

## Groundwater Pollution

Groundwater accounts for 16 % of the drinking water supplied in Ireland. In some counties over 80% of drinking water is supplied from groundwater. Generally groundwater is not subjected to any treatment process before consumption. It is therefore vital that it is protected from any pollution which could be harmful to human health.

Contamination by disease causing organisms (pathogens) is currently the biggest threat to our groundwater resources and is regarded as a public health issue. Pathogenic organisms present in our groundwater originate from the faecal waste of humans and animals who are already infected with, or are carriers of the disease. Monitoring has indicated the widespread pollution of groundwater by faecal waste. The two most likely causes of faecal contamination are the land spreading of animal waste and failing septic tank systems.

Groundwater monitoring has also shown the presence of high levels of nitrate which can be harmful to human health and causes eutrophication in surface waters. Elevated nitrate levels in groundwater are primarily caused by the use of synthetic fertilizers on agricultural land but are also the result of failing septic tank systems and the poor management of animal waste. Groundwater protection schemes are being used to reduce groundwater pollution. The schemes set out a system which allows for the better management of activities that pose a threat to groundwater.

## Fish Kills

The presence of healthy fish stocks, particularly salmon and trout, in rivers and lakes is considered to be an indicator of good water quality. Equally fish kills are taken as a sign of serious pollution and indicate that significant disruption to the ecosystem has occurred. Protecting our fish stocks is important for our tourism industry. The most recent report published by the Environmental Protection Agency indicates that there were 34 reported fish kills in 2006. Although this is a reduction on previous years, the number of fish kills in Ireland remains unacceptably high. Figure 6 shows the number of reported fish kills in Ireland from 1986-2006.

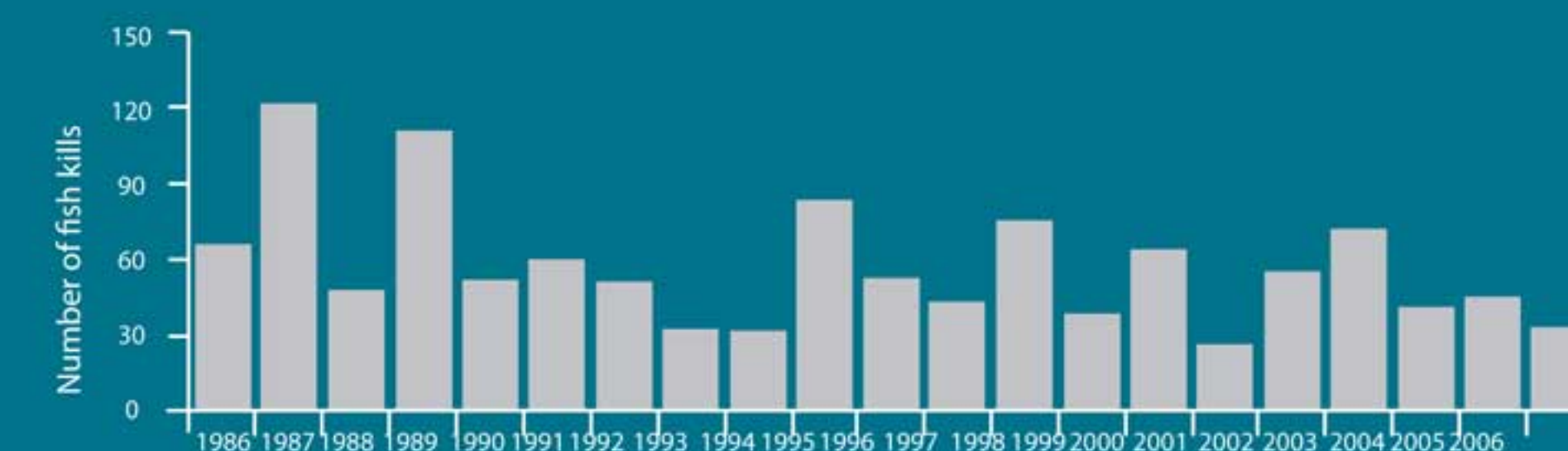


Figure 6. The number of Reported Fish Kills in Ireland: 1986-2006 (Source: EPA)

Agriculture	Industry	Local Authority	Eutrophication	Other	Unknown	Total
5	5	7	5	10	5	34

Figure 7. Causes of Fish Kills in Ireland for 2006 (Source EPA)

The deoxygenation of surface waters is the main cause of fish kills in Ireland. This is brought about by nutrient pollution and the discharge of organic waste into the water system. Bacteria use up oxygen as they digest organic material thus reducing oxygen levels. Most incidences of organic pollution occur as a result of animal and human waste entering the water system. The run-off from farmyards can have a high organic content and has been a cause of fish kills in the past.

Fish kills are also caused by the accidental spillage or intentional discharge of harmful chemicals, poisonous substances, wastewaters and petroleum products from agricultural and industrial sources. The spillage of agricultural pesticides has been attributed to a number of fish kills. Figure 7 shows the causes of fish kills in Ireland for 2006. Harmful substances must be managed closely by us and never disposed of into the water system or poured down the drain. Under Irish law it is illegal to cause water pollution by intentionally discharging harmful substances into surface or groundwaters.

## Physical Modifications to Our Waterways

The impact that physical modifications are having on our waterways is a growing concern. Waterways are being altered in order to increase their beneficial use for us. Physical modifications include:

- Damming rivers and lakes in order to supply water or to generate electricity.
- Constructing flood defenses along rivers and in coastal areas.
- Draining land so it can be used for housing developments, agriculture activity and forestry.
- Straightening and deepening waterways for navigational purposes.

Physically altering our water environment can cause the loss of significant habitats and threatens the survival of many rare aquatic animal and plant species. It can also cause a decline in fish stocks in our rivers and lakes.

## Invasive Alien Species

One of the most significant threats to the quality of Ireland's water environment is the presence and spread of non-native or 'alien' plant and animal species. Exotic species introduced to Ireland include the Zebra Mussel (figure 8) and Chinese Mitten Crab. Non-native aquatic plants and animals represent one of the biggest threats to biodiversity as they can displace existing species and upset the natural ecological balance of our waterways. Their presence can also restrict angling, boating, swimming and other water-based leisure pursuits. If you use our rivers and lakes for recreational purposes you should educate yourself about alien species as it is our responsibility to prevent the further movement of such species through our water system.

## Further Information

- For more information about the quality of Ireland's water environment you can consult the Environmental Protection Agency's website at: [www.epa.ie](http://www.epa.ie). Here you can find a number of reports regarding the quality of Ireland's water environment.
- For more detailed information on the condition of our water environment you can also consult the characterisation report drawn up as part of the Water Framework Directive. You can access this report at: [www.wfd.ie](http://www.wfd.ie)
- Information on the quality of the water environment in each River Basin District can be accessed by obtaining a copy of **"Water Matters Have your Say"** from each Districts own website.
- Information on alien plant and animal species can be found on the Central Fisheries Board website at: [www.cfb.ie](http://www.cfb.ie)

**ENFO**  
7 St. Andrew Street / Dublin 2 / Ireland

**Phone** + 353 1 888 2001 or 1890 200 191  
**Fax** + 353 1 888 3946  
**E-mail** [info@enfo.ie](mailto:info@enfo.ie)  
**Web** [www.enfo.ie/](http://www.enfo.ie/)



## Water Quality in Ireland

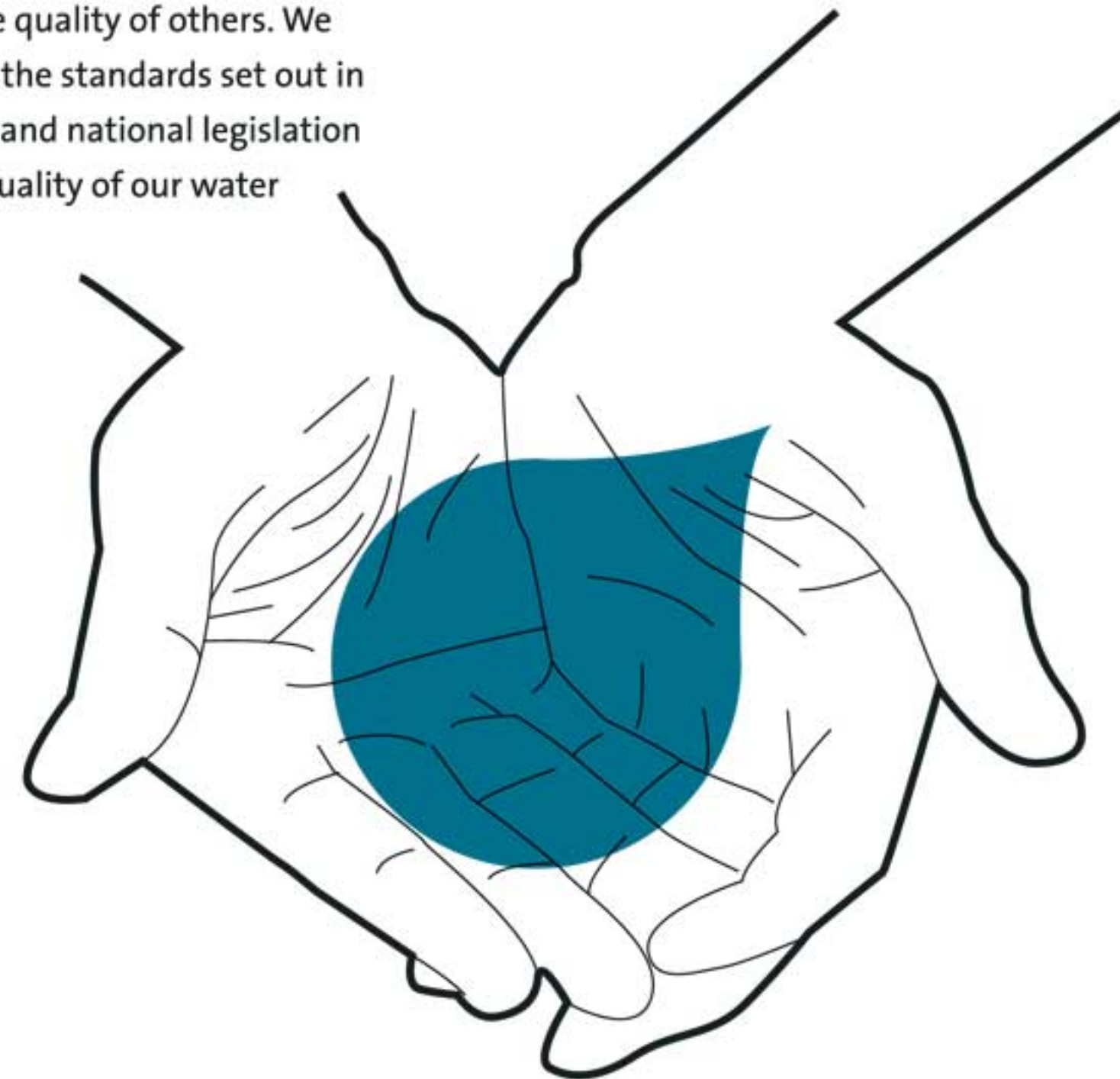






# Introduction

- Human activity has had a significant impact on the condition of the water environment. The impact we have had on the water system is not just related to water pollution but also to the over-abstraction of water for our use, and our physical alteration of the water environment through activities such as building dams and draining wetlands. There are a number of reasons why we must protect the water environment and limit our impact on it.
- To protect human health we must ensure our drinking water sources remain free from any pollution which could be harmful to us.
  - To ensure the quality and quantity of water available for industrial and agricultural purposes it is important that our resources remain free from pollution and are used sustainably.
  - Our rivers and lakes provide for activities such as angling, sailing, bathing and many other water-based sports. It is important that we preserve these waters to ensure their recreational value. Our waterways are also an important part of our tourism industry.
  - To preserve wetland habitats and aquatic ecosystems we must ensure that the water environment remains in as natural a state as possible, free from any human disturbance. Ireland is home to many unique habitats and aquatic plant and animal species which must be protected under national and European law.
  - As set out in the Water Framework Directive all waters in Ireland must achieve 'good status' by 2015. To ensure this objective can be met we have to preserve the condition of some waters and improve the quality of others. We must also meet the standards set out in other European and national legislation governing the quality of our water environment.



# Water Quality in Ireland

In comparison to most other European countries the quality of Ireland's waters is generally good. However the condition of our water environment has significantly declined over the past number of decades. This decline is linked to:

- Population growth.
- The intensification of agricultural activity.
- Economic development.
- The growth of our urban centres.
- Development in rural areas.

More recently monitoring has shown a slight increase in the quality of our waters. The most recent study published by the Environmental Protection Agency regarding the condition of Ireland's waters indicates that:

## Rivers

Over 70% of Ireland's rivers have a satisfactory water quality and would achieve the target of 'good status' set out in the Water Framework Directive. Less than 1% of our rivers are seriously polluted. The assessment of Ireland's rivers is based on their biological quality. Generally rivers in areas which are more intensely farmed and have a greater population density are of a lower quality. Figure 1. shows the quality of Ireland rivers.



Figure 1. River Quality in Ireland (Source: EPA)

## Lakes

Over 85% of the lakes assessed for the report have a satisfactory water quality. For the remaining 15% action will need to be taken so they can achieve 'good status' by 2015. As nutrient enrichment is the greatest threat to the quality of our lakes, nutrient levels are used to assess their condition.

## Estuaries & Coastal Waters

Only 36 % of the estuarine and coastal areas assessed are classified as being unpolluted. As with lakes, the quality of coastal waters is determined by their nutrient levels.

## Groundwater

Of the groundwater monitoring locations sampled, over half show some level of contamination by animal or human faecal waste. Contamination by faecal waste provides a strong indication that disease-causing organisms (e.g. bacteria, viruses, protozoan) may be present. Any indication of faecal contamination means that water supplies are unfit for human consumption. A quarter of groundwater monitoring location show levels of the nutrient nitrate (nitrogen) above the mean guide concentration levels for drinking water and 2% showed levels above the maximum allowable concentration. Nitrate levels are found to be higher in areas which are more intensively farmed.

## Bathing waters

There are 131 designated bathing areas in Ireland including both seawater (122) and freshwater (9) sites. The quality of Ireland's bathing waters is very good; 97 % of bathing areas comply with the minimum European mandatory standards (figure 2) while 90 % comply with the more stringent European bathing water standards.

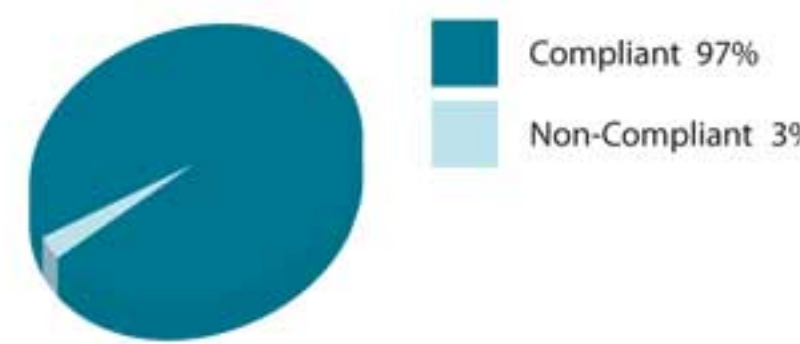


Figure 2. Bathing Water Quality. Compliance with EU Mandatory Limits. (Source EPA)

# Key Issues

There are a number of key issues affecting quality of Ireland's water environment.

## Eutrophication

Eutrophication is one of the most significant issues facing Ireland's aquatic environment and is one of the key obstacles to us meeting the requirements of the Water Framework Directive. It has been identified by the Environmental Protection Agency as, "probably Ireland's most serious pollution problem". Eutrophication is the over-enrichment or pollution of the water environment with the nutrients; nitrogen and phosphorous. Nutrients are essential for the growth of aquatic plant and animal life but if present in excessive amounts they can cause a significant decline in water quality.

Elevated nutrient levels cause the excessive growth and decay of plants and algae (microscopic floating plants) in surface waters. When the plants die they are biologically decomposed by micro-organisms such as bacteria, protozoa and fungi. During the biological degradation process bacteria consume oxygen dissolved in the water. This reduces the level of oxygen which fish and other aquatic life depend on for their survival. Eutrophication reduces the biodiversity of a water body as only hardier aquatic life, which can tolerate lower oxygen levels, can survive. Fish like trout and salmon are sensitive to changes in oxygen levels and require high levels of dissolved oxygen to survive. A significant number of fish kills which occur in Ireland are due to eutrophication.



Figure 3. An Algal Bloom Resulting from Nutrient Pollution

# Eutrophication

Some types of algae produce toxins which are harmful to humans, fish and other aquatic life. In extreme cases lakes may be closed to the public if the growth of harmful algae is such that it presents a hazard to public health. The prolific growth of algae, known as algal blooms, produces what looks like a green scum on the water's surface. Other signs of eutrophication include green 'cloudiness' in the water, a slimy green coating on the surface of stones and rocks around watercourses and an overgrowth of larger plant life. Figure 3 shows an algal bloom formed as a result of nutrient pollution.

Significant sources of nutrient pollution include:

- Animal wastes and chemical fertilisers which are spread on agricultural land.
- The discharge of untreated or inadequately treated wastewater into watercourses.
- Improperly maintained or poorly sited septic tank systems.

According to the latest report published by the Environmental Protection Agency nearly 15% of our lakes (figure 4) are identified as being affected by eutrophication. The quality of estuarine and coastal waters have also been significantly undermined by nutrient pollution. Almost 19 % of coastal water bodies (figure 5) are reported to be eutrophic by the Environmental Protection Agency. The nutrient levels in our groundwater and rivers, which feed into lakes and coastal waters, is also high indicating that nutrient pollution is a problem right through our water system, consequently it may take years for nutrient levels to reduce significantly.

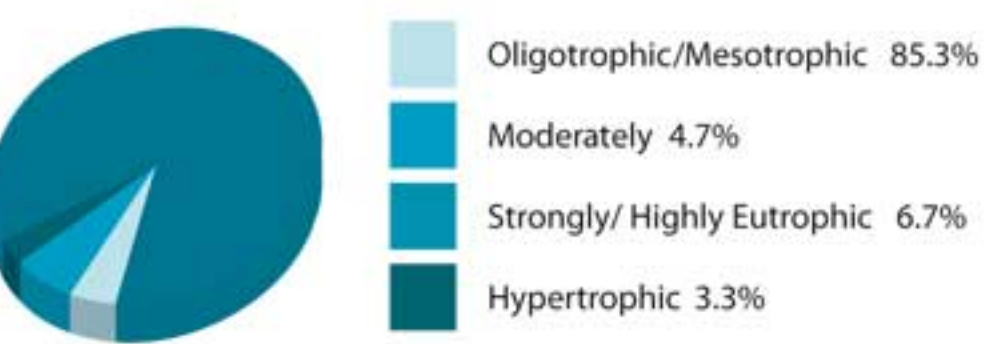


Figure 4 Eutrophication of Ireland's Lakes (Source: EPA)

The problem of eutrophication is being tackled in a number of ways. European and national legislation has been introduced to control the spreading of animal waste especially in vulnerable areas. In accordance with the Wastewater Treatment Directive the standard of wastewater treatment in Ireland has risen. This has reduced the nutrients discharged into the water system from our wastewater treatment facilities. More stringent controls are being introduced to ensure that septic tank systems are installed and maintained properly.

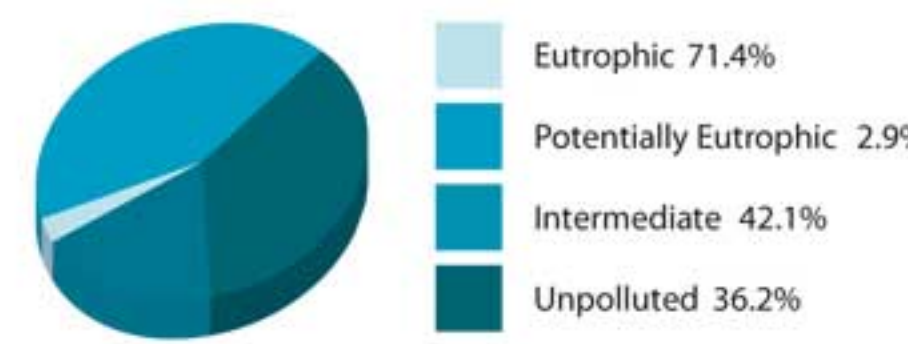


Figure 5. Estuarine and Coastal Water Quality (Source: EPA)

