

EXECUTIVE SUMMARY

SCOPE OF REPORT

This report presents a review of water quality in the State for the years 2004 to 2006. It is the latest in a series of comprehensive three-year reviews of water quality in Ireland that have been undertaken by the Environmental Protection Agency (EPA) and its predecessor organisations. Since the last such report, for the 2001 to 2003 period, the EPA has published various interim and indicator reports according as data has become available. The purpose of the present report, however, is to present a more detailed review of all the main aspects of the quality of the aquatic environment in Ireland in order to provide sound guidance towards its protection and enhancement.

The report is based on measurements made on 1,151 rivers (representing 13,240 km of river and stream channel), the four principal canal systems, on 449 lakes, 69 estuarine and coastal waterbodies and at 137 groundwater sampling locations. While the monitoring programmes for rivers, canals, lakes and tidal waters are similar to those in the previous recent 3-year reporting periods, that for groundwater is new and designed to meet the requirements of the Water Framework Directive (WFD). These water quality data have been generated primarily by the ongoing surveys carried out by the EPA and local authorities and are complemented by those provided by a number of other bodies, in particular the Central Fisheries Board and the Marine Institute.

WATER QUALITY OF RIVERS AND STREAMS

National Situation

The water quality situation in the 13,240 km of river and stream channel was surveyed and assessed by the EPA using a biological assessment method. The assigned biological status is considered as representative of overall river status and to reflect any overall trends in conditions. Following the application of this method, the total river length surveyed in 2004-2006 has been apportioned to four biological Quality Classes: in terms of the estimated channel length in each class the status of this national river baseline in the current and preceding three-year period was as follows:

	Period	Channel length	Percentage
Class A (unpolluted)	2004-2006	9451 km	71.4%
	2001-2003	9163 km	69.2%
Class B (slightly polluted)	2004-2006	2401 km	18.1%
	2001-2003	2370 km	17.9%
Class C (moderate pollution)	2004-2006	1324 km	10.0%
	2001-2003	1637 km	12.3%
Class D (serious pollution)	2004-2006	63.5 km	0.5%
	2001-2003	76 km	0.6%

Situation in the River Basin Districts

In decreasing order of the proportion of surveyed channel length in Class A, the River Basin Districts (RBDs) may be ranked as follows (1998-2000 and 2001-2003 given for comparison):

River Basin District	1998-2000	2001-2003	2004-2006
South Western RBD	83	89	90
Western RBD	84	84	84
North Western IRBD	74	76	71
Shannon IRBD	67	63	67
South Eastern RBD	62	58	62
Eastern RBD	42	41	52
Neagh Bann IRBD	54	55	49
National Average	70	69	71.4

As expected, the less densely populated, less developed and less intensively farmed regions along the western seaboard have the higher proportions of unpolluted channel while the eastern and south-eastern areas are most affected by water quality degradation.

Changes since 2001-2003

The figures show that there was a substantial increase in the proportion of channel classed as unpolluted in the current compared to the previous period and a small increase in the slightly polluted waters. This was due to a marked reduction in the moderately polluted channel and a further reduction in the length of seriously polluted channel, which amounted to 76 km in 2001-2003, as compared with 112 km in 1998-2000, and is the lowest on record since the early 1990s. At RBD level, recent improvements have been recorded in the South Western, South Eastern and Eastern RBDs and Shannon IRBD, whereas decreases in the Class A channel length were measured in the North Western and Neagh Bann IRBD.

Serious pollution has been substantially reduced in the Eastern RBD and to a lesser extent in the South Eastern RBD. While moderate pollution has reduced in the South Eastern RBD compared with the previous period, it has remained the same in the Eastern, South Western and Western RBDs and increased in the North Western, Shannon and Neagh Bann RBDs.

Suspected Causes of Pollution

A total of 39 locations were assessed as seriously polluted in the 2004-2006 period. Of these, 21 were suspected to be so classified as a result of municipal, mostly sewage, discharges: this is three less than in the 2001-2003 survey period. Most of the affected locations have been seriously polluted for a considerable time but in some instances the deterioration to this status has occurred recently. Agriculture is suspected as seriously polluting a further nine locations while industry, forestry, oil and unknown sources are suspected for the remaining instances. All of these seriously polluted locations are identified in Chapter Two. With regard to the moderate and slight pollution detected in the period, the bulk of this was suspected to be

caused by municipal and agricultural sources. The predominant suspected causes of slight pollution were agricultural sources and of moderate pollution were municipal sources.

Fish Kills

The total number of fish kills in surface freshwaters (rivers and lakes) reported by the Central Fisheries Board (CFB) in the period under review was 122. This represents a marked improvement over the previous three year period when 147 such events were recorded, but is still unacceptably high. Agriculture was suspected as being responsible for some 34 of these fish kills, with 28 due to sewage discharges and 15 to industry, with the balance attributable to 'other' (26) and 'unknown' (19) causes.

Quality of Salmonid Waters

Data collected during the period 2004-2006 for the waters designated under the EU Freshwater Fish Directive are reviewed. As noted for previous review periods, breaches of the water quality limits set by the Directive were largely due to nitrite; there were 129 exceedences recorded in 23 of the 34 designated rivers. More than half of these exceedences were accounted for by breaches in four rivers: Boyne (21), Blackwater (Munster) (18), Nore (18) and Slaney (14). Other parameters for which the limits were breached include B.O.D (6) dissolved oxygen (3), ammonium (3) and dissolved Copper (5) and Zinc (2). Nine of the 34 designated rivers were likely to have been in compliance with all of the parameters for which sufficient data are available; these rivers include the Deel (Crossmolina), Glone (Mayo), Gweestion, Manulla, Moy, Owengarve (Sligo), Spaddagh, Trimoge and Yellow (Foxford).

Nitrates

The oxidised nitrogen values measured in the current review period indicate that while individual breaches of the EU guideline limit have been recorded, nitrate concentrations in Irish surface waters are generally well within the mandatory limit set for abstraction and drinking waters. The trend of increasing average median and maximum nitrate levels in the rivers of the southeast in the latest survey period is a situation that will need attention.

Toxic Substances in Rivers and Streams

The data arising from surveys of the levels of toxic and bioaccumulative substances in rivers, undertaken by the EPA in the period, are reviewed. The results of the survey showed that 31 of the 41 WFD Priority Substances and 89 of the 161 relevant pollutants were detected in one or more samples, often at trace levels. The most commonly detected compounds were metals and polycyclic aromatic hydrocarbon (PAH). The levels of the locally relevant pollutants were considered, and 28 compounds were considered to merit inclusion, along with the 41 priority substances on the WFD list, in the Surveillance Monitoring programme. This programme commenced in July 2007 and the first cycle of monitoring is due for completion in 2009.

Quality of Canal Waters

Physico-chemical sampling of the four waterways (Grand Canal, Royal Canal, Barrow Navigation and Shannon-Erne Waterway) in the 2004-2006 monitoring period showed that most sampling sites were compliant with the water quality limits used for assessment

purposes and that, with the exception of the Barrow Navigation, water quality was good overall. However, breaches of the limits occurred in all water bodies to a greater or lesser extent during the period and were mainly due to exceedance of phosphorus (TP and MRP) and microbiological (total and faecal coliforms) limits. The majority of breaches in the Royal and Grand Canals were attributed to a small number of feeder streams that caused localised pollution problems. The Barrow Navigation exhibited unsatisfactory water quality throughout the sampling programme, as evidenced by the high incidence of bacteriological contamination and elevated phosphorus levels.

Phytoplankton development (as determined by a measure of the algal pigment Chlorophyll) in the Royal and Grand Canals as well as for canal and lake sites in the Shannon-Erne Waterway indicate that these waters are oligotrophic or mesotrophic suggesting low levels of nutrient enrichment.

WATER QUALITY OF LAKES

National Situation

The assessment of the water quality of lakes is based on estimates of the level of algal and cyanobacterial growth in the water column (as indicated by a measure of the algal pigment Chlorophyll) and thus of the tendency to eutrophication. The majority (383 or 85.3%) of the 449 lakes examined in the period 2004-2006 were of satisfactory water quality. This compares favourably with the 82 per cent recorded in the previous period of assessment. The combined areas of these satisfactory lakes represent almost 92 per cent of the total area of such waters surveyed in the period. The water quality of the remaining 66 lakes was less than satisfactory. Fifty one lakes were classified as eutrophic in varying degrees. Of these 21 were classified as moderately eutrophic and 30 as strongly or highly eutrophic compatible with a strong to high level of pollution and a marked degree of impairment of beneficial use. The remaining 15 lakes were classified as hypertrophic, i.e. the most enriched status and characterized by very high levels of algal growth consistent with a very high level of pollution and impairment of use.

Regional Situation: assessment by River Basin District

Over half of the lakes examined (282) were located in the Western River Basin District (WRBD) and the North West International River Basin District (NWIRBD), reflecting the distribution of lakes in Ireland. The Shannon International River Basin District (ShIRBD) had the next highest portion of lakes at 74. In decreasing order of the percentage of the number of lakes classified in a satisfactory status (oligotrophic or mesotrophic), the River Basin Districts (RBDs) may be ranked as follows (2001-2003 given for comparative purposes):

River Basin District	2001-2003	2004-2006
Western RBD	98%	100%
Shannon IRBD	83%	84%
Eastern RBD	63%	80%
North Western IRBD	77%	79%
South Western RBD	79%	76%
South Eastern RBD	83%	69%
Neagh Bann IRBD	48%	56%
National Average	82%	85.3%

Analysis by Size

The surface area of the 449 lakes examined in the period 2004-2006 amounted to 1014 km². Lakes accounting for 931.8 km² (91.9%) were in the satisfactory oligotrophic or mesotrophic categories, marginally higher than that for the period 2001-2003 (91%). A further 46.8 km² (4.6%) were classified as eutrophic and 35.4 km² (3.5%) were assigned to the hypertrophic category.

Over ninety nine percent of lakes in the State have surface areas less than 1 km² (100ha) and slightly more than 100 lakes are greater than 1 km². Of the 449 lakes examined in the 2004-2006 period 364 were less than 1 km² in surface area. The number of monitored lakes in the small (<1 km²), medium (1-7.5 km²) and large (>7.5km²) categories and the percentage of these lakes assigned to the oligo/mesotrophic, eutrophic hypertrophic categories is as follows

	No.	Oligo/mesotrophic	Eutrophic	Hypertrophic
Small (<1 km ²)	364	85%	12%	3%
Medium (1-7.5 km ²)	61	87%	7%	6%
Large (>7.5km ²)	24	83%	8%	8%

As in previous assessment periods a high percentage of the larger lakes (>7.5 km²) were assessed as satisfactory, including Loughs Corrib, Derg, Ree and Mask, the largest lakes in the State. However, in the case of seven of these lakes: Loughs Key, Ree, Derg, Corrib, Derravaragh, Arrow and Gill the infestation of these lakes by the Zebra mussel may have been at least partially responsible for much of the reduction of the chlorophyll concentrations recorded in recent years. In the case of the large western lakes, while the open waters showed low or moderate levels of planktonic algae, instances of excessive algal and other plant growth have been noted in the littoral (near shore) areas and these may indicate localised nutrient enrichment.

Chlorophyll concentrations indicative of serous pollution were again recorded in two of the large lakes, viz Loughs Gowna and Oughter.

Trends in Lake Water Quality

The percentage of lake surface area classified in each trophic status has remained relatively stable since 1998-2000. However, there has been a small rise in the percentage area assessed as hypertrophic in the current sampling period. This increase could be linked to the decline in the highly/strongly eutrophic category noted in the current period. Lough Allua, Gowna, Muckno and Mullagh and Inner lake all moved from the highly/strongly eutrophic category to the hypertrophic category in the current review period.

Of the 21 lakes examined continuously since 1976 eight have been in a satisfactory condition on all occasions, although all have fluctuated between oligotrophic and mesotrophic status in this period. Reviews of a further six lakes are available since 1982-1986 and of these lakes only four: Glendalough Upper, Maumwee, Nafurnace and Nahasleam, were classified as being of oligotrophic status for each review period.

Loughs Ree, Derg, Derravaragh Ennell and Leane, have shown a marked improvement in quality following earlier enrichment during the 32 year period, while Loughs Gowna and Muckno exhibit the symptoms of declining quality. The quality of the remaining lakes shows considerable fluctuation.

Acid-Sensitive Waters

Monitoring of the representative acid-sensitive lakes and their feeder streams, in Counties Donegal (Lough Veagh), Galway (Lough Maumwee) and Wicklow (Glendalough Upper), continued in the 2004-2006 period. The analysis of the monitoring data continued to demonstrate the absence of an impact in the Donegal and Galway lakes and streams due to artificial acidification. The intermittent presence of acid sensitive organisms at the sampling station on the Lugduff River, tributary of Glendalough Lake Upper, and in the littoral fauna of that lake suggest a reduction in the level of impact by artificial acidity in these waters, which were regarded as being severely degraded by artificial acidification in the past decades.

Lake Bathing Waters

There are nine lake bathing water areas designated for the purposes of the EU Bathing Waters Directive. These bathing areas achieved 100 per cent compliance with the EU mandatory standards for each year during the review period. However, compliance with the more stringent EU guide values has declined from 89 per cent in 2004 to a low of 78 per cent in 2006, indicating some deterioration in water quality.

QUALITY OF TRANSITIONAL AND COASTAL WATERS

National Situation

The assessment of the trophic status of transitional (estuarine) and coastal waters around Ireland, in the period 2004–2006, is mainly based on the analysis of data collected by the EPA and from the Marine Institute’s annual winter nutrient surveys. A total of 69 individual estuarine and coastal waters bodies in 25 estuarine and coastal areas were assessed in this period. Of these, 13 were classed as eutrophic, two as potentially eutrophic, 27 as of intermediate status and 27 as unpolluted. The 13 eutrophic waters were:

Castletown Estuary	Rogerstown Estuary (Inner)	Broadmeadow Estuary (Inner)
Lr Slaney Estuary	South Wexford Harbour	Wexford Harbour
Upper Blackwater Estuary	Lower Blackwater Estuary	Owenacurra Estuary
Upper Bandon Estuary	Lower Bandon Estuary	Argideen Estuary
Upper Lee (Tralee) Estuary		

The condition of 60 of the 69 water bodies assessed, has remained unchanged since the 1999-2003 assessment period. Of the nine water bodies that have changed in status, six have shown a decline in status while three have shown an improvement. The Upper Blackwater estuary and Wexford Harbour are now classified as eutrophic having previously being classified respectively as potentially eutrophic and intermediate, while Dungarvan Harbour, the Lower Lee (Tralee) estuary, and Sligo Harbour have all moved from the unpolluted category to intermediate.

Of the 12 water bodies classed as eutrophic in the 1999-2003 assessment, 11 remain so, with only Lough Mahon, which is now classified as intermediate, having improved in status. Improvements were also observed in the Boyne estuary, which has moved from being potentially eutrophic in the previous assessment to intermediate in the current period, and in the Upper Feale estuary, which is now considered to be unpolluted.

Data on nitrate and phosphate concentrations in the offshore waters of the Irish Sea arising from winter/spring surveys carried out by the Marine Institute indicate no instances of excessive nutrient enrichment. Moreover, there were indications of a decrease in both oxidised nitrogen and orthophosphate in all regions, but with the exception of total oxidised nitrogen in the southwest Irish Sea, where a five percentage point increase in concentration was measured. Nutrient concentrations were consistently below the OSPAR thresholds and the ratios between the different nutrient elements, which can indicate anthropogenic nutrient disturbance, were also generally below their respective OSPAR thresholds. .

Quality of Shellfish and Shellfish Waters

The Marine Institute monitors the levels of potentially toxic and bioaccumulative hazardous substances in commercial fish and shellfish from selected sites around the Irish coast. These are substances, such as mercury, that have been identified as being of particular concern to the marine environment and to consumers of seafood. Data from the 2004-2006 period continued to demonstrate the relatively low levels of such substances in samples taken in Irish waters, which are well within those set for the purposes of consumer protection.

The classification shellfish production areas is required under the Directive (91/492/EEC) and by the 1996 Regulations (S.I. No. 147, 1996). The proportion of areas in the Class A category, from which shellfish may go direct for human consumption, was in the range 22-29 percent in the period 2004-2006. The remaining waters were in the Class B category while no Class C water was reported in 2004, 2005 and 2006.

The shellfish production areas around the coast of Ireland are monitored on a weekly or monthly basis for phytoplankton and the presence of marine biotoxins. This is based mainly on the examination of phytoplankton samples for the presence of toxin producing algae, in particular species of Dinoflagellates. Levels of biotoxins were low in 2004 when less than four per cent of shellfish tested positive for Diarrhetic Shellfish Poisoning (DSP). In 2005 and 2006 there were prolonged closures or restricted harvesting of shellfish, due to the presence of DSP and Azaspiracid Shellfish Poisoning (AZP) toxins in coastal waters. There is little evidence to suggest that the variable occurrence of toxin emitting species in Irish waters is related to anthropogenic nutrient enrichment; instead studies suggest that the blooms originate offshore and are blown inshore by onshore winds.

Quality of Marine Bathing Waters

The water quality at the 122 marine bathing areas in Ireland has remained high and compares very favourably with that in other EU Member States. During each year of the 2004-2006 review period, over 96 per cent of the sites monitored complied with the minimum mandatory standards set by the EU Bathing Waters Directive and national regulations. The proportion of sites complying with the more stringent EU guideline standards rose during the review period from 88 per cent in 2004 to 91 per cent in 2006. These results are an improvement over the

previous reporting period where the maximum proportion of sites complying with the more stringent values was 84 per cent.

The Blue Flag awards for bathing waters, administered in Ireland by An Taisce, is based on the performance and standards achieved during the previous bathing season. In 2004, 2005 and 2006, respectively, 77, 79 and 81 blue flags were awarded to Irish beaches. The 2006 figure was the highest number of Blue Flags ever achieved by Ireland.

Radioactivity Monitoring

Radioactivity monitoring of the Irish marine environment in 2004-2006 was undertaken by the Radiological Protection Institute of Ireland (RPII) and gave particular attention to fish and shellfish collected at the north-east coast fishing ports where the highest concentrations of Sellafield-derived radionuclides have been found. Seawater, sediment and seaweed were also collected from coastal sites while seawater and sediment samples were taken for examination at offshore sites in the western Irish Sea. Caesium-137 continues to be the dominant radionuclide accounting for approximately 60-70 per cent of the total radiation dose from Sellafield to the Irish population. The dose due to this radionuclide has declined significantly over the last two decades corresponding with the reduction in discharges from Sellafield.

The results of the monitoring programmes between 2003 and 2005 show that, the levels of anthropogenic radioactivity in the Irish environment are low by comparison with the doses received as a result of background radiation and do not pose a significant risk to human health. The currently estimated radiation dosage to heavy consumers of seafood is only a very small proportion (~0.02%) of the total annual dosage received from all sources. Radiation doses to the Irish population resulting from discharges at Sellafield, on the north-west English coast, are now very low and on the basis of current scientific knowledge do not pose a significant health risk. Further reductions in these doses are being pursued through the implementation of the OSPAR Strategy with regard to Radioactive Substances. All signatories to the Strategy are committed to progressive and substantial reductions in radioactive discharges from their facilities.

Oil Pollution Incidents

The documentation and investigation of oil pollution in the marine environment is the responsibility of the Irish Coast Guard whose remit covers an area stretching to 200 miles off the west coast and to the median line between Ireland and the UK in the Irish and Celtic Seas, covering an area of approximately 200,000 km².

Anti-pollution measures were successfully deployed during the current assessment period in the small number incidents involving large vessels. During 2004-2006, 149 reports of pollution were investigated the majority of which occurred in smaller harbours and adjacent areas. Mineral oils accounted for the bulk of the polluting material observed but, in most cases, it was not possible to identify the vessels involved.

QUALITY OF GROUNDWATERS

National Situation

An improved groundwater monitoring programme has been developed and implemented in Ireland to examine groundwater quality, and the links between groundwater and the ecological health of associated surface waters. Monitoring points have been selected to reflect variations in hydrogeology and anthropogenic pressures in Ireland. Between 2004-2006, a total of 1,362 individual samples were analysed at 137 monitoring stations. The data indicate that the chemical quality of groundwater is generally good, with only a small number of monitoring points having concentrations greater than the drinking water standards. However, nitrate and phosphate concentrations are significantly higher than background concentrations in places, thereby having the potential to contribute to surface water eutrophication. Also, microbial pathogens are more prevalent, largely from organic waste sources, and can pose a threat to human health. Therefore, greater attention needs to be given to groundwater protection, and in particular to prevention of pollution at source.

Groundwater Quality

The assessment of the status of groundwater in Ireland in 2004- 2006 is based on the analysis of data collected by the EPA and the South Eastern River Basin District project team between 2004-2006. The data are presented for parameters that are indicators of anthropogenic pollution (Ammonium, Nitrate, Phosphate and Faecal Coliforms) and comparison is made with the appropriate threshold values, standards and principles that will be utilised for WFD classification for these parameters.

Ammonium

Background concentrations of ammonium in water are generally low and its presence in groundwater at levels > 0.15 mg/l N is usually indicative of a nearby source of organic pollution; however, in peat land areas higher ammonium concentrations may occur naturally. The majority (90.5%) of the groundwater monitoring locations examined in 2004-2006 had mean concentrations of less than 0.05 mg/l N, with concentrations greater than 0.23 mg/l N, the drinking water MAC, recorded at only 4 of the 137 monitoring locations. Two of these four monitoring locations also tested positive for faecal coliforms, possibly indicating that pollutants from nearby organic pollution sources are getting into groundwater. No significant changes in ammonium concentrations at the monitoring locations between 1995 and 2006 were noted.

Nitrate

Background levels of nitrate in groundwater are generally low and concentrations higher than 10 mg/l as NO₃ are usually indicative of anthropogenic organic or inorganic inputs. The presence of high nitrate concentrations in groundwaters is a concern for public health if the water is used for potable supplies and such waters may also be a significant factor in surface water eutrophication at times when these waters contribute the bulk of the flow in rivers and streams. Of the 137 monitoring locations, the mean nitrate concentrations exceeded 37.5 mg/l NO₃ (the annual meant nitrate threshold concentration for groundwater) at 13 (9.5%) sites,

while at three (2%) of these locations, the mandatory 50 mg/l NO₃ was exceeded. Generally, the southeast of the country has the greatest proportion of monitoring locations with elevated nitrate concentrations.

Phosphate

In general phosphate concentrations in groundwater are not a cause of concern in relation to its use as a drinking water supply. As in the case of nitrate, a concern can arise with the effect on associated waters, if phosphate concentrations in groundwater are in excess of 0.03 mg/l P, the limit set for the annual median concentration in rivers under the Phosphorus Regulations, at times when groundwater provides a significant proportion of river flow, it may be contributing to eutrophication in the receiving surface waters. Mean phosphate concentrations exceeded 0.03 mg/l P at 41 of the 137 sampling locations, 15 of which exceeded 0.05 mg/l P. Concentrations greater than 0.03 mg/l P were recorded in 318 samples; one of which exceeded the MAC of 2.2 mg/l P.

Microbial Pathogens

The main threat to users of groundwaters is contamination with pathogenic micro-organisms, originating in sewage, animal manures or other organic wastes. The presence of faecal coliform bacteria (e.g. *Escherichia coli*) in water samples is taken as an indicator of faecal contamination and thus of the potential presence of associated pathogenic micro-organisms, capable of causing disease.

Between 2004-06, a total of 1,330 samples were analysed for faecal coliforms at 135 monitoring locations. Positive faecal coliform counts were detected in 338 (25.4%) samples, 143 (10.9%) of which exceeded 10/100 ml. Positive counts were detected at 79 (58.5%) monitoring locations on one or more occasions during the reporting period. A count of 10/100 ml is regarded as an indication of gross contamination. Faecal coliform counts in excess of 10/100 ml were recorded at 50 (37%) monitoring locations. The data indicate that there has been a gradual reduction in faecal coliforms counts at the groundwater monitoring points between 1995 and 2006.

CONCLUSIONS

The principal findings of the water monitoring programmes carried out in the 2004-2006 period indicate that:

- There is an overall improvement in the quality of surface and groundwater in the state since the previous assessment period.
- Nutrient enrichment causing eutrophication is the main threat to these systems. In the freshwaters this is attributed primarily to excessive inputs of phosphorus. However, excessive levels of nitrate were also recorded in both surface and groundwaters. In rivers and lakes, nitrate is generally present at levels that are less than the guide limit set for drinking water, but are, however, likely to be contributing to the eutrophication process. In groundwater nitrate is often present at levels higher than those in surface waters and in a number of the locations sampled exceeds the limits for drinking water.

- The total number of fish-kills in surface freshwaters was markedly reduced compared with recent previous assessment periods.
- Intermittent contamination of groundwaters with faecal coliforms appears to be relatively widespread and constitutes a risk for those using such untreated waters for drinking without sterilisation.
- The principal sources of these contaminants in rivers were discharges from municipal sewage treatment works and Agricultural.
- While there is evidence of an overall improvement in water quality, the rate of this improvement in surface waters is not sufficient to meet the requirement of the Water Framework Directive of having good status in all waters by 2015. Extensive measures will be required to achieve the target set out in the Directive.
- The main restorative measure required for surface water is nutrient loss control. In relation to point sources, this will necessitate further upgrading of sewage and industrial waste treatment plants to facilitate the removal of phosphorus and/or nitrogen; for certain sewage treatment plants such upgrading is also a requirement under the Urban Waste Water Treatment Directive.
- In relation to diffuse sources the National Action Plan for the implantation of the Nitrates Directive should provide a basis for the reduction of both nitrate and phosphate losses from farm land, which is the main contributor of these nutrients to waters. It should also benefit groundwater in reducing the potential for bacterial and nitrate contamination.