details on RAL supplies in Carlow, see www.epa.ie

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Oct-11	Leighlinbridge
Oct-11	Bagenalstown

CAVAN COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Cavan County Council is responsible for the operation of 17 Public Water Supplies (PWS) serving a population of 25,015.

Microbiological compliance in Cavan PWSs increased from 96.6% in 2010 to 100% in 2011. Chemical compliance levels have decreased from 99.0% in 2010 to 97.9% in 2011.

	Micro	Chemical
2011	100	97.9

Microbiological Parametric Values:

No non-compliances of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Trihalomethanes	Cavan RWSS (1) Killeshandra (1)
Fluoride	Bailieboro RWSS (2) Ballyjamesduff RWSS (3) Belturbet (1) Cavan RWSS (1) Kingscourt (1)
Bromate	Ballyhaise (1)
Total No.:	**11**

The trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present. The bromate exceedance was determined to be a disinfection byproduct linked to the type of treatment used at the plant. The fluoride non-compliances were due to elevated levels of fluoride above the Irish standard. However, all samples were below the EU fluoride standard of 1.5 mg/l.

Boil Water Notices & Water Restrictions

A summary of boil water notices (BWN) and water restriction (WR) notices issued to consumers by Cavan County Council or active during 2011 is as follows (full details in Appendix III):

Date Issued	Date Lifted/ Active	BWN/ WR[2]	Name of PWS	Reason
Jun-10	Jun-11	BWN	Ballieborough Mountain Line	*E. coli*
Jan-11	Mar-11	BWN	Arvagh PWS*	*E. coli*

*BWN/WR affected part of the supply zone

One new boil water notice was issued during 2011 and one remained in place from the previous year. At the end of 2011, no boil notices or water restrictions remained in place on Cavan County Council's PWS.

[2] In some instances the boil notice or water restriction only applies to part of the supply.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	5
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	2

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, two public water supplies (Arvagh and Bailieboro Mountain Line) in Cavan were removed from the RAL as remedial works had been completed to the satisfaction of the EPA and none were added. For full details on RAL supplies in Cavan, see www.epa.ie

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Oct-11	Bawnboy PWS

CLARE COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Clare County Council is responsible for the operation of 21 Public Water Supplies (PWS) serving a population of 79,913.

Microbiological compliance in Clare PWSs was 100% in both 2010 and 2011. Chemical compliance levels increased from 99.1% in 2010 to 100% in 2011.

	Micro	Chemical
2011	100	100

Microbiological Parametric Values:

No non-compliances of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

No non-compliances of the chemical parametric values occurred during 2011.

Boil Water Notices & Water Restrictions

A summary of boil water notices (BWN) and water restriction (WR) notices active or issued to consumers by Clare County Council during 2011 is as follows (full details in Appendix III):

Date Issued	Date Lifted/ Active	BWN / WR[3]	Name of PWS	Reason
Oct-08	Active	WR	Ennis*	Lead
Oct-10	Jun-11	BWN	Ballyvaughan	Odour
Oct-11	Nov-11	BWN	Whitegate	Cryptosporidium

*BWN/WR affected part of the supply zone

One water restriction notice and one boil notice remained active during 2011 from previous years. One new boil water notice was issued during 2011. At the end of 2011, no boil notices remained in place. One water restriction remained active at the end of 2011 for part of the Ennis PWS (approximately 80 people are affected).

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	1
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	2

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, two public water supplies (Ballyvaughan and Flagmount) were removed due to the completion of the necessary remedial works to the satisfaction of the EPA and none were added. For full details on RAL supplies in Clare, see www.epa.ie

Directions

The EPA issued 1 Direction to Clare County Council during 2011. Details are as follows:

Year	Name of PWS	Reason for Direction
2011	Ennis	No timeframe submitted for the removal of lead mains in the network

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Sep-11	Scarrif PWS
Sep-11	Ennis PWS
Dec-11	Turlough PWS

[3] In some instances the boil notice or water restriction only applies to part of the supply.

CORK CITY COUNCIL

Summary of Public Water Supply Quality in 2011

Cork City Council is responsible for the operation of 1 Public Water Supply (PWS) serving a population of 123,000.

Microbiological compliance levels in Cork City PWS increased from 99.6% in 2010 to 100% in 2011. Chemical compliance levels were 100% in both 2010 and 2011.

	Micro	Chemical
2011	100	100

Microbiological Parametric Values:

No non-compliances of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

No non-compliances of the chemical parametric values occurred during 2011.

Boil Water Notices & Water Restrictions

No boil water notices or water restriction notices were issued to consumers by Cork City Council during 2011 and none remained active during 2011 from previous years.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	1
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	0

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. Progress with the upgrade of Cork City's water supply has been slow and the supply is not likely to be upgraded until 2014. For full details on RAL supplies in Cork City, see www.epa.ie

Audits of Drinking Water Treatment Plants

The EPA did not carry out any audits of drinking water treatment plants during 2011.

CORK COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Cork County Council is responsible for the operation of 179 Public Water Supplies (PWS) serving a population of 307,075.

Microbiological compliance in Cork PWSs has increased from 99.6% in 2010 to 99.7% in 2011. Chemical compliance levels have decreased marginally from 99.3% in 2010 to 99.2% in 2011.

	Micro	Chemical
2011	99.7	99.2

Microbiological Parametric Values:

A summary of the PWS with microbiological non-compliances during 2011 is as follows:

Parameter	2011 Name of PWS
E. coli	Gortnaskehy (1) Kealkill (1) Kildorrery Old (1)
Total No.:	**3**

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Trihalomethanes	Castletownbere (1) Schull (1)
Fluoride	Midleton Urban (1)
Total No.:	**3**

The trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present whilst the fluoride non-compliances were due to elevated levels of fluoride above the Irish standard. However, all samples were below the EU fluoride standard of 1.5 mg/l.

Boil Water Notices & Water Restrictions

A summary of boil water notices (BWN) and water restriction (WR) notices issued to consumers or active during 2011 are detailed below (full details in Appendix III):

Date Issued	Date Lifted/ Active	BWN / WR[4]	Name of PWS	Reason
Mar-07	Feb-12	WR	Castletownkinnagh	Nitrate
Nov-08	Active	WR	Glashaboy*	Lead
Jul-10	Active	WR	Glashaboy*	Lead
May-10	Feb-11	BWN	Newcestown*	*E.coli*
Sep-10	Feb-11	BWN	Carrignadoura	*E.coli*
May-11	May-11	BWN	Castletownroche	*Cryptosporidium*
May-11	May-11	BWN	Clonakilty	Burst mains
Sep-11	Oct-11	BWN	Kildorrery*	*E.coli*
Oct-11	Feb-12	BWN	Gortnaskehy	Inadequate Disinfection
Nov-11	Dec-11	BWN	Banteer*	*E. coli*

*BWN/WR affected part of the supply zone

Five new boil water notices were issued during 2011 and two that remained in place from previous years were lifted. No new water restriction notices were issued but three remained in place (two in Glashaboy and Castletownkinnagh) from previous years.

[4] In some instances the boil notice or water restriction only applies to part of the supply.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	33
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	2

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, two public water supplies were removed from the RAL (Ballymakerra and Youghal Regional) and none were added. For full details on RAL supplies in Cork, see www.epa.ie

Directions

The EPA issued one Direction to Cork County Council during 2011. Details are as follows:

Year	Name of PWS	Reason for Direction
2011	Mallow	No timeframe submitted for the removal of lead mains in the network

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Oct-11	Mount North PWS
Nov-11	Cloyne PWS

DONEGAL COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Donegal County Council is responsible for the operation of 34 Public Water Supplies (PWS) serving a population of 136,579.

Microbiological compliance levels in Donegal PWSs decreased from 99.8% in 2010 to 99.5% in 2011. Chemical compliance levels were 99.4% in both 2010 and 2011.

	Micro	Chemical
2011	99.5	99.4

Microbiological Parametric Values:

A summary of the PWS with microbiological non-compliances during 2011 is as follows:

Parameter	2011 Name of PWS
E. coli	Inishowen East (1) Ballintra (1)
Enterococci	Ballintra (1)
Total No.:	**3**

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Trihalomethanes	Ballyshannon (2) Cashilard (1) Fintown (1) Greencastle (1) Letterkenny (1) Portnoo-Narin (1) Rathmullen (2) Burnfoot (1) Creeslough (1) Owenteskna (3)
Copper	Fintown (1)
Total No.:	**15**

The copper non-compliance was due to the consumer's internal plumbing while the trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present.

Boil Water Notices & Water Restrictions

A summary of boil water notices (BWN) and water restriction (WR) notices active or issued to consumers by Donegal County Council during 2011 is as follows (full details in Appendix III):

Date Issued	Date Lifted/ Active	BWN/ WR[5]	Name of PWS	Reason
May-11	May-11	BWN	Ballintra	*E. coli*

One new boil water notice was issued during 2011. No boil water notices or water restrictions remained active from previous years. At the end of 2011, no boil notices or water restrictions remained in place on Donegal County Council's PWS.

[5] In some instances the boil notice or water restriction only applies to part of the supply.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	13
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	3

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, three public water supplies were removed from the RAL (Ballintra, Killybegs and Rosses Regional) due to the completion of the necessary remedial works to the satisfaction of the EPA and none were added. For full details on RAL supplies in Donegal, see www.epa.ie

Directions

The EPA issued eight Directions to Donegal County Council during 2011. Details are as follows:

Year	Name of PWS	Reason for Direction
2011	Letterkenny	Trihalomethanes exceedances and inadequate action plan submitted
2011	Fintown	Trihalomethanes exceedances and inadequate action plan submitted
2011	Cashilard	Trihalomethanes exceedances and inadequate action plan submitted
2011	Ballyshannon	Trihalomethanes exceedances and inadequate action plan submitted
2011	Gortahork/ Falcarragh	Trihalomethanes exceedances and inadequate action plan submitted
2011	Rathmullen	Trihalomethanes exceedances and inadequate action plan submitted
2011	Greencastle	Trihalomethanes exceedances and inadequate action plan submitted
2011	Portnoo Narin	Trihalomethanes exceedances and inadequate action plan submitted

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Feb-11	Gortahork/Falcarragh
Feb-11	Rathmullen
Oct-11	Rathmullen
Oct-11	Donegal (River Eske)
Oct-11	Carndonagh
Oct-11	Culdaff

DUBLIN CITY COUNCIL

Summary of Public Water Supply Quality in 2011

Dublin City Council is responsible for the operation of 6 Public Water Supplies (PWS) serving a population of 476,500.

Microbiological compliance in Dublin City PWSs was 100% in both 2010 and 2011. Chemical compliance levels decreased from 99.7% in 2010 to 99.5% in 2011.

	Micro	Chemical
2011	100	99.5

Microbiological Parametric Values:

No non-compliances of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Lead	Ballymore Eustace (1) Ballyboden (3) Vartry-Ballymore Eustace (1)
Total No.:	**5**

The lead non-compliances were attributed to the presence of lead communication pipes in the distribution network.

Boil Water Notices & Water Restrictions

No boil water notices or water restriction notices were issued to consumers during 2011 and none remained active from previous years.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	3
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	0

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, no public water supplies in Dublin City were removed or added to the RAL. For full details on RAL supplies in Dublin City, see www.epa.ie

Audits of Drinking Water Treatment Plants

The EPA did not carry out any audits of drinking water treatment plants during 2011.

DUN LAOGHAIRE RATHDOWN COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Dun Laoghaire Rathdown County Council is responsible for the operation of 8 Public Water Supplies (PWS) serving a population of 220,670.

Microbiological compliance in Dun Laoghaire Rathdown PWSs was 100% in both 2010 and 2011. Chemical compliance levels have improved from 99.9% in 2010 to 100% in 2011.

	Micro	Chemical
2011	100	100

Microbiological Parametric Values:

No non-compliances of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

No non-compliances of the chemical parametric values occurred during 2011.

Boil Water Notices & Water Restrictions

No boil water notices or water restriction notices were issued to consumers during 2011 and none remained active from previous years.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	3
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	0

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, no public water supplies in Dun Laoghaire Rathdown were removed or added to the RAL. For full details on RAL supplies in Dun Laoghaire Rathdown, see www.epa.ie

Audits of Drinking Water Treatment Plants

The EPA did not carry out any audits of drinking water treatment plants during 2011.

FINGAL COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Fingal County Council is responsible for the operation of 2 Public Water Supplies (PWS) serving a population of 259,100.

Microbiological compliance in Fingal PWSs has decreased from 100% in 2010 to 99.7% in 2011. Chemical compliance levels increased from 99.8% in 2010 to 100% in 2011.

	Micro	Chemical
2011	99.7	100

Microbiological Parametric Values:

A summary of the PWS with microbiological non-compliances during 2011 is as follows:

Parameter	2011 Name of PWS
E. coli	Leixlip (1)
Total No.:	**1**

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Pesticides (Isoproturon)	Leixlip (1)
Total No.:	**1**

The pesticides exceedance was due to elevated levels of pesticides (Isoproturon) in the source water. All follow up samples were clear.

Boil Water Notices & Water Restrictions

A summary of boil water notices (BWN) and water restriction (WR) notices active or issued to Fingal County Council consumers during 2011 are detailed below (full details in Appendix III):

Date Issued	Date Lifted/ Active	BWN/ WR[6]	Name of PWS	Reason
Oct-11	Active	WR	Leixlip PWS*	Copper & Nickel

*BWN/WR affected part of the supply zone

One new water restriction notice was issued during 2011. No boil water notices or water restrictions remained active from previous years. At the end of 2011 one water restriction remained in place.

EPA Enforcement in 2011

Remedial Action List

There are no supplies in Fingal on the Remedial Action List.

Audits of Drinking Water Treatment Plants

The following drinking water treatment plant was audited by the EPA during 2011:

Date Audited	PWS Audited
Oct-11	Bog of the Ring

[6] In some instances the boil notice or water restriction only applies to part of the supply.

GALWAY CITY COUNCIL

Summary of Public Water Supply Quality in 2011

Galway City Council is responsible for the operation of 1 Public Water Supply (PWS) serving a population of 75,606.

Microbiological compliance levels in the Galway City PWS increased from 99.7% in 2010 to 100% in 2011. Chemical compliance levels increased from 99.9% in 2010 to 100% in 2011.

	Micro	Chemical
2011	100	100

Microbiological Parametric Values:

No non-compliances of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

No non-compliances of the chemical parametric values occurred during 2011.

Boil Water Notices & Water Restrictions

No boil water notices or water restriction notices were issued to consumers by Galway City Council during 2011 and none remained active during 2011 from previous years.

EPA Enforcement in 2011

Remedial Action List

There are no supplies in Galway City on the Remedial Action List.

Audits of Drinking Water Treatment Plants

The EPA did not carry out any audits of drinking water treatment plants during 2011.

Galway City Council was the first WSA in Ireland to fully implement the Water Safety Plan approach to manage the Galway City public water supply.

GALWAY COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Galway County Council is responsible for the operation of 35 Public Water Supplies (PWS) serving a population of 132,270.

Microbiological compliance in Galway County PWSs was 100% in both 2010 and 2011. Chemical compliance levels increased from 99.0% in 2010 to 99.6% in 2011.

	Micro	Chemical
2011	100	99.6

Microbiological Parametric Values:

No non-compliances of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Trihalomethanes	Carraroe (1) Clifden (1) Inishere (1) Kinvara (1) Rosmuc (1) Tully-Tullycross (1) Ballinasloe (1) Killimor (1)
Total No.:	**8**

The trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present.

Boil Water Notices & Water Restrictions

A summary of boil water notices (BWN) and water restriction (WR) notices issued to consumers or active during 2011 are detailed below (full details in Appendix III):

Date Issued	Date Lifted/ Active	BWN/ WR[7]	Name of PWS	Reason
Oct-08	May-12	BWN	Letterfrack	*Cryptosporidium*
Oct-08	Mar-12	BWN	Rosmuc	*Cryptosporidium*
Nov-09	Aug-11	BWN	Mid-Galway	*E.coli*
Aug-10	May-12	BWN	Tully-Tullycross	*E. coli*
Dec-10	Apr-11	BWN	Gort	Plant failure
Jan-11	Jan-11	BWN	Ballinasloe*	Burst Mains
Mar-11	May-11	WR	Carraroe	Source Contamination
Sep-11	Nov-11	WR	Inishere	Chloride

*BWN/WR affected part of the supply zone

One new boil water notice was issued during 2011. Five remained in place from previous years. Two new water restriction notices were issued during 2011 while none remained in place from previous years.

At the end of 2011, three boil water notices remained active on the Letterfrack, Rosmuc and Tully-Tullycross PWSs.

[7] In some instances the boil notice or water restriction only applies to part of the supply.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	32
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	0

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, no public water supplies were removed or added to the RAL in Galway. For full details on RAL supplies in Galway, see www.epa.ie

Directions

The EPA issued two Directions to Galway County Council during 2011. Details are as follows:

Year	Name of PWS	Reason for Direction
2011	Carraroe	Hydrocarbon spillage
2011	Kilkerrin, Moylough	No *Cryptosporidium* barrier in place and no action plan submitted

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Mar-11	Carraroe PWS
Apr-11	Gort
Sep-11	Dunemore/Glenamaddy
Sep-11	Mountbellew P.S.
Sep-11	Kilkerrin/Moylough
Sep-11	Kinvara

KERRY COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Kerry County Council is responsible for the operation of 74 Public Water Supplies (PWS) serving a population of 113,735.

Microbiological compliance levels in Kerry PWSs increased from 99.7% in 2010 to 99.9% in 2011. Chemical compliance levels have marginally decreased from 97.0% in 2010 to 96.9% in 2011.

	Micro	Chemical
2011	99.9	96.9

Microbiological Parametric Values:

A summary of the PWS with microbiological non-compliances during 2011 is as follows:

Parameter	2011 Name of PWS
E. coli	Caragh Lake (1)
Total No.:	**1**

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Trihalomethanes	An Daingean (2) An Ghleann (2) Aughacasla (2) Baile an Sceilg (1) Cahersiveen (1) Caragh Lake (1) Castlegregory (2) Central Regional : Ballintobeenig (4) Ballymacadam (3) Killsarkin (3) Knocknageeha Gneeveguilla (3) Lisloose (7) Lissardboola (7) Sheheree (3) Lough Guitane (1) Scart (5) Kenmare (1) Kilgarvan (1) Lauragh (2) Lios Cearnaigh (2) Shrone (3) Templenoe (2) Waterville (2)
Fluoride	An Daingean (4) Mid Kerry (3)
Tetrachloroethene & Trichloroethene	An Mhin Aird No. 3(1)
Nitrites (at WTP)	Sneem (1)
Pesticides (MCPA)	Dromin : Listowel/Moyvane (1) Dromin: Ballybunnion (1) Dromin: Ballyduff (1) Dromin: Ballylongford (1) Dromin: Tarmons (1) Galey (1) Lyreacrompane (1) Dromin: Ballyduff (1)
Total No.:	**78**

The trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present while the nitrites (at WTP) and tetrachloroethene & trichloroethene non-compliances were once off occurrences and follow up samples were clear. The fluoride non-compliances were due to elevated levels of fluoride above the Irish standard. However, all samples were below the EU fluoride standard of 1.5 mg/l. The pesticides exceedances were due to elevated levels of pesticides (MCPA) in the source water.

Boil Water Notices & Water Restrictions

A summary of boil water notices (BWN) and water restriction (WR) notices issued to consumers or active during 2011 are detailed below (full details in Appendix III):

Date Issued	Date Lifted/ Active	BWN / WR[8]	Name of PWS	Reason
Feb-09	Sep-11	BWN	Mid Kerry, Gearha*	Crypto
Jun-09	Active	BWN	Glenbeigh*	Inadequate Disinfection
Jul-09	Active	WR	Kenmare*	Inadequate Disinfection
Jul-09	Active	WR	Mountain Stage*	Inadequate Disinfection
Aug-09	Active	WR	Kilgarvan *	Inadequate Disinfection
Aug-09	Active	WR	An Mhuiríoch/ Baile Breach*	Inadequate Disinfection
Aug-09	Active	WR	An Baile Mór*	Inadequate Disinfection
Aug-09	Jun-12	WR	An Mhín Aird No 2*	Inadequate Disinfection
Aug-09	Active	WR	An Fheothanach*	Inadequate Disinfection
Aug-09	Aug-12	WR	Baile an Lochaigh	Inadequate Disinfection
Aug-09	Active	WR	Central Regional: Lough Guitane(H)*	Inadequate Disinfection
May-10	Active	BWN	An Cheapaigh Thiar*	Inadequate Disinfection
Jul-10	Active	WR	Annascaul*	Inadequate Disinfection
Jul-10	Active	WR	An Clochán*	Inadequate Disinfection
Jul-10	Active	WR	Cé Bhréannain*	Inadequate Disinfection

*BWN/WR affected part of the supply zone and in most cases only the first few houses

Three boil water notices and twelve water restriction notices remained active during 2011 from previous years. At the end of 2011, two boil water notices and all twelve water restriction notices remained active. No new boil water notices or water restriction notices were issued to consumers during 2011.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	54
No. of PWS added to RAL in 2011:	1
No. of PWS removed from RAL in 2011:	0

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, no public water supplies were removed and one supply was added (Emlaghpeasta). For full details on RAL supplies in Kerry, see www.epa.ie

Directions

The EPA issued five Directions to Kerry County Council during 2011. Details are as follows:

[8] In some instances the boil notice or water restriction only applies to part of the supply.

Year	Name of PWS	Reason for Direction
2011	Glenderry	No Chlorine Monitor or Alarm
2011	Brandon	Inadequate disinfection contact time and inadequate action plan submitted
2011	Annascaul	Inadequate disinfection contact time and inadequate action plan submitted
2011	Lough Guitane, Killarney	Inadequate disinfection contact time and inadequate action plan submitted
2011	Lisardboola	No timeframe submitted for the removal of lead mains in the network

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Sep-11	Dromin Scartleigh
Sep-11	An Dangean
Oct-11	Central Regional: Lough Guitane
Oct-11	Ardfert South PWSS 004F

KILDARE COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Kildare County Council is responsible for the operation of 11 Public Water Supplies (PWS) serving a population of 163,758.

Microbiological compliance levels in Kildare PWSs were 100% in both 2010 and 2011. Chemical compliance levels have increased from 99.8% in 2010 to 100% in 2011.

	Micro	Chemical
2011	100	100

Microbiological Parametric Values:

No non-compliance of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

No non-compliances of the chemical parametric values occurred during 2011.

Boil Water Notices & Water Restrictions

No boil water notices or water restriction notices were issued to consumers and none remained active from previous years.

EPA Enforcement in 2011

Remedial Action List

There are no supplies in Kildare on the Remedial Action List.

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Sep-11	Athy Town Council
Sep-11	Monasterevin

KILKENNY COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Kilkenny County Council is responsible for the operation of 19 Public Water Supplies (PWS) serving a population of 61,507.

Microbiological compliance in Kilkenny PWSs has decreased from 100% in 2010 to 99.7% in 2011. Chemical compliance levels increased from 99.4% in 2010 to 99.7% in 2011.

	Micro	Chemical
2011	99.7	99.7

Microbiological Parametric Values:

A summary of the PWS with microbiological non-compliances during 2011 is as follows:

Parameter	2011 Name of PWS
E. coli	Kilmaganny (1)
Total No.:	**1**

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Lead	Castlecomer (Old) (1)
Trihalomethanes	Kilkenny City (Radestown) (2)
Fluoride	South Kilkenny Environs (1)
Nitrate	Ballyragget (1)
Arsenic	Inistioge (1)
Total No.:	**6**

The trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present. The fluoride non-compliance was due to elevated levels of fluoride above the Irish standard. However, all samples were below the EU fluoride standard of 1.5 mg/l. The nitrate non-compliance was attributed to agricultural activity in the vicinity of the source. The arsenic non-compliance was due to elevated levels of arsenic in the source water. However, the borehole from which the sample was taken is no longer in use. The lead non-compliance was due to the presence of lead communication pipes in the supply.

Boil Water Notices & Water Restrictions

A summary of boil water notices (BWN) and water restriction (WR) notices issued to consumers by Kilkenny County Council or active during 2011 is as follows (full details in Appendix III):

Date Issued	Date Lifted/ Active	BWN/ WR[9]	Name of PWS	Reason
Mar-11	Apr-11	BWN	Gowran-Goresbridge-Paulstown	Inadequate Disinfection

One new boil water notice was issued to consumers by Kilkenny County Council during 2011. No boil water notices or water restrictions remained active from previous years.

[9] In some instances the boil notice or water restriction only applies to part of the supply.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	5
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	3

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. Three public water supplies (Castlecomer (old), Clogh-Castlecomer and Mooncoin Regional) were removed from the RAL due to the completion of the necessary remedial works to the satisfaction of the EPA and none were added. For full details on RAL supplies in Kilkenny, see www.epa.ie

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Apr-11	Gowran-Goresbridge-Paulstown
Sep-11	Ballyragget
Sep-11	Bennetsbridge
Sep-11	Thomastown
Oct-11	Gowran-Goresbridge-Paulstown
Nov-11	Graiguenamagh

LAOIS COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Laois County Council is responsible for the operation of 32 Public Water Supplies (PWS) serving a population of 63,308.

Microbiological compliance levels in PWSs in Laois marginally decreased from 99.7% in 2010 to 99.6% in 2011. Chemical compliance levels were 99.8% in both 2010 and 2011.

	Micro	Chemical
2011	99.6	99.8

Microbiological Parametric Values:

A summary of the PWS with microbiological non-compliances during 2011 is as follows:

Parameter	2011 Name of PWS
E. coli	The Strand (1)
Total No.:	**1**

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Fluoride	Emo (2) Portlaoise (1)
Mercury	Mountmellick (1)
Total No.:	**4**

The fluoride non-compliances were due to elevated levels of fluoride above the Irish standard. However, all samples were below the EU fluoride standard of 1.5 mg/l. The mercury non-compliance was due to elevated levels of mercury in the source water, however all previous and subsequent samples were compliant.

Boil Water Notices & Water Restrictions

A summary of boil water notices (BWN) and water restriction(WR) notices issued to consumers by Kilkenny County Council or active during 2011 is as follows (full details in Appendix III):

Date Issued	Date Lifted/ Active	BWN/ WR[10]	Name of PWS	Reason
Jan-07		BWN	The Strand	*E. coli*

No new boil water notices were issued to consumers in 2011 and one remained active from 2007. No new water restriction notices were issued in 2011. At the end of 2011, one boil water notice remained in place.

[10] In some instances the boil notice or water restriction only applies to part of the supply.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	1
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	0

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, no supplies in Laois were added or removed from the RAL. For full details on RAL supplies in Laois, see www.epa.ie

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Sep-11	Durrow 1
Sep-11	Mountmellick 1
Sep-11	Mountrath
Sep-11	Portlaoise
Sep-11	Timahoe

LEITRIM COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Leitrim County Council is responsible for the operation of 12 Public Water Supplies (PWS) serving a population of 19,057.

Microbiological compliance levels in Leitrim PWSs were 100% in both 2010 and 2011. Chemical compliance levels decreased from 100% in 2010 to 99.2% in 2011.

	Micro	Chemical
2011	100	99.2

Microbiological Parametric Values:

No non-compliance of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Lead	Manorhamilton (1)
Trihalomethanes	South Leitrim Regional (2)
Total No.:	**3**

The trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present. The lead non-compliance was most likely due to the consumer's internal plumbing.

Boil Water Notices & Water Restrictions

No boil water notices or water restrictions notices were issued to consumers during 2011 and none remained active from previous years.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	1
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	1

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, one public water supply (Fivemilebourne) was removed from the RAL due to the completion of the necessary remedial works to the satisfaction of the EPA and none were added. For full details on RAL supplies in Leitrim, see www.epa.ie

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Oct-11	Kinlough/Tullaghan

LIMERICK CITY COUNCIL

Summary of Public Water Supply Quality in 2011

Limerick City Council is responsible for the operation of 1 Public Water Supply (PWS) serving a population of 55,000.

Microbiological compliance levels in the Limerick City PWS were 100% in both 2010 and 2011. Chemical compliance levels increased from 99.8% in 2010 to 100% in 2011.

	Micro	Chemical
2011	100	100

Microbiological Parametric Values:

No non-compliance of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

No non-compliances of the chemical parametric values occurred during 2011.

Boil Water Notices & Water Restrictions

No boil water or water restrictions notices were issued to consumers during 2011 and none remained active from previous years.

EPA Enforcement in 2011

Remedial Action List

There are no supplies in Limerick City on the Remedial Action List.

Audits of Drinking Water Treatment Plants

The following drinking water treatment plant was audited by the EPA during 2011:

Date Audited	PWS Audited
Oct-11	Limerick City PWS

LIMERICK COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Limerick County Council is responsible for the operation of 48 Public Water Supplies (PWS) serving a population of 69,138.

Microbiological compliance has decreased in PWSs in Limerick from 100% in 2010 to 99.8% in 2011. Chemical compliance levels in Limerick PWSs were 100% in both 2010 and 2011.

	Micro	Chemical
2011	99.8	100

Microbiological Parametric Values:

A summary of the PWS with microbiological non-compliances during 2011 is as follows:

Parameter	2011 Name of PWS
Enterococci	Limerick City Environs (1)
Total No.:	**1**

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2010 is as follows:

Parameter	2011 Name of PWS
Lead	Martinstown (1)
Total No.:	**1**

The lead non-compliance was a once off occurrence and all repeat samples were clear.

Boil Water Notices & Water Restrictions

A summary of boil water notices (BWN) and water restriction (WR) notices issued to consumers or active during 2011 are detailed below (full details in Appendix III):

Date Issued	Date Lifted/ Active	BWN/ WR[11]	Name of PWS	Reason
Jun-10	Sep-12	BWN	Faleen*	Precautionary
Nov-10	Dec-11	BWN	Pallaskenry/ Kildimo*	*Inadequate Disinfection*
Dec-10	Jan-11	BWN	Abbeyfeale	*Aluminium*
Dec-10	Jan-11	BWN	Kilmallock	*E. coli*
Dec-10	Jan-11	BWN	Newcastle West	*Turbidity*

*BWN/WR affected part of the supply zone

No new boil water notices were issued during 2011 and five remained in place from previous years. No new water restriction notices were issued in 2011 and none remained in place from previous years. At the end of 2011, one boil water notice remained in place.

[11] In some instances the boil notice or water restriction only applies to part of the supply.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	4
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	2

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, two public water supplies (Caherconlish and Kilmallock) were removed as the necessary remedial works were completed to the satisfaction of the EPA and none were added. For full details on RAL supplies in Limerick, see www.epa.ie

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Sep-11	Ardpatrick
Sep-11	Knocklong
Oct-11	Bruree
Oct-11	Castletown/ballyagran
Oct-11	Croom
Oct-11	Fedamore
Oct-11	Pallasgreen
Nov-11	Caherconlish
Nov-11	Murroe

LONGFORD COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Longford County Council is responsible for the operation of 7 Public Water Supplies (PWS) serving a population of 15,393.

Microbiological compliance levels in PWSs in Longford increased from 98.7% in 2010 to100% in 2011. Chemical compliance levels decreased from 98.9% in 2010 to 96.8% in 2011.

	Micro	Chemical
2011	100	96.8

Microbiological Parametric Values:

No non-compliance of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Fluoride	Gowna (1)
Trihalomethanes	Ballymahon (1) Longford Central (2)
Pesticides (MCPA)	Longford Central (1)
Total No.:	**5**

The trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present. The fluoride non-compliance was due to elevated levels of fluoride above the Irish standard. However, all samples were below the EU fluoride standard of 1.5 mg/l. The pesticide exceedance was due to elevated levels of pesticides (MCPA) in the source water.

Boil Water Notices & Water Restrictions

A summary of boil water notices (BWN) and water restriction (WR) notices issued to consumers or active during 2011 are detailed below (full details in Appendix III):

Date Issued	Date Lifted/ Active	BWN/ WR[12]	Name of PWS	Reason
Sep-11	Active	BWR	Newtowncashel*	Inadequate Disinfection

*BWN/WR affected part of the supply zone

One new boil water notice was issued during 2011 and none remain in place from previous years. No new water restriction notices were issued and none remain in place from previous years. At the end of 2011, one boil water notice remained in place on Longford County Council's PWSs.

[12] In some instances the boil notice or water restriction only applies to part of the supply.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	3
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	0

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, no public water supplies in Longford were removed or added to the RAL. For full details on RAL supplies in Longford, see www.epa.ie

Directions

The EPA issued two Directions to Longford County Council during 2011. Details are as follows:

Year	Name of PWS	Reason for Direction
2011	Granard	No timeframe submitted for the removal of lead mains in the network
2011	Longford Central	No timeframe submitted for the removal of lead mains in the network

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Oct-11	Longford Central

LOUTH COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Louth County Council is responsible for the operation of 16 Public Water Supplies (PWS) serving a population of 99,825.

Microbiological compliance levels in PWSs in Louth increased from 99.3% in 2010 to 100% in 2011. Chemical compliance levels decreased from 99.1% in 2010 to 98.9% in 2011.

	Micro	Chemical
2011	100	98.9

Microbiological Parametric Values:

No non-compliance of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Trihalomethanes	Cavanhill (2) Staleen (1)
Fluoride	Cavanhill (2) Greenmount (1)
Antimony	Clogherhead (1) Staleen (1)
Copper	Staleen (1)
Nickel	Greenmount (1)
Pesticides (MCPA & IMecoprop)	Greenmount (2) Tallanstown (1)
Total No.:	**13**

The trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present. The fluoride non-compliances were due to elevated levels of fluoride above the Irish standard. However, all samples were below the EU fluoride standard of 1.5 mg/l. The antimony non-compliances were due to elevated levels of antimony in the source water and the nickel non-compliance was a once off occurrence and all follow up samples were clear. The pesticides exceedances were due to elevated levels of pesticides (MCPA and Mecoprop)) in the source water. The Copper exceedance was most likely due to the consumer's internal plumbing.

Boil Water Notices & Water Restrictions

No boil water or water restrictions notices were issued to consumers during 2011 and none remained active from previous years.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	3
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	0

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, no public water supplies in Louth were removed or added to the RAL. For full details on RAL supplies in Louth, see www.epa.ie

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Sep-11	Cooley
Sep-11	Carlingford
Oct-11	Collon
Oct-11	Drybridge

MAYO COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Mayo County Council is responsible for the operation of 24 Public Water Supplies (PWS) serving a population of 78,509.

Microbiological compliance levels in PWSs in Mayo were 100% in both 2010 and 2011. Chemical compliance levels have increased from 98.9% in 2010 to 99.3% in 2011.

	Micro	Chemical
2011	100	99.3

Microbiological Parametric Values:

No non-compliance of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Trihalomethanes	Cong (1) Foxford (1) Lough Mask (2)
Flouride	Ballina (1) Lough Mask (1)
Total No.:	**6**

The trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present. The fluoride non-compliances were due to elevated levels of fluoride above the Irish standard. However, all samples were below the EU fluoride standard of 1.5 mg/l.

Boil Water Notices & Water Restrictions

A summary of boil water notices (BWN) and water restriction (WR) notices issued to consumers or active during 2011 are detailed below (full details in Appendix III):

Date Issued	Date Lifted/ Active	BWN/ WR[13]	Name of PWS	Reason
Sep-11	Oct-11	BWN	Charlestown	*E. coli*

*BWN/WR affected part of the supply zone

One new boil water notice was issued during 2011 and none remain in place from previous years. No new water restriction notices were issued and none remain in place from previous years. At the end of 2011, no boil water notices remained in place on Mayo County Council's PWSs.

[13] In some instances the boil notice or water restriction only applies to part of the supply.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	8
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	4

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, four public water supplies (Achill Regional, Clare Island, Mulranny and Swinford) were removed from the RAL and none were added. For full details on RAL supplies in Mayo, see www.epa.ie

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Jan-11	Clare Island WSS
Apr-11	Inisturk
Oct-11	Lough Mask RWSS
Dec-11	Charlestown

MEATH COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Meath County Council is responsible for the operation of 36 Public Water Supplies (PWS) serving a population of 140,674.

Microbiological compliance levels in PWSs in Meath were 100% in both 2010 and 2011. Chemical compliance levels improved from 99.7% in 2010 to 100% in 2011.

	Micro	Chemical
2011	100	100

Microbiological Parametric Values:

No non-compliance of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

No non-compliances of the chemical parametric values occurred during 2011.

Boil Water Notices & Water Restrictions

No boil water or water restrictions notices were issued to consumers during 2011 and none remained active from previous years.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	5
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	2

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, two public water supplies (Batterstown and Slane) were removed from the RAL due to the completion of the necessary remedial works and none were added. For full details on RAL supplies in Meath, see www.epa.ie

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Jun-11	Slane
Sep-11	Kilmainamwood
Oct-11	East Meath
Nov-11	Enfield
Nov-11	Kilmessan

MONAGHAN COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Monaghan County Council is responsible for the operation of 10 Public Water Supplies (PWS) serving a population of 34,232.

Microbiological compliance levels in PWSs in Monaghan were 100% in both 2010 and 2011. Chemical compliance levels have increased from 98.9% in 2010 to 100% in 2011.

	Micro	Chemical
2011	100	100

Microbiological Parametric Values:

No non-compliance of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

No non-compliances of the chemical parametric values occurred during 2011.

Boil Water Notices & Water Restrictions

No boil water notices or water restrictions notices were issued to consumers during 2011 and none remained active during 2010 from previous years.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	3
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	0

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, no supplies were removed from the RAL and none were added. For full details on RAL supplies in Monaghan, see www.epa.ie

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Sep-11	Carrickmacross
Sep-11	Clones
Sep-11	Monaghan

NORTH TIPPERARY COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

North Tipperary County Council is responsible for the operation of 28 Public Water Supplies (PWS) serving a population of 43,067.

Microbiological compliance levels in PWSs in North Tipperary were 100% in both 2010 and 2011. Chemical compliance levels increased from 99.9% in 2010 to 100% in 2011.

	Micro	Chemical
2011	100	100

Microbiological Parametric Values:

No non-compliance of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

No non-compliances of the chemical parametric values occurred during 2011.

Boil Water Notices & Water Restrictions

A summary of boil water notices (BWN) and water restriction (WR) notices issued to consumers or active during 2011 are detailed below (full details in Appendix III):

Date Issued	Date Lifted/ Active	BWN/ WR[14]	Name of PWS	Reason
Oct-08	Sep-11	WR	Thurles (Zone 1)*	Lead

*WR affected part of the Thurles supply zone (30 people affected)

No new boil water notices or water restrictions were issued during 2011 and none remain in place from previous years. At the end of 2011, no boil notices or water restriction notices remained in place on PWSs in North Tipperary.

[14] In some instances the boil notice or water restriction only applies to part of the supply.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	3
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	0

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, no supplies were removed from the RAL and none were added. For full details on RAL supplies in North Tipperary, see www.epa.ie

Audits of Drinking Water Treatment Plants

The following drinking water treatment plant was audited by the EPA during 2011:

Date Audited	PWS Audited
Oct-11	Thurles (Zone 1)

OFFALY COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Offaly County Council is responsible for the operation of 23 Public Water Supplies (PWS) serving a population of 44,267.

Microbiological compliance levels in PWSs in Offaly increased from 98.8% in 2010 to 100% in 2011. Chemical compliance levels decreased from 100% in 2010 to 99.3% in 2011.

	Micro	Chemical
2011	100	99.3

Microbiological Parametric Values:

No non-compliance of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Trihalomethanes	Clara/Ferbane RWSS (1)
Flouride	Dungar (1) Kilcormac (1) Rahan - Agall/Hollimshill (1) Tullamore (1)
Pesticides (Mecoprop)	Clara/Ferbane RWSS (1)
Total No.:	**6**

The trihalomethanes non-compliance was primarily due to the chlorination of water with elevated levels of organic matter present. The fluoride non-compliances were due to elevated levels of fluoride above the Irish standard. However, all samples were below the EU fluoride standard of 1.5 mg/l. The pesticide exceedance was due to elevated levels of pesticides (Mecoprop) in the source water.

Boil Water Notices & Water Restrictions

No boil water notices or water restriction notices were issued to consumers during 2011 and none remained active from previous years.

EPA Enforcement in 2011

Remedial Action List

There are no supplies in Offaly on the Remedial Action List.

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Sep-11	Banagher RWSS
Sep-11	Moneygall
Sep-11	Rahan Tully
Sep-11	Rhode RWSS
Sep-11	Shinrone/Brosna
Sep-11	Tullamore
Sep-11	Walsh Island

ROSCOMMON COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Roscommon County Council is responsible for the operation of 21 Public Water Supplies (PWS) serving a population of 48,807.

Microbiological compliance levels in PWSs in Roscommon increased from 99.6% in 2010 to 99.7% in 2011. Chemical compliance levels decreased from 99.3% in 2010 to 99.2% in 2011.

	Micro	Chemical
2011	99.7	99.2

Microbiological Parametric Values:

A summary of the PWS with microbiological non-compliances during 2011 is as follows:

Parameter	2011 Name of PWS
E.coli	Lecarrow (1)
Total No.:	**1**

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Trihalomethanes	NERWSS - Strokestown/Elphin (2) NERWSS – Tarmonbarry (1) Roscommon Central (1)
Nitrites (at WTW)	Castlerea Regional (1)
Fluoride	NERWSS - Tarmonbarry (1)
Lead	North Roscommon Regional (1)
Total No.:	**7**

The trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present whilst the nitrites (at WTP) non-compliance was a once off occurrence and all follow up samples were clear. The fluoride non-compliance was due to elevated levels of fluoride above the Irish standard. However, levels were below the EU fluoride standard of 1.5 mg/l. The lead non-compliance was due to the presence of lead communication pipes in the supply.

Boil Water Notices & Water Restrictions

A summary of boil water notices (BWN) and water restriction (WR) notices active or issued to consumers during 2011 is as follows (full details in Appendix III):

Date Issued	Date Lifted/ Active	BWN/ WR[15]	Name of PWS	Reason
Feb-10	Apr-12	BWN	Castlerea Regional	*Cryptosporidium*
Mar-11	Apr-11	BWN	Castlerea Urban	*Cryptosporidium*
Mar-11	Apr-11	BWN	Boyle	*Cryptosporidium*
Mar-11	Apr-11	BWN	Boyle/ Ardcarne	*Cryptosporidium*
May-11	Jul-11	BWN	Mount Talbot/ Four Roads	*Cryptosporidium*
May-11	Jun-11	BWN	Strokestown/ Elphin	*Cryptosporidium*
May-11	Jun-11	BWN	Rooskey	*Cryptosporidium*
May-11	Jun-11	BWN	Tarmonbarry	*Cryptosporidium*
Sep-11	Dec-11	WR	Arigna	Iron

Seven new boil notices were issued to consumers by Roscommon County Council during 2011 and one remained active from 2010. One new water restriction was issued to consumers during 2011 and none remained active from previous years. At the end of 2011, one boil notice remained in place on the Castlerea Regional PWS. No water restrictions remained in place at the end of 2011.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	13
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	0

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, no supplies were removed from the RAL and none were added. For full details on RAL supplies in Roscommon, see www.epa.ie

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Feb-11	North Roscommon Regional
Feb-11	Boyle/Ardcarne
Sep-11	Knockcroghery
Sep-11	Mount Talbot/Four Roads
Sep-11	Roscommon Central
Dec-11	Boyle/Ardcarne
Dec-11	Keadue
Dec-11	Grangemore
Dec-11	Lecarrow

[15] In some instances the boil notice or water restriction only applies to part of the supply.

SLIGO COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Sligo County Council is responsible for the operation of 13 Public Water Supplies (PWS) serving a population of 59,717.

Microbiological compliance levels in Sligo PWSs increased from 99.6% in 2010 to 100% in 2011. Chemical compliance levels increased from 96.9% in 2010 to 98.8% in 2011.

	Micro	Chemical
2011	100	98.8

Microbiological Parametric Values:

No non-compliance of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Lead	Foxes Den (1) Kilsellagh (Rosses Point (1) Lough Gill(Cairns Hill)(1) Lough Talt Regional (1)
Trihalomethanes	Lough Gill Regional (2) Lough Talt (3) Killaraght (1)
Total No.:	**10**

The lead non compliances were due to the presence of lead in the communication pipe, service pipe and/or internal plumbing of consumer's premises. The trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present.

Boil Water Notices & Water Restrictions

A summary of boil water notices (BWN) and water restriction (WR) notices active or issued to consumers during 2011 is as follows (full details in Appendix II):

Date Issued	Date Lifted/ Active	BWN / WR[16]	Name of PWS	Reason
Mar-11	Apr-11	BWN	Killaraght[15]	*Cryptosporidium*

One new boil notice was issued to consumers by Sligo County Council during 2011 and none remained active from previous years. No water restrictions were issued in 2011 and none remained active from previous years. At the end of 2011, no boil or water restriction notices remained in place.

[16] In some instances the boil notice or water restriction only applies to part of the supply.

[16] Killaraght PWS is supplied from Boyle/Ardcarne PWS operated by Roscommon Co Co.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	4
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	1

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, one public water supply (Kilsellagh) was removed from the RAL due to the completion of the necessary remedial works and none were added. For full details on RAL supplies in Sligo, see www.epa.ie

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Oct-11	Lough Gill (Cairns Hill)

SOUTH DUBLIN COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

South Dublin County Council is responsible for the operation of 4 Public Water Supplies (PWS) serving a population of 247,180.

Microbiological compliance levels in PWSs in South Dublin were 100% in both 2010 and 2011. Chemical compliance levels decreased from 100% in 2010 to 99.8% in 2011.

	Micro	Chemical
2011	100	99.8

Microbiological Parametric Values:

No non-compliance of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Flouride	Ballymore Eustace (1)
Total No.:	**1**

The fluoride non-compliance was due to elevated levels of fluoride above the Irish standard. However, levels were below the EU fluoride standard of 1.5 mg/l.

Boil Water Notices & Water Restrictions

No boil water notices were issued during 2011 and none remain in place from previous years.

EPA Enforcement in 2011

Remedial Action List

There are no supplies in South Dublin on the Remedial Action List.

Audits of Drinking Water Treatment Plants

The EPA did not carry out any audits of drinking water treatment plants during 2011.

SOUTH TIPPERARY COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

South Tipperary County Council is responsible for the operation of 26 Public Water Supplies (PWS) serving a population of 73,300.

Microbiological compliance levels have increased in PWSs in South Tipperary from 99.8% in 2010 to 100% in 2011. Chemical compliance levels increased from 99.1% in 2010 to 99.7% in 2011.

	Micro	Chemical
2011	100	99.7

Microbiological Parametric Values:

No non-compliance of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Trihalomethanes	Gortnapisha Regional (1)
Fluoride	Ardfinnan (1) Cahir Reservoir (1)
Total No.:	**3**

The trihalomethanes non-compliance was primarily due to the chlorination of water with elevated levels of organic matter present. The fluoride non-compliances were due to elevated levels of fluoride above the Irish standard. However, all samples were below the EU fluoride standard of 1.5 mg/l.

Boil Water Notices & Water Restrictions

A summary of boil water notices (BWN) and water restriction (WR) notices active or issued to consumers during 2011 is as follows (full details in Appendix III):

Date Issued	Date Lifted/ Active	BWN/ WR[17]	Name of PWS	Reason
Oct-08	Active	BWN	Cloran Regional*	*E.coli*
Oct-08	Active	BWN	Gortnapisha Regional*	*E.coli*
Sep-09	Active	BWN	Burncourt Regional*	*Cryptosporidium*
Oct-11	Dec-11	WR	Galtee Regional*	Precautionary

*BWN affected part of the supply zone

No new boil water notices were issued during 2011 and three remained active from previous years. All boil water notices were issued in respect of part of the supply due to the supply of undisinfected water and are not in place for the majority of consumers. One water restriction was issued in 2011 and none remained active from previous years. At the end of 2010, three boil notices remained in place. No water restriction notices remained in place at the end of 2011.

[17] In some instances the boil notice or water restriction only applies to part of the supply.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	13
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	0

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, no supplies were removed from the RAL and none were added. For full details on RAL supplies in South Tipperary, see www.epa.ie

Audits of Drinking Water Treatment Plants

The EPA did not carry out any audits of drinking water treatment plants during 2011.

WATERFORD CITY COUNCIL

Summary of Public Water Supply Quality in 2011

Waterford City Council is responsible for 1 Public Water Supply (PWS) serving a population of 46,747.

Microbiological compliance in the Waterford City PWS was 100% in both 2010 and 2011. Chemical compliance levels increased from 99.1% in 2010 to 99.6% in 2011.

	Micro	Chemical
2011	100	99.6

Microbiological Parametric Values:

No non-compliance of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Fluoride	Waterford City (1)
Total No.:	**1**

The fluoride non-compliance was due to elevated levels of fluoride above the Irish standard. However, the sample was below the EU fluoride standard of 1.5 mg/l.

Boil Water Notices & Water Restrictions

No boil water notices or water restriction notices were issued to consumers during 2011 and none remained in place from previous years.

EPA Enforcement in 2011

Remedial Action List

There are no supplies in Waterford City on the Remedial Action List.

Audits of Drinking Water Treatment Plants

The EPA did not carry out any audits of drinking water treatment plants during 2011.

WATERFORD COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Waterford County Council is responsible for the operation of 108 Public Water Supplies (PWS) serving a population of 35,234.

Microbiological compliance levels in PWSs in Waterford County were 99.7% in both 2010 and 2011. Chemical compliance levels increased from 98.1% in 2010 to 99.2% in 2011.

	Micro	Chemical
2011	99.7	99.2

Microbiological Parametric Values:

A summary of the PWS with microbiological non-compliances during 2011 is as follows:

	2011
Parameter	**Name of PWS**
E. coli	Inchinleamy (1)
Total No.:	**1**

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

	2010
Parameter	**Name of PWS**
Nitrate	Glenawillin (1) LCB Ballyhane (1) LCB Cappoquin (1)
Trihalomethanes	Ring/Helvick/Seaview (1) Tallow (1)
Lead	Stradbally (1)
Fluoride	Dungarvan (1) LCB Ballyduff (1) Portlaw (1) Tramore/Carrigavantry (1)
Total No.:	**10**

The nitrate non-compliances were attributed to agricultural practices in the vicinity of the source whilst the trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present. The fluoride non-compliances were due to elevated levels of fluoride above the Irish standard. However, all samples were below the EU fluoride standard of 1.5 mg/l. The lead non-compliance was most likely due to the presence of internal lead plumbing.

Boil Water Notices & Water Restrictions

A summary of boil water notices (BWN) and water restriction (WR) notices issued to consumers or active during 2011 are detailed below (full details in Appendix III):

Date Issued	Date Lifted/ Active	BWN/ WR[18]	Name of PWS	Reason
May-10	Active	WR	Glenawillin	Nitrate
Dec-10	Mar-11	BWN	Kill/Ballylaneen	Turbidity (at WTW)
Apr-11	May-11	BWN	Stradbally	Precautionary

One new boil water notice was issued to consumers by Waterford County Council during 2011. One boil water notice and one water restriction remained active from the previous year. At the end of 2011, one water restriction notice remained in place. No boil water notices remained in place at the end of 2011.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	13
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	1

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, one public water supply (LCB Cappoquin) was removed from the RAL due to the completion of the necessary remedial works to the satisfaction of the EPA and none were added to the RAL. For full details on RAL supplies in Waterford, see www.epa.ie

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Sep-11	Dungarvan
Oct-11	LCB Cappoquin
Oct-11	LCB Ballyhane
Oct-11	Ring/Helvick/Seaview
Nov-11	Ballyogarty

[18] In some instances the boil notice or water restriction only applies to part of the supply.

WESTMEATH COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Westmeath County Council is responsible for the operation of 15 Public Water Supplies (PWS) serving a population of 62,325.

Microbiological compliance levels in PWSs in Westmeath were 100% in both 2010 and 2011. Chemical compliance levels increased from 98.8% in 2010 to 99.7% in 2011.

	Micro	Chemical
2011	100	99.7

Microbiological Parametric Values:

No non-compliance of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Copper	Ardonagh Reservoir (1)
Trihalomethanes	Gaybrook Water Tower (1)
Total No.:	**2**

The trihalomethanes non-compliance was primarily due to the chlorination of water with elevated levels of organic matter present. The copper non-compliance was a once off occurrence and all follow up samples were clear.

Boil Water Notices & Water Restrictions

No boil water notices or water restriction notices were issued to consumers during 2011 and none remained in place from previous years.

EPA Enforcement in 2011

Remedial Action List

There are no supplies in Westmeath on the Remedial Action List.

Audits of Drinking Water Treatment Plants

The EPA did not carry out any audits of drinking water treatment plants during 2011.

WEXFORD COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Wexford County Council is responsible for the operation of 28 Public Water Supplies (PWS) serving a population of 104,090.

Microbiological compliance levels have increased in PWSs in Wexford from 99.6% in 2010 to 100% in 2011. Chemical compliance levels increased from 99.8% in 2010 to 99.9% in 2011.

	Micro	Chemical
2011	100	99.9

Microbiological Parametric Values:

No non-compliance of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Fluoride	Sow Regional (1)
Total No.:	**1**

The fluoride non-compliance, which was greater than the EU fluoride limit of 1.5 mg/l, was due to elevated levels of fluoride in the treated water.

Boil Water Notices & Water Restrictions

No boil water notices or water restriction notices were issued to consumers during 2011 and none remained in place from previous years.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	1
No. of PWS added to RAL in 2011:	0
No. of PWS removed from RAL in 2011:	1

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, one public water supply (Gorey Region) was removed from the RAL due to the completion of the necessary remedial works to the satisfaction of the EPA and none were added. For full details on RAL supplies in Wexford, see www.epa.ie

Directions

The EPA issued three Directions to Wexford County Council during 2011. Details are as follows:

Year	Name of PWS	Reason for Direction
2011	Wexford	Deficiencies in disinfection procedures were identified
2011	Gorey Region	No Chlorine Monitor or Alarm
2011	Sow Region	Deficiencies identified in plant operation and management

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Oct-11	Enniscorthy
Oct-11	Kilmuckridge
Dec-11	Coolgreany
Dec-11	Gorey Region

WICKLOW COUNTY COUNCIL

Summary of Public Water Supply Quality in 2011

Wicklow County Council is responsible for the operation of 54 Public Water Supplies (PWS) serving a population of 101,821.

Microbiological compliance in Wicklow PWSs was 100% in both 2010 and 2011. Chemical compliance levels were 99.1% in both 2010 and 2011.

	Micro	Chemical
2011	100	99.1

Microbiological Parametric Values:

No non-compliance of the microbiological parametric values occurred during 2011.

Chemical Parametric Values:

A summary of the PWS with non-compliances of the chemical parametric values during 2011 is as follows:

Parameter	2011 Name of PWS
Trihalomethanes	Aughrim Annacurra (2) Bray (1) Enniskerry (1) Wicklow (7)
Total No.:	**11**

The trihalomethanes non-compliances were primarily due to the chlorination of water with elevated levels of organic matter present.

Boil Water Notices & Water Restrictions

A summary of boil water notices (BWN) and water restriction (WR) notices issued to consumers or active during 2011 are detailed below (full details in Appendix III):

Date Issued	Date Lifted/ Active	BWN/ WR[19]	Name of PWS	Reason
Apr -10	Feb-11	BWN	Ballymorris	*E. coli*
Jun-11	Jul-11	BWN	Ballinteskin	Coliform Bacteria
Sep-11	Dec-11	BWN	Ballycoog	Precautionary
Oct-11	Nov-11	BWN	Ballymorris	Precautionary
Oct-11	Nov-11	BWN	Raheengraney	E. coli

Four new boil water notices were issued to consumers by Wicklow County Council during 2011 and one remained active from the previous year. No water restrictions were issued in 2011 and none remained active from previous years. At the end of 2011, no boil water notices or water restrictions remained in place.

[19] In some instances the boil notice or water restriction only applies to part of the supply.

EPA Enforcement in 2011

Remedial Action List

No. of PWS on the RAL at the end of 2011:	13
No. of PWS on the RAL at the end of 2011:	0
No. of PWS added to RAL in 2011:	1

The RAL is a list of PWSs where remedial action is required to ensure compliance with the requirements of the Drinking Water Regulations. In 2011, none were added to the RAL and one was removed (Rathdrum) due to the completion of the necessary remedial works to the satisfaction of the EPA and none were added. For full details on RAL supplies in Wicklow, see www.epa.ie

Directions

The EPA issued one Direction to Wicklow County Council during 2011. Details are as follows:

Year	Name of PWS	Reason for Direction
2011	Avoca, Ballinaclash	Trihalomethanes exceedance and no action plan submitted

Audits of Drinking Water Treatment Plants

The following drinking water treatment plants were audited by the EPA during 2011:

Date Audited	PWS Audited
Jun-11	Ballinteskin
Sep-11	Baltinglass
Sep-11	Wicklow Regional
Dec-11	Redcross
Dec-11	Roundwood

APPENDIX II –DRINKING WATER SUPPLY IN IRELAND.

Drinking Water Supply in Ireland

The Regulations specify two types of supplies ("public" and "private"), but in practice there are five distinct categories of water supply in Ireland (see also Table 1):

- **Public Water Supplies (PWS).** These are WSA operated schemes (though these may be run by a private contractor on behalf of the WSA). They supply water to the majority of households in Ireland.

- **"Public" Group Water Schemes (PuGWS).** These are schemes where the water is provided by the WSA but responsibility for distribution of the water rests with the group scheme. These schemes tend to be supplied by larger public water supplies.

- **"Private" Group Water Schemes (PrGWS).** These are schemes where the owners of the scheme (usually representatives of the local community) source and distribute their own water. Combined, the "public" and "private" group water schemes supply water to around 7% of the population of Ireland.

- **Small Private Supplies (SPS).** This is a group of different types of supplies (1,429) comprising industrial water supplies (such as those used in the brewing industry) to boreholes serving commercial premises (e.g. pubs, hotels etc.) and public buildings (e.g. schools, nursing homes).

- **Exempted Supplies.** These are supplies serving less than 50 persons and not supplying water as part of a public or commercial activity. The majority of these supplies are private wells serving individual houses. These supplies serve approximately 12% of the population.

Table 1: Water Supply Zones (WSZs) and Proportion of the Population Served, 2011.

Type of Supply	No. of WSZs[1]	% of Total Population Served
Public Water Supply	939	80.0
Public Group Water Scheme	643	2.3
Private Group Water Scheme	486	4.7
Small Private Supply	1,429	0.7
Exempted Supplies[2]	N/A	12.3

[1] A water supply zone (WSZ) is a geographically defined area within which drinking water comes from one or more sources and water quality is uniform.

[2] Exempted supplies are supplies that are provided from either an individual supply providing less than $10m^3$ a day on average or serving fewer than 50 persons and do not supply water as part of a public or commercial activity. Exempted supplies may also be a supply used exclusively for the purposes in respect of which the sanitary authority is satisfied that the quality of the water has no influence, either directly or indirectly, on the health of consumer's concerned (e.g. industrial cooling water).

APPENDIX III - LIST OF ALL BOIL WATER NOTICES OR WATER RESTRICTIONS PLACED OR ACTIVE ON PUBLIC WATER SUPPLIES DURING 2011

WSA	Name of Public Water Supply	Reason	Boil Water Notice (BWN) or Water Restriction (WR)	Population Affected	Affecting Full Supply or Part of Supply?	Date Notice Imposed	Date Notice Lifted
Laois County Council	The Strand	E. coli	BWN	9	Full	11/01/2007	
Cork County Council	Castletownkinnagh	Nitrate	WR	33	Full	01/03/2007	15/02/2012
Clare County Council	Ennis PWS	Lead	WR	80	Part	07/10/2008	
North Tipperary County Council	Thurles (ZONE 1)	Lead	WR	318	Part	08/10/2008	08/09/2011
Galway County Council	Letterfrack PWS(Dawros)	Cryptosporidium	BN	300	Full	10/10/2008	28/05/2012
Galway County Council	Rosmuc P.S	Cryptosporidium	BN	1,090	Full	10/10/2008	28/03/2012
South Tipperary County Council	Cloran Regional	E. coli	BN	9	Part	22/10/2008	
South Tipperary County Council	Gortnapisha Regional	E. coli	BN	9	Part	22/10/2008	
Cork County Council	Glashaboy	Lead	WR	150	Part	11/11/2008	
Kerry County Council	Mid Kerry : Gearha (H) 300A	Cryptosporidium	BN	25	Part	11/02/2009	22/09/2011
Kerry County Council	Glenbeigh PWSS 040A	Inadequate Disinfection	BN	16	Part	26/06/2009	
Kerry County Council	Kenmare PWSS 045A	Inadequate Disinfection	WR	20	Part	28/07/2009	
Kerry County Council	Mountain Stage PWSS 062A	Inadequate Disinfection	WR	3	Part	28/07/2009	
Kerry County Council	Kilgarvan PWSS 046A	Inadequate Disinfection	WR	5	Part	05/08/2009	
Kerry County Council	An Mhuiríoch/ Baile Breach PWSS 063D	Inadequate Disinfection	WR	3	Part	05/08/2009	
Kerry County Council	An Baile Mór PWSS 012D	Inadequate Disinfection	WR	150	Part	05/08/2009	
Kerry County Council	An Mhín Aird No. 2 PWSS 061D	Inadequate Disinfection	WR	30	Part	05/08/2009	18/06/2012

WSA	Name of Public Water Supply	Reason	Boil Water Notice (BWN) or Water Restriction (WR)	Population Affected	Affecting Full Supply or Part of Supply?	Date Notice Imposed	Date Notice Lifted
Kerry County Council	An Fheothanach PWSS	Inadequate Disinfection	WR	50	Part	05/08/2009	
Kerry County Council	Baile an Lochaigh PWSS 007D	Inadequate Disinfection	WR	50	Part	05/08/2009	07/08/2012
Kerry County Council	Central Regional: Lough Guitane (H) 400F	Inadequate Disinfection	WR	30	Part	05/08/2009	
South Tipperary County Council	Burncourt Regional	Cryptosporidium	BN	178	Part	01/09/2009	
Galway County Council	Mid-Galway	E. coli	BN	3,917	Full	30/11/2009	04/08/2011
Roscommon County Council	Castlerea Regional	Cryptosporidium	BN	2,600	Full	26/02/2010	30/04/2012
Wicklow County Council	BALLYMORRIS PUBLIC SUPPLY	E. coli	BN	9	Full	09/04/2010	10/02/2011
Cork County Council	Newcestown	E. coli	BN	9	Part	04/05/2010	21/02/2011
Kerry County Council	An Ceapaigh Thiar PWSS 021D	Inadequate Disinfection	BN	9	Part	06/05/2010	
Waterford County Council	Glenawillin	Nitrate	WR	60	Full	24/05/2010	
Limerick County Council	Faleen PUB DWS	Precautionary - no exceedance confirmed	BN	6	Part	01/06/2010	03/09/2012
Cavan County Council	Bailieborough Mountain Line	E. coli	BN	15	Full	17/06/2010	20/06/2011
Kerry County Council	An Clochán PWSS 028D	Inadequate Disinfection	WR	9	Part	16/07/2010	
Kerry County Council	Annascaul PWSS 002D	Inadequate Disinfection	WR	3	Part	16/07/2010	
Kerry County Council	Cé Bhréannain PWSS 015D	Inadequate Disinfection	WR	6	Part	16/07/2010	
Cork County Council	Glashaboy	Lead	WR	190	Part	28/07/2010	
Galway County Council	Tully-Tullycross	E. coli	BN	325	Full	13/08/2010	28/05/2012

WSA	Name of Public Water Supply	Reason	Boil Water Notice (BWN) or Water Restriction (WR)	Population Affected	Affecting Full Supply or Part of Supply?	Date Notice Imposed	Date Notice Lifted
Cork County Council	Carrignadoura	E. coli	BN	100	Full	27/09/2010	24/02/2011
Clare County Council	Ballyvaughan PWS	Odour	BN	1,000	Full	05/10/2010	14/06/2011
Limerick County Council	PALLASKENRY/KILDIMO PUB DWS	Inadequate Disinfection	BN	18	Part	11/11/2010	22/12/2011
Limerick County Council	ABBEYFEALE PUB DWS	Aluminium	BN	3,029	Full	21/12/2010	13/01/2011
Galway County Council	Gort	Plant Failure	BN	8,000	Full	21/12/2010	18/04/2011
Limerick County Council	KILMALLOCK PUB DWS	E. coli	BN	2,338	Full	22/12/2010	10/01/2011
Limerick County Council	NEWCASTLE WEST PUB DWS	Turdidity	BN	7,469	Full	23/12/2010	11/01/2011
Waterford County Council	Kill/Ballylaneen	Turbidity (at WTW)	BN	500	Full	28/12/2010	11/03/2011
Galway County Council	Ballinasloe Public Supply	Burst Mains	BN	600	Part	06/01/2011	21/01/2011
Cavan County Council	Arvagh P.W.S.	E. coli	BN	16	Part	26/01/2011	16/03/2011
Roscommon County Council	Castlerea Urban	Cryptosporidium	BN	1,800	Full	23/03/2011	15/04/2011
Roscommon County Council	Boyle	Cryptosporidium	BN	3,300	Full	23/03/2011	15/04/2011
Roscommon County Council	Boyle/Ardcarne	Cryptosporidium	BN	1,200	Full	23/03/2011	15/04/2011
Sligo County Council	Killaraght Public Water Supply	Cryptosporidium	BN	110	Full	28/03/2011	15/04/2011
Kilkenny County Council	Gowran-Goresbridge-Paulstown WS 1007	Inadequate Disinfection	BN	3,312	Full	28/03/2011	01/04/2011
Galway County Council	Carraroe PWS	Source Contamination	WR	3,875	Full	29/03/2011	24/05/2011
Waterford County Council	Stradbally	Precautionary – no exceedance confirmed	BN	500	Full	11/04/2011	10/05/2011

WSA	Name of Public Water Supply	Reason	Boil Water Notice (BWN) or Water Restriction (WR)	Population Affected	Affecting Full Supply or Part of Supply?	Date Notice Imposed	Date Notice Lifted
Cork County Council	Castletownroche	Cryptosporidium	BN	1,073	Full	10/05/2011	20/05/2011
Donegal County Council	BALLINTRA	E. coli	BN	450	Full	19/05/2011	25/05/2011
Roscommon County Council	Mount Talbot/Four Roads	Cryptosporidium	BN	3,500	Full	27/05/2011	14/07/2011
Roscommon County Council	NERWSS - Strokestown/Elphin	Cryptosporidium	BN	3,000	Full	27/05/2011	10/06/2011
Roscommon County Council	NERWSS - Rooskey	Cryptosporidium	BN	508	Full	27/05/2011	10/06/2011
Roscommon County Council	NERWSS - Tarmonbarry	Cryptosporidium	BN	400	Full	27/05/2011	10/06/2011
Cork County Council	Clonakility	Burst Mains	BN	12,666	Full	27/05/2011	28/05/2011
Wicklow County Council	BALLINTESKIN PUBLIC SUPPLY	Coliform Bacteria	BN	30	Full	14/06/2011	01/07/2011
Galway County Council	Inishere	Chloride	WR	274	Full	02/09/2011	04/11/2011
Longford County Council	NEWTOWNCASHEL	Inadequate Disinfection	BN	120	Part	05/09/2011	
Wicklow County Council	BALLYCOOG PUBLIC SUPPLY	Precautionary - no exceedance confirmed	BN	46	Full	16/09/2011	16/12/2011
Cork County Council	Kildorrery Old	E. coli	BN	15	Part	26/09/2011	24/10/2011
Roscommon County Council	Arigna	Iron	WR	270	Full	27/09/2011	09/12/2011
Mayo County Council	CHARLESTOWN WSS	E. coli	BN	1,378	Full	30/09/2011	04/10/2011
Cork County Council	Gortnaskehy	Inadequate Disinfection	BN	35	Full	01/10/2011	24/02/2012
Carlow County Council	Tynock	E. coli	BN	40	Full	05/10/2011	10/10/2011
South Tipperary County Council	Galtee Regional	Precautionary - no	WR	100	Part	10/10/2011	13/12/2011

WSA	Name of Public Water Supply	Reason	Boil Water Notice (BWN) or Water Restriction (WR)	Population Affected	Affecting Full Supply or Part of Supply?	Date Notice Imposed	Date Notice Lifted
		exceedance confirmed					
Fingal County Council	F_ZONE1	Copper and Nickel	WR	840	Part	23/09/2011	
Wicklow County Council	BALLYMORRIS PUBLIC SUPPLY	Precautionary - no exceedance confirmed	BN	9	Full	26/10/2011	29/11/2011
Wicklow County Council	RAHEENGRANEY PUBLC SUPPLY	E. coli	BN	9	Full	26/10/2011	07/11/2011
Clare County Council	Whitegate PWS	Cryptosporidium	BN	400	Full	27/10/2011	11/11/2011
Cork County Council	Banteer	E. coli	BN	80	Part	22/11/2011	07/12/2011

Note: Some notices indicated to be active at the end of 2011, above, may have been rescinded between the end of 2011 and the date of publication of this report.

APPENDIX IV - SUMMARY OF MONITORING CARRIED OUT IN 2011

Table 1. Total Number of Water Supply Zones (WSZs) Monitored and Samples Analysed for All Parameters in Public Water Supplies in 2011.

Parameter	No. of WSZs Monitored	No. of WSZs with Exceedances	% of WSZs Complying	No. of Samples Analysed	No. of Samples Exceeding	% of Samples Complying
Microbiological Parameters						
E. coli	931	12	**98.7**	10264	12	**99.9**
Enterococci	685	3	**99.6**	2315	3	**99.9**
Chemical Parameters						
1,2-dichloroethane	622	0	**100**	1209	0	**100**
Antimony	563	2	**99.6**	1130	2	**99.8**
Arsenic	624	1	**99.8**	1256	1	**99.9**
Benzene	621	0	**100**	1206	0	**100**
Benzo(a)pyrene	612	0	**100**	1092	0	**100**
Boron	563	0	**100**	1142	0	**100**
Bromate	617	1	**99.8**	1130	1	**99.9**
Cadmium	623	0	**100**	1250	0	**100**
Chromium	623	0	**100**	1250	0	**100**
Copper	638	3	**99.5**	1417	3	**99.8**
Cyanide	540	0	**100**	1030	0	**100**
Fluoride	674	31	**95.4**	3427	41	**98.8**
Lead	722	12	**98.3**	2267	14	**99.4**
Mercury	623	1	**99.8**	1218	1	**99.9**
Nickel	636	1	**99.8**	1262	1	**99.9**
Nitrate	758	5	**99.3**	3973	7	**99.8**
Nitrite (at tap)	691	0	**100**	4956	0	**100**
Nitrites (at WTW)	104	2	**98.1**	621	2	**99.7**
PAH	608	0	**100**	1086	0	**100**
Pesticides - Total	605	0	**100**	1102	0	**100**
Selenium	565	0	**100**	1147	0	**100**
Tetrachloroethene & Trichloroethene	624	1	**99.8**	1211	1	**99.9**
Trihalomethanes(Total)	644	70	**89.1**	1417	127	**91.0**
Indicator Parameters						
Aluminium	708	51	**92.8**	7587	88	**98.8**
Ammonium	932	4	**99.6**	10268	6	**99.9**
Chloride	617	1	**99.8**	1257	1	**99.9**
Clostridium Perfringens	692	18	**97.4**	8579	18	**99.8**
Coliform Bacteria	931	124	**86.7**	10267	200	**98.1**
Colony Count @ 22Â°C	483	22	**95.4**	1163	22	**98.1**
Colour	932	102	**89.1**	10311	244	**97.6**
Conductivity	923	0	**100**	10743	0	**100**
Iron	771	53	**93.1**	6695	142	**97.9**
Manganese	647	25	**96.1**	2308	29	**98.7**
Odour	896	43	**95.2**	9865	131	**98.7**
Oxidisability	2	0	**100**	2	0	**100**
pH	932	217	**76.7**	10436	479	**95.4**
Sodium	636	1	**99.8**	1247	1	**99.9**
Sulphate	568	0	**100**	1125	0	**100**
Taste	756	13	**98.3**	8030	43	**99.5**
Total Organic Carbon	554	22	**96.0**	1094	25	**97.7**
Turbidity (at tap)	932	13	**98.6**	10401	15	**99.9**
Turbidity (at WTW)	164	38	**76.8**	1597	72	**95.5**
Radioactivity						
Total Indicative Dose	2	0	**100**	23	0	**100**
Tritium	22	0	**100**	73	0	**100**

Table 2. Total Number of Water Supply Zones (WSZs) Monitored and Samples Analysed for All Parameters in Public Group Water Schemes in 2011.

Parameter	No. of WSZs Monitored	No. of WSZs with Exceedances	% of WSZs Complying	No. of Samples Analysed	No. of Samples Exceeding	% of Samples Complying
Microbiological Parameters						
E. coli	602	4	**99.3**	1516	4	**99.7**
Enterococci	116	0	**100**	132	0	**100**
Chemical Parameters						
1,2-dichloroethane	67	0	**100**	70	0	**100**
Antimony	71	0	**100**	73	0	**100**
Arsenic	83	0	**100**	89	0	**100**
Benzene	84	0	**100**	87	0	**100**
Benzo(a)pyrene	94	0	**100**	97	0	**100**
Boron	71	0	**100**	73	0	**100**
Bromate	128	0	**100**	154	0	**100**
Cadmium	83	0	**100**	89	0	**100**
Chromium	79	0	**100**	85	0	**100**
Copper	103	0	**100**	109	0	**100**
Cyanide	71	0	**100**	72	0	**100**
Fluoride	186	3	**98.4**	355	4	**98.9**
Lead	128	0	**100**	159	0	**100**
Mercury	83	0	**100**	87	0	**100**
Nickel	103	0	**100**	109	0	**100**
Nitrate	216	0	**100**	453	0	**100**
Nitrite (at tap)	354	0	**100**	763	0	**100**
Nitrites (at WTW)	75	0	**100**	170	0	**100**
PAH	88	0	**100**	91	0	**100**
Pesticides - Total	74	0	**100**	77	0	**100**
Selenium	71	0	**100**	73	0	**100**
Tetrachloroethene & Trichloroethene	77	0	**100**	80	0	**100**
Trihalomethanes(Total)	105	13	**87.6**	116	15	**87.1**
Indicator Parameters						
Aluminium	489	13	**97.3**	1120	13	**98.8**
Ammonium	600	2	**99.7**	1497	2	**99.9**
Chloride	78	0	**100**	82	0	**100**
Clostridium Perfringens	558	10	**98.2**	1298	10	**99.2**
Coliform Bacteria	602	43	**92.9**	1517	45	**97.0**
Colony Count @ 22Â°C	64	1	**98.4**	67	1	**98.5**
Colour	602	27	**95.5**	1517	36	**97.6**
Conductivity	578	0	**100**	1456	0	**100**
Iron	408	22	**94.6**	903	23	**97.5**
Manganese	211	6	**97.2**	383	8	**97.9**
Odour	566	34	**94.0**	1346	47	**96.5**
Oxidisability	2	0	**100**	2	0	**100**
pH	602	15	**97.5**	1517	22	**98.5**
Sodium	91	0	**100**	97	0	**100**
Sulphate	71	0	**100**	73	0	**100**
Taste	372	0	**100**	901	0	**100**
Total Organic Carbon	71	7	**90.1**	93	7	**92.5**
Turbidity (at tap)	601	5	**99.2**	1511	5	**99.7**
Turbidity (at WTW)	77	4	**94.8**	190	5	**97.4**
Radioactivity						
Total Indicative Dose	0	0		0	0	
Tritium	0	0		0	0	

Table 3. Total Number of Water Supply Zones (WSZs) Monitored and Samples Analysed for All Parameters in Private Group Water Schemes in 2011.

Parameter	No. of WSZs Monitored	No. of WSZs with Exceedances	% of WSZs Complying	No. of Samples Analysed	No. of Samples Exceeding	% of Samples Complying
Microbiological Parameters						
E. coli	453	46	**89.8**	1717	56	**96.7**
Enterococci	249	13	**94.8**	316	13	**95.9**
Chemical Parameters						
1,2-dichloroethane	233	0	**100**	251	0	**100**
Antimony	231	0	**100**	249	0	**100**
Arsenic	235	0	**100**	253	0	**100**
Benzene	233	0	**100**	251	0	**100**
Benzo(a)pyrene	222	0	**100**	240	0	**100**
Boron	231	0	**100**	248	0	**100**
Bromate	229	1	**99.6**	250	1	**99.6**
Cadmium	235	0	**100**	253	0	**100**
Chromium	235	0	**100**	253	0	**100**
Copper	238	0	**100**	273	0	**100**
Cyanide	226	0	**100**	243	0	**100**
Fluoride	232	0	**100**	278	0	**100**
Lead	237	0	**100**	381	0	**100**
Mercury	233	1	**99.6**	251	1	**99.6**
Nickel	235	1	**99.6**	253	1	**99.6**
Nitrate	362	2	**99.4**	903	2	**99.8**
Nitrite (at tap)	337	0	**100**	1045	0	**100**
Nitrites (at WTW)	7	0	**100**	13	0	**100**
PAH	221	0	**100**	238	0	**100**
Pesticides - Total	226	0	**100**	241	0	**100**
Selenium	232	0	**100**	253	0	**100**
Tetrachloroethene & Trichloroethene	231	0	**100**	248	0	**100**
Trihalomethanes(Total)	234	15	**93.6**	264	17	**93.6**
Indicator Parameters						
Aluminium	337	11	**96.7**	1126	17	**98.5**
Ammonium	453	4	**99.1**	1620	5	**99.7**
Chloride	235	2	**99.1**	254	3	**98.8**
Clostridium Perfringens	364	36	**90.1**	1238	39	**96.8**
Coliform Bacteria	453	113	**75.1**	1719	157	**90.9**
Colony Count @ 22Â°C	141	7	**95.0**	158	7	**95.6**
Colour	453	57	**87.4**	1710	77	**95.5**
Conductivity	453	0	**100**	1625	0	**100**
Iron	346	19	**94.5**	1117	23	**97.9**
Manganese	298	16	**94.6**	680	18	**97.4**
Odour	426	13	**96.9**	1491	19	**98.7**
Oxidisability	0	0		0	0	
pH	453	40	**91.2**	1712	64	**96.3**
Sodium	235	2	**99.1**	254	2	**99.2**
Sulphate	232	1	**99.6**	250	1	**99.6**
Taste	346	0	**100**	1045	0	**100**
Total Organic Carbon	239	11	**95.4**	354	11	**96.9**
Turbidity (at tap)	453	15	**96.7**	1718	15	**99.1**
Turbidity (at WTW)	20	1	**95.0**	33	1	**97.0**
Radioactivity						
Total Indicative Dose	0	0		0	0	
Tritium	5	0	**100**	5	0	**100**

Table 4. Total Number of Water Supply Zones (WSZs) Monitored and Samples Analysed for All Parameters in Small Private Supplies in 2011.

Parameter	No. of WSZs Monitored	No. of WSZs with Exceedances	% of WSZs Complying	No. of Samples Analysed	No. of Samples Exceeding	% of Samples Complying
Microbiological Parameters						
E. coli	1059	82	**92.3**	1622	88	**94.6**
Enterococci	531	40	**92.5**	754	41	**94.6**
Chemical Parameters						
1,2-dichloroethane	19	1	**94.7**	21	1	**95.2**
Antimony	46	1	**97.8**	51	1	**98.0**
Arsenic	78	4	**94.9**	97	5	**94.8**
Benzene	20	0	**100**	22	0	**100**
Benzo(a)pyrene	19	0	**100**	20	0	**100**
Boron	66	0	**100**	81	0	**100**
Bromate	18	0	**100**	20	0	**100**
Cadmium	146	0	**100**	182	0	**100**
Chromium	147	0	**100**	183	0	**100**
Copper	324	2	**99.4**	368	2	**99.5**
Cyanide	17	0	**100**	19	0	**100**
Fluoride	55	0	**100**	79	0	**100**
Lead	431	1	**99.8**	546	1	**99.8**
Mercury	18	0	**100**	20	0	**100**
Nickel	147	0	**100**	183	0	**100**
Nitrate	792	10	**98.7**	1049	10	**99.0**
Nitrite (at tap)	826	3	**99.6**	1239	4	**99.7**
PAH	20	0	**100**	21	0	**100**
Pesticides - Total	20	0	**100**	22	0	**100**
Selenium	66	0	**100**	81	0	**100**
Tetrachloroethene & Trichloroethene	20	0	**100**	22	0	**100**
Trihalomethanes(Total)	19	1	**94.7**	29	1	**96.6**
Indicator Parameters						
Aluminium	510	8	**98.4**	797	8	**99.0**
Ammonium	1020	30	**97.1**	1527	39	**97.4**
Chloride	207	2	**99.0**	226	2	**99.1**
Clostridium Perfringens	512	35	**93.2**	758	38	**95.0**
Coliform Bacteria	1061	345	**67.5**	1621	391	**75.9**
Colony Count @ 22Â°C	13	2	**84.6**	15	2	**86.7**
Colour	1054	42	**96.0**	1584	54	**96.6**
Conductivity	1024	2	**99.8**	1533	2	**99.9**
Iron	841	77	**90.8**	1241	86	**93.1**
Manganese	499	58	**88.4**	647	68	**89.5**
Odour	944	3	**99.7**	1401	3	**99.8**
Oxidisability	0	0		0	0	
pH	1058	191	**81.9**	1591	239	**85.0**
Sodium	93	21	**77.4**	112	22	**80.4**
Sulphate	20	0	**100**	22	0	**100**
Taste	376	2	**99.5**	528	2	**99.6**
Total Organic Carbon	17	1	**94.1**	19	1	**94.7**
Turbidity (at tap)	996	41	**95.9**	1526	44	**97.1**
Turbidity (at WTP)	0	0		0	0	
Radioactivity						
Total Indicative Dose	0	0		0	0	
Tritium	2	0	**100**	2	0	**100**

APPENDIX V - MICROBIOLOGICAL, CHEMICAL AND INDICATOR PARAMETERS IN THE 2007 DRINKING WATER REGULATIONS.

MICROBIOLOGICAL, CHEMICAL AND INDICATOR PARAMETRIC VALUES

	Parameter	Parametric Value	Unit	Comments	Notes
Microbiological Parameters					
1	*Escherichia coli* (*E. coli*)	0	No./100 ml	The *E. coli* bacteria is present in very high numbers in human or animal faeces and is rarely found in the absence of faecal pollution. As such, its presence in drinking water is a good indication that either the source of the water has become contaminated or that the treatment process at the water treatment plant is not operating adequately.	
2	*Enterococci*	0	No./100 ml	*Enterococci* originate in human or animal waste and thus their presence provides an indication that the water supply has been contaminated with faeces	
Chemical Parameters					
3	Acrylamide	0.10	µg/l	Acrylamide can be present in water supplies from the use of polyacrylamides as coagulant aids in water treatment. It is classified by the International Agency for Research on Cancer (IARC) in Group 2A (i.e., probably carcinogenic to humans).	Note 1
4	Antimony	5.0	µg/l	Antimony is a naturally occurring trace element used in the metal industry and in flame retardant materials. It can also occur naturally from weathering of rocks. The toxicity of antimony depends on the form it occurs in (naturally occurring antimony is likely to be in the less toxic form) and while there is some evidence for the carcinogenicity of certain antimony compounds by inhalation, there is no data to indicate carcinogenicity by the oral route.	
5	Arsenic	10	µg/l	Arsenic is widely distributed through-out the Earth's crust and is used in certain industrial applications (primarily as alloying agents in the manufacture of transistors, lasers and semi-conductors) and has been used in the past as a component of the wood preservative CCA (Copper-Chromium-Arsenic) though it is no longer in use. However, the primary source of arsenic in drinking water is from its dissolution into groundwater from naturally occurring ores and minerals. Arsenic has been shown to have significant health effects in some parts of the world (e.g. Bangladesh). Arsenic is one of the few substances shown to cause cancer in humans through consumption of drinking water and there is overwhelming evidence that consumption of arsenic through drinking water is causally related to the development of cancer in several different locations in the body.	
6	Benzene	1.0	µg/l	The principle source of benzene is from vehicle emissions which may find their way into water. Benzene is carcinogenic to humans.	
7	Benzo(a)pyrene	0.010	µg/l	Benzo(a)pyrene was formerly included in the group of chemicals called PAHs (Polycyclic Aromatic Hydrocarbons) which are generally undesirable in water. The absolute undesirability of benzo(a)pyrene in drinking water has been emphasised by its inclusion as a separate parameter. It is carcinogenic.	
8	Boron	1.0	mg/l	Boron is a naturally occurring element and can occur naturally in groundwater. It is also used in the manufacture of glass, soap, and detergents and as flame retardants. Development toxicity has been demonstrated in laboratory animals at levels in excess of the parametric value.	
9	Bromate	10	µg/l	Bromate is classified by the International Agency for Research on Cancer (IARC) in Group 2B (i.e., possibly carcinogenic to humans). Bromate is not normally found in water but may be formed during ozonation when the bromide ion is present in	Note 2

	Parameter	Parametric Value	Unit	Comments	Notes
				water. Under certain conditions, bromate may also be formed in concentrated hypochlorite solutions used to disinfect water (WHO, 2004).	
10	Cadmium	5.0	µg/l	Cadmium is used in the steel and plastics industry and is a common component of batteries. It may also enter water from trace impurities in the zinc of galvanised pipes and solders and some metal fittings. Cadmium can accumulate in the kidneys.	
11	Chromium	50	µg/l	Chromium is commonly found in the Earth's crust, though can be present in water from contamination from timber treatment chemicals (Copper-Chromium-Arsenic). The toxicity of chromium depends on the form in which it is found, with hexavalent chromium classified as a human carcinogen.	
12	Copper	2.0	mg/l	Copper is a nutrient essential for health, though at elevated levels can become a contaminant (elevated levels can cause acute gastrointestinal effects). The primary source of copper in drinking water is from corrosion of internal copper plumbing. The levels of copper in drinking water depend on the length of time the water has been stagnant in the copper piping and thus fully flushed water generally has low levels of copper.	Note 3
13	Cyanide	50	µg/l	Cyanide is a reactive, highly toxic entity, which, in excessive amounts, will cause mortality to humans. It is a common constituent of industrial wastes, especially from metal plating processes and electronic components manufacture.	
14	1,2-dichloroethane	3.0	µg/l	1,2-dichloroethane is a synthetic intermediate and organic solvent used in the manufacture of chemicals. It can enter water from discharges from facilities using the chemical. It is a toxic substance which can cause a variety of ill-effects including eye damage, dermatitis and narcotic effects. It has also been classified by the IARC in Group 2 (possible human carcinogen).	
15	Epichlorohydrin	0.10	µg/l	Epichlorohydrin can be present in water supplies from the use of polyamines as coagulant aids in water treatment and from epoxy resin linings of water mains and water retaining structures. It is classified by the International Agency for Research on Cancer (IARC) in Group 2A (i.e., probably carcinogenic to humans).	Note 1
16	Fluoride	0.8	mg/l	Fluoride arises almost exclusively from fluoridation of public water supplies and from industrial discharges, although it occurs naturally in quite rare instances. Past health studies have shown that the addition of fluoride to water supplies at levels above 0.6mg/l F^- leads to a reduction in tooth decay in growing children and that the optimum beneficial effects were thought to occur around 1.0 mg/l. However, in light of recent international and Irish research which shows an increasing occurrence of dental fluorosis, the Forum on Fluoridation (2002) recommended the lowering of the fluoride levels in drinking water to a range of 0.6 to 0.8 mg/l, with a target of 0.7 mg/l.	Note 11
17	Lead	10	µg/l	Lead is present in drinking water primarily from its dissolution from lead pipes or lead-containing solder and thus the concentration of lead in drinking water depends on a number of factors including pH, temperature, water hardness and standing time of the water. Consequently, the method of sampling for lead is critical and depending on the method used results can vary significantly. According to the World Health Organisation (WHO, 2004) lead is a general toxicant that accumulates in bone. Infants, children up to 6 years of age and pregnant women are the most susceptible to its health effects. It is toxic to both the central and peripheral nervous systems.	Notes 3 and 4
18	Mercury	1.0	µg/l	Mercury is a very toxic metal that primarily affects the kidney. It has been used in electrical appliances, batteries, plastics and in dental amalgams, though many of these uses are no longer applicable.	
19	Nickel	20	µg/l	Nickel is a metal used in the production of stainless steels and alloys and thus may be present in drinking water from water that comes into contact with nickel or chromium plated taps particularly where the water has been stagnant prior to consumption.	Note 3

	Parameter	Parametric Value	Unit	Comments	Notes
				Nickel compounds are carcinogenic and metallic nickel is possibly carcinogenic.	
20	Nitrate	50	mg/l	Nitrate in the environment originates mostly from organic and inorganic sources such as waste discharges, animal slurries and artificial fertiliser. High levels of nitrate in drinking water may induce "blue baby" syndrome (methaemaglobinemia). The nitrate converts to nitrite which reacts with blood haemoglobin thus reducing the availability of the blood to hold oxygen.	Note 5
21	Nitrite	0.50	mg/l	Nitrites exist in very low levels principally because the nitrogen will tend to exist in other forms (such as ammonia). Nitrite is an intermediate in the oxidation of ammonia to nitrate. Nitrite is associated with methaemaglobinemia as previously discussed.	Note 5
22	Pesticides	0.10	µg/l	Pesticides refer to a wide range of chemicals used for the control of pests. The parametric value is set on a precautionary basis. Where pesticides are detected the individual pesticide detected must be considered and its toxicology.	Notes 6 and 7
23	Pesticides – Total	0.50	µg/l	Pesticides refer to a wide range of chemicals used for the control of pests. The parametric value is set on a precautionary basis. Where pesticides are detected the individual pesticide detected must be considered and its toxicology.	Note 6 and 8
24	Polycyclic aromatic hydrocarbons (PAH)	0.10*	µg/l	Polycyclic Aromatic Hydrocarbons (PAHs) are a group of organic compounds containing 2 or more fused aromatic rings of carbon and hydrogen atoms. Although there are many compounds in this group, for the purposes of determining compliance with the Drinking Water Regulations only four are considered – benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene and indeno(1,2,3-cd)pyrene. They originate from many sources including coal-tar coating of drinking water pipes, soot, vehicle emissions and as combustion products of hydrocarbon fuels. This group of compounds are widely regarded as carcinogens, though the potency of the different PAHs varies.	Note 9
25	Selenium	10	µg/l	Selenium originates from the weathering of rocks and soils but is also used in industry as a chemical catalyst. It is an essential biological requirement though only very small concentrations of selenium are required, above which it is toxic and can cause a variety of illnesses.	
26	Tetrachloroethene/Trichloroethene	10*	µg/l	Tetrachloroethene and trichloroethene are synthetic solvents used in the dry-cleaning industry and other various industrial and manufacturing processes as well as being used as a degreaser. It may be carcinogenic but otherwise can have a variety of ill effects.	
27	Trihalomethanes – Total	100*	µg/l	Trihalomethanes (THMs) are derivatives of the simplest organic compound - methane, CH_4 - in which 3 of the hydrogen atoms are substituted by halogen atoms. The principal halogens are fluorine (F_2), chlorine (Cl_2), bromine (Br_2) and iodine (I_2), but while many combinations are theoretically possible, the term trihalomethanes is applied to four specific compounds containing only chlorine and/or bromine as the halogen elements. The four compounds are *chloroform* ($CHCl_3$), *bromodichloromethane* ($CHBrCl_2$), *dibromochloromethane* ($CHBr_2Cl$) and *bromoform* ($CHBr_3$). As a powerful oxidising agent, chlorine also breaks down the complex and inert organic molecules which are the colouring agents of the water, forming smaller, reactive entities. These entities react with chlorine (and with bromine derived from the oxidation by chlorine of bromide naturally present) to form the THM compounds, the most abundant of which is chloroform ($CHCl_3$). There is thus a fairly straightforward relationship between the degree of colour in the water prior to chlorination and the quantities of THMs present following chlorination. If colour is present at the point of chlorination, THMs are likely to be formed. THM compounds are undesirable in drinking water for two reasons. Firstly, the actual compounds themselves may pose a hazard to the health of the consumer if present in excessive amounts. Chloroform is classified by IARC as a possible	Note 10

	Parameter	Parametric Value	Unit	Comments	Notes
				carcinogen although the Committee on Toxicology has concluded "*Problems remain in the interpretation of published studies. These include the small relative risks recorded, the possibility of residual confounding, and the problems with exposure assessment. They concluded that the evidence for a causal association between cancer and exposure to chlorination by-products is limited and any such association is unlikely to be strong".* Secondly, the presence of the THM group may be an indicator of the possible presence of other organic by-products of chlorination in trace amounts. The WHO advises that "*In controlling trihalomethanes, a multistep treatment system should be used to reduce organic trihalomethane precursors, and primary consideration should be given to ensuring that disinfection is never compromised*".	
28	Vinyl chloride	0.50	µg/l	Vinyl chloride can be present in water supplies from the use of unplasticised polyvinyl chloride (uPVC) pipes in water distribution systems. It is carcinogenic.	Note 1
Indicator Parameters					
29	Aluminium	200	µg/l	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".*	
30	Ammonium	0.30	mg/l	Ammonium in water supplies originates from agricultural and industrial processes, as well as from disinfection with chloramines (a method of disinfection not in use in Ireland). Elevated levels of ammonium may arise from intensive agriculture in the catchment of the water source. Ammonium is therefore an indicator of possible bacterial, sewage and animal waste pollution. Ammonium in itself is not a health risk but the parametric value serves as a valuable indicator of source pollution.	
31	Chloride	250	mg/l	Chloride can originate from natural sources such as saltwater intrusion in coastal sources but can be present in sewage and industrial effluents and thus can be an indicator of pollution from these sources.	Note 12
32	*Clostridium perfringens* (incl spores)	0	No/100 ml	*Clostridium perfringens* is a member of the bacterial intestinal flora of humans and therefore serves as an indicator of faecal pollution. The spores of *Clostridium perfringens* are particularly resistant to unfavourable conditions in the environment and thus they survive for long periods. As such they can be useful indicators of water that is intermittently polluted.	Note 13
33	Colour	Acceptable to consumers and no abnormal change		Colour in water is usually due to the presence of complex organic molecules derived from vegetable (humic) matter such as peat, leaves, branches etc. While colour, in itself is primarily as aesthetic parameter it may indicate other problems with the water supply particularly where the water is chlorinated. In such cases the formation of trihalomethanes may occur.	
34	Conductivity	2500	µS cm^{-1}	Conductivity is a measure of the ability of water to conduct an electrical current, therefore conductivity is related to the ionic	Note

	Parameter	Parametric Value	Unit	Comments	Notes
			at 20 ^{0}C	content of the water.	12
35	Hydrogen ion concentration	≥ 6.5 and ≤9.5	pH units	pH is a measure of whether a liquid is acid or alkaline. The pH scale ranges from 0 (very acid) to 14 (very alkaline). The range of natural pH in freshwaters extends from around 4.5 for acid peaty upland waters to over 10 in waters where there is intense photosynthetic activity by algae. However, the most frequently encountered range is 6.5 to 8.0. The control of pH is a critical component of water treatment and distribution, influencing the effectiveness of coagulation, disinfection and the concentration of plumbing materials (such as lead, copper and nickel) in the final product.	Note 12
36	Iron	200	µg/l	Iron is an abundant metal found in the Earth's crust. It is naturally present in water but can also be present in drinking water from the use of iron coagulants or the corrosion of steel and cast iron pipes during water distribution. Iron is an essential element in human nutrition. The WHO (WHO, 2004) states that values of up to 2 mg/l (10 times the parametric value) do not present a hazard to health. However, at levels less than 2 mg/l but above the parametric value, the colour of water may turn brown, become turbid or may deposit solids on clothes washed in the water or food cooked using water.	
37	Manganese	50	µg/l	Manganese is an element abundant in the Earth's crust and is commonly found in groundwater. In common with iron, the problems associated with levels of manganese above the parametric value are primarily aesthetic, as manganese can cause staining problems. High levels of manganese also cause objectionable tastes in the water but there are no particular toxicological connotations. The WHO recommend a guideline value of 0.4 mg/l, which is twice the parametric value in the Regulations.	
38	Odour	Acceptable to consumers and no abnormal change			
39	Oxidisability	5.0	mg/l 0_2	Oxidisability is a measure of the organic (and other oxidisable) matter present in a water.	Note 14
40	Sulphate	250	mg/l	Sulphate is naturally occurring and is present in numerous minerals. The WHO review (WHO, 2004) did not identify a level of sulphate in water that is likely to cause adverse health effects but studies did indicate a laxative effect at concentrations of 1,000 to 1,200 mg/l (i.e., several times higher than the parametric value).	Note 12
41	Sodium	200	mg/l	Sodium is an abundant natural constituent of rocks and soils and is always present in natural waters. Excessive intake can cause hypertension but the primary mode of intake is via food.	
42	Taste	Acceptable to consumers and no abnormal change			

	Parameter	Parametric Value	Unit	Comments	Notes
43	Colony count 22^{0}C	No abnormal change		This is the number of organisms per millilitre when the water is stored at 22^{0}C. The usefulness of this parameter is that sudden or significant changes in the levels of organisms can indicate problems with the water supply.	
44	Coliform bacteria	0	No./100 ml	The coliform bacteria (previously know as Total Coliforms) are a group of organisms that can survive and grow in water. They are a useful indicator of treatment efficiency and the cleanliness of the distribution mains. Coliform bacteria can occur in sewage and in natural waters. Coliform bacteria should not be present in water that is disinfected and their presence indicates that either disinfection has not been complete, that there is ingress into the water mains in the distribution network or that the sample point is contaminated.	
45	Total Organic Carbon (TOC)	No abnormal change		This is a measure of the organic carbon in water. Sudden or significant changes in the level of TOC in the treated water can indicate problems with the water supply.	Note 15
46	Turbidity	Acceptable to consumers and no abnormal change		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.	Note 16
47	Tritium	100	Bq/l	Tritium, as a form of Hydrogen, is found naturally in air and water. It is produced naturally in the upper atmosphere when cosmic rays strike nitrogen molecules in the air. Tritium is also produced commercially in reactors. It is used in various self-luminescent devices, such as exit signs in buildings, aircraft dials, gauges, luminous paints, wristwatches and in life science research. The main human health hazard associated with Tritium relates to its ingestion or inhalation which, if in high levels, can lead to the generation of low energy radioactive decay products in the body.	Notes 17 and 19
48	Total indicative dose	0.10	mSv/year		Notes 18 and 19

* sum of concentrations of specified compounds

Notes

Note 1: The parametric value refers to the residual monomer concentration in the water as calculated according to specifications of the maximum release from the corresponding polymer in contact with the water.

Note 2: For the water referred to in sub-articles 6 (a), (b) and (c) the parametric value to be met by 1 January, 2004 is 25 μg/l. A value of 10 μg/l must be met by 25 December, 2008.

Note 3: The value applies to a sample of water intended for human consumption obtained by an adequate sampling method* at the tap and taken so as to be representative of a weekly average value ingested by consumers and that takes account of the occurrence of peak levels that may cause adverse effects on human health.

*The Copper, Lead and Nickel parameters shall be monitored in such a manner as the Minister shall determine from time to time.

Note 4: For water referred to in sub-articles 6 (a), (b) and (c), the parametric value to be met by 1, January 2004 is 25 μg/l. A value of 10 μg/l must be met by 25 December, 2013.

All appropriate measures shall be taken to reduce the concentration of lead in water intended for human consumption as much as possible during the period needed to achieve compliance with the parametric value.

When implementing the measures priority shall be progressively given to achieve compliance with that value where lead concentrations in water intended for human consumption are highest.

Note 5: Compliance must be ensured with the conditions that [nitrate]/50 + [nitrite]/3 < 1, the square brackets signifying the concentrations in mg/l for nitrate (NO_3) and nitrite (NO_2) and the value of 0.10mg/l for nitrites ex water treatment works.

Note 6: Only those pesticides which are likely to be present in a given supply require to be monitored.

"Pesticides" means:

- organic insecticides,
- organic herbicides,
- organic fungicides,
- organic nematocides,
- organic acaricides,
- organic algicides,
- organic rodenticides,
- organic slimicides,
- related products (inter alia, growth regulators)

and their relevant metabolites, degradation and reaction products.

Note 7: The parametric value applies to each individual pesticide. In the case of aldrin, dieldrin, heptachlor and heptachlor epoxide the parametric value is 0.030 μg/l.

Note 8: "Pesticides – Total" means the sum of all individual pesticides detected and quantified in the course of the monitoring procedure.

Note 9: The specified compounds are:

- benzo(b)fluoranthene
- benzo(k)fluoranthene
- benzo(ghi)perylene
- indeno(1,2,3-cd)pyrene.

Note 10: The specified compounds are: chloroform, bromoform, dibromochloromethane and bromodichloromethane.

For the water referred to in sub-articles 6 (a), (b) and (c), the parametric value to be met by 1 January, 2004 is 150 μg/l. A value of 100 μg/l must be met by 25 December, 2008.

All appropriate measures must be taken to reduce the concentration of THMs in water intended for human consumption as much as possible during the period needed to achieve compliance with the parametric value.

When implementing the measures to achieve this value, priority must progressively be given to those areas where THM concentrations in water intended for human consumption are highest.

Note 11: The parametric value is 1.0mg/l for fluoridated supplies. In the case of supplies with naturally occurring fluoride the parametric value is 1.5mg/l.

Note 12: The water should not be aggressive

Note 13: This parameter need not be measured unless the water originates from or is influenced by surface water. In the event of non-compliance with this parametric value, the supply shall be investigated to ensure that there is no potential danger to human health arising from the presence of pathogenic micro-organisms, e.g. *cryptosporidium*.

Note 14: This parameter need not be measured if the parameter TOC is analysed.

Note 15: This parameter need not be measured for supplies of less than 10,000m^3 a day.

Note 16: In the case of surface water treatment, a parametric value not exceeding 1.0 NTU (nephelometric turbidity units) in the water ex treatment works must be strived for.

Note 17: Monitoring frequencies to be set at a later date in Part 2 of the Schedule.

Note 18: Excluding tritium, potassium –40, radon and radon decay products; monitoring frequencies, monitoring methods and the most relevant locations for monitoring points to be set at a later date in Part 2 of the Schedule.

Note 19: **A**. The proposals required by Note 6 on monitoring frequencies, and Note 7 on monitoring frequencies, monitoring methods and the most relevant locations for monitoring points in Part 2 of the Schedule shall be adopted in accordance with the Committee procedure laid down in Article 12 of Council Directive 98/83/EEC.

B. Drinking water need not be monitored for tritium or radioactivity to establish total indicative dose where, on the basis of other monitoring carried out, the levels of tritium of the calculated total indicative dose are well below the parametric value.

An Ghníomhaireacht um Chaomhnú Comhshaoil

Is í an Gníomhaireacht um Chaomhnú Comhshaoil (EPA) comhlachta reachtúil a chosnaíonn an comhshaol do mhuintir na tíre go léir. Rialaímid agus déanaimid maoirsiú ar ghníomhaíochtaí a d'fhéadfadh truailliú a chruthú murach sin. Cinntímid go bhfuil eolas cruinn ann ar threochtaí comhshaoil ionas go nglactar aon chéim is gá. Is iad na príomh-nithe a bhfuilimid gníomhach leo ná comhshaol na hÉireann a chosaint agus cinntiú go bhfuil forbairt inbhuanaithe.

Is comhlacht poiblí neamhspleách í an Ghníomhaireacht um Chaomhnú Comhshaoil (EPA) a bunaíodh i mí Iúil 1993 faoin Acht fán nGníomhaireacht um Chaomhnú Comhshaoil 1992. Ó thaobh an Rialtais, is í an Roinn Comhshaoil, Pobal agus Rialtais Áitiúil.

ÁR bhFREAGRACHTAÍ

CEADÚNÚ

Bíonn ceadúnais á n-eisiúint againn i gcomhair na nithe seo a leanas chun a chinntiú nach mbíonn astuithe uathu ag cur sláinte an phobail ná an comhshaol i mbaol:

- áiseanna dramhaíola (m.sh., líonadh talún, loisceoirí, stáisiúin aistrithe dramhaíola);
- gníomhaíochtaí tionsclaíocha ar scála mór (m.sh., déantúsaíocht cógaisíochta, déantúsaíocht stroighne, stáisiúin chumhachta);
- diantalmhaíocht;
- úsáid faoi shrian agus scaoileadh smachtaithe Orgánach Géinathraithe (GMO);
- mór-áiseanna stórais peitreail;
- scardadh dramhuisce.

FEIDHMIÚ COMHSHAOIL NÁISIÚNTA

- Stiúradh os cionn 2,000 iniúchadh agus cigireacht de áiseanna a fuair ceadúnas ón nGníomhaireacht gach bliain.
- Maoirsiú freagrachtaí cosanta comhshaoil údarás áitiúla thar sé earnáil - aer, fuaim, dramhaíl, dramhuisce agus caighdeán uisce.
- Obair le húdaráis áitiúla agus leis na Gardaí chun stop a chur le gníomhaíocht mhídhleathach dramhaíola trí comhordú a dhéanamh ar líonra forfheidhmithe náisiúnta, díriú isteach ar chiontóirí, stiúradh fiosrúcháin agus maoirsiú leigheas na bhfadhbanna.
- An dlí a chur orthu siúd a bhriseann dlí comhshaoil agus a dhéanann dochar don chomhshaol mar thoradh ar a ngníomhaíochtaí.

MONATÓIREACHT, ANAILÍS AGUS TUAIRISCIÚ AR AN GCOMHSHAOL

- Monatóireacht ar chaighdeán aeir agus caighdeáin aibhneacha, locha, uiscí taoide agus uiscí talaimh; leibhéil agus sruth aibhneacha a thomhas.
- Tuairisciú neamhspleách chun cabhrú le rialtais náisiúnta agus áitiúla cinntí a dhéanamh.

RIALÚ ASTUITHE GÁIS CEAPTHA TEASA NA HÉIREANN

- Cainníochtú astuithe gáis ceaptha teasa na hÉireann i gcomhthéacs ár dtiomantas Kyoto.
- Cur i bhfeidhm na Treorach um Thrádáil Astuithe, a bhfuil baint aige le hos cionn 100 cuideachta atá ina mór-ghineadóirí dé-ocsaíd charbóin in Éirinn.

TAIGHDE AGUS FORBAIRT COMHSHAOIL

- Taighde ar shaincheisteanna comhshaoil a chomhordú (cosúil le caighdéan aeir agus uisce, athrú aeráide, bithéagsúlacht, teicneolaíochtaí comhshaoil).

MEASÚNÚ STRAITÉISEACH COMHSHAOIL

- Ag déanamh measúnú ar thionchar phleananna agus chláracha ar chomhshaol na hÉireann (cosúil le pleananna bainistíochta dramhaíola agus forbartha).

PLEANÁIL, OIDEACHAS AGUS TREOIR CHOMHSHAOIL

- Treoir a thabhairt don phobal agus do thionscal ar cheisteanna comhshaoil éagsúla (m.sh., iarratais ar cheadúnais, seachaint dramhaíola agus rialacháin chomhshaoil).
- Eolas níos fearr ar an gcomhshaol a scaipeadh (trí cláracha teilifíse comhshaoil agus pacáistí acmhainne do bhunscoileanna agus do mheánscoileanna).

BAINISTÍOCHT DRAMHAÍOLA FHORGHNÍOMHACH

- Cur chun cinn seachaint agus laghdú dramhaíola trí chomhordú An Chláir Náisiúnta um Chosc Dramhaíola, lena n-áirítear cur i bhfeidhm na dTionscnamh Freagrachta Táirgeoirí.
- Cur i bhfeidhm Rialachán ar nós na treoracha maidir le Trealamh Leictreach agus Leictreonach Caite agus le Srianadh Substaintí Guaiseacha agus substaintí a dhéanann ídiú ar an gcrios ózóin.
- Plean Náisiúnta Bainistíochta um Dramhaíl Ghuaiseach a fhorbairt chun dramhaíl ghuaiseach a sheachaint agus a bhainistiú.

STRUCHTÚR NA GNÍOMHAIREACHTA

Bunaíodh an Ghníomhaireacht i 1993 chun comhshaol na hÉireann a chosaint. Tá an eagraíocht á bhainistiú ag Bord lánaimseartha, ar a bhfuil Príomhstiúrthóir agus ceithre Stiúrthóir.

Tá obair na Gníomhaireachta ar siúl trí ceithre Oifig:

- An Oifig Aeráide, Ceadúnaithe agus Úsáide Acmhainní
- An Oifig um Fhorfheidhmiúchán Comhshaoil
- An Oifig um Measúnacht Comhshaoil
- An Oifig Cumarsáide agus Seirbhísí Corparáide

Tá Coiste Comhairleach ag an nGníomhaireacht le cabhrú léi. Tá dáréag ball air agus tagann siad le chéile cúpla uair in aghaidh na bliana le plé a dhéanamh ar cheisteanna ar ábhar imní iad agus le comhairle a thabhairt don Bhord.

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