



# **Phosphorus Regulations National Implementation Report, 2005**

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## List of Abbreviations

BATNEEC	Best available technology not entailing excessive costs
CAP	Common Agricultural Policy
CSO	Combined Sewer Overflow
DAF	Department of Agriculture and Food
DEHLG	Department of Environment, Heritage and Local Government
EMS	Environmental Management System
EPA	Environmental Protection Agency
ERTDI	Environmental Research, Technological Development & Innovation
EU	European Union
GAEC	Good Agricultural and Environmental Condition
GIS	Geographical Information System
GSDSDS	Greater Dublin Strategic Drainage Study
GPS	Global Positioning System
GSI	Geological Survey of Ireland
IAE	Intensive Agricultural Enterprise
ICW	Integrated Constructed Wetland
IFA	Irish Farmers Association
IPC	Integrated Pollution Control
IPPC	Integrated Pollution Prevention and Control
LA	Local authority
LGCSB	Local Government Computer Services Board
MCEI	Minimum Criteria for Environmental Inspections
MRP	Molybdate reactive phosphorus
N	Nitrogen
NMP	Nutrient Management Plan
OECD	Organisation for Economic Co-operation and Development
OEE	Office of Environmental Enforcement
OPW	Office of Public Works
P	Phosphorus
p.e.	Population equivalents
PMS	Performance Management System
RBD	River Basin District
RBM	River Basin Management
REPS	Rural Environment Protection Scheme
SIPTU	Services, Industrial, Professional and Technical Union
SMR	Statutory Management Requirement
SPC	Strategic Policy Committee
SuDS	Sustainable Drainage Systems
SWAN	Sustainable Water Network
WFD	Water Framework Directive
WQMMS	Water Quality Monitoring and Management System
WWTP	Waste Water Treatment Plant

## Executive Summary

This is the third National Implementation Report published by the Environmental Protection Agency (EPA) on the Phosphorus Regulations. It is prepared under Article 4(4) of the Local Government (Water Pollution) Act, 1977 (Water Quality Standards for Phosphorus) Regulations, 1998 (S.I. 258 of 1998). The report has been prepared from information and water quality data submitted by local authorities in their Implementation Reports and from water quality data collected by the Agency in the 2001-2003 period.

The Phosphorus Regulations require that water quality be maintained or improved by reference to the baseline biological quality rating (rivers) or trophic status (lakes) assigned by the Agency in the 1995-97 review period or at the first occasion thereafter. Water quality targets set in the Regulations must be met by 2007 at the latest for waters surveyed by the EPA in the 1995-97 period and within a maximum of ten years for waters first surveyed after 1997.

The main conclusions of this report are as follows:

- The water quality at 63.4 per cent of the monitoring stations nationally is compliant with the Regulations i.e., the water quality at these stations meets the biological and/or the molybdate reactive phosphorus (MRP) targets in the Regulations. This represents an increase of 3.4% in compliance from the baseline (generally 1995-1997) period. This may largely be accounted for by a substantial increase in MRP monitoring.
- Marked increases (>30%) in compliance between the baseline and 2001-03 periods are apparent in Dublin City, Kildare, Fingal, Westmeath, South Dublin and Meath. These increases are partly due to increased monitoring for MRP and in some cases (most notably Dublin City) reductions in MRP levels. Significant improvements in biological water quality have been achieved in Fingal, Kildare and Meath. A significant decline (>20%) in compliance with the Regulations is apparent in Donegal and Wicklow.
- A worrying trend is the decline in the number and percentage of river stations of highest biological water quality (Q5) (down from 4.6 per cent of stations in the baseline to 2.7 per cent of stations in 2001-2003). Similar analysis also reveals a decline of 1.4 per cent in stations of Q4-5 status between the baseline and current monitoring periods (from 21.5 per cent to 19.1 per cent).
- Of the 496 lakes with updated trophic status information available, 401 currently comply with the targets set in the Regulations and the remaining 95 do not. Counties with a relatively large number of non-compliant lakes (>4) include Monaghan (31), Cavan (14), Clare (14), Leitrim (9), Cork (7), and Longford (6). Agricultural activities are considered to be the source of the nutrient enrichment affecting most of the non-compliant lakes but point sources including sewage discharges are involved in some cases.

Progress has been made by a number of local authorities in the implementation of measures to tackle water pollution, e.g., in the implementation of agricultural bye-laws, in carrying out farm surveys, in reviewing discharge licences, in upgrading/constructing wastewater treatment plants and collection systems, and in carrying out misconnection surveys. The development of teams within some local authorities to tackle agricultural pollution issues is welcome. However, significant work remains to be done in order to meet the targets of the Phosphorus Regulations by 2007.

The installation of phosphorus removal at certain inland wastewater treatment plants has proven successful in improving water quality. However, municipal pollution problems remain very significant nationally due to, for example, overloading of wastewater treatment plants, poor performance of plants and stormwater overflows. In addition, only 17 per cent of waste water treatment plants (serving above 500 populations equivalents) discharging to sensitive waters (as defined in the Urban Waste Water Treatment Regulations, 2001) have nutrient reduction facilities. Construction/upgrade of wastewater treatment plants and collection systems should be prioritised based on the significance of environmental impacts. A number of local authorities also report that many single house treatment systems are not installed or maintained properly, thus contributing to surface and groundwater pollution.

Tackling pollution from agricultural sources remains the greatest challenge. Eleven local authorities report significant farm survey work in the 2002-2004 period (i.e., over 100 farm surveys each). However, the current level of work in this area will have to rise dramatically in order to make a significant impact on this type of pollution. Common Agricultural Policy (CAP) reform, and implementation of cross-compliance requirements and the Nitrates Directive should help to tackle pollution from agriculture over the longer term. It is essential for successful implementation of the Regulations that adequate resources are available to local authorities and the EPA to implement those measures considered necessary for water quality protection. Measures to address agricultural pollution, in particular, are resource intensive in terms of personnel and consideration should be given at a national and at a local authority level to ensuring adequate resources are devoted to this area.

Ireland is currently on target with regards to meeting its commitments under the Water Framework Directive (WFD). However, the real challenge of the WFD will be the implementation of measures to successfully protect and improve water quality to ensure good water status. Despite the implementation of local authority measures programs under the Phosphorus Regulations national water quality has not yet improved significantly, though there have been some local improvements in water quality due to measures implementation. Local authorities will play a key role in the implementation of the Water Framework Directive in Ireland, including in the development and implementation of measures. The River Basin Management projects, which have been established to facilitate implementation of the Directive, should help provide local authorities with the information necessary to protect and improve water quality within their functional areas. The projects should assist local authorities in gaining co-operation

from all relevant sectors and other interested parties to enable successful water quality management. However, it is important that local authorities act on the wide array of information already available to them on pollution blackspots and suspected causes to ensure compliance with prescribed water quality standards. Current monitoring results indicate that significantly increased efforts will be required to meet the water quality targets of the Regulations (and indeed the more stringent targets of the WFD).

Key recommendations of this report are:

- It is recommended that local authorities identify the causes of decline in high quality waters (i.e., Q5 and Q4-5) and rectify them as a matter of urgency. Where water quality remains high, local authorities must prevent deterioration of high quality waters, for example, through increased control of development in these catchments. This may include increased liaison with, and control over, upland land-users (e.g., cattle and sheep farmers, foresters) where many of the high-quality sites occur.
- Local authorities should also focus on tackling serious and moderate pollution; and on the implementation of measures that are likely to lead to quick benefits in terms of improved water quality. A catchment-based approach to water quality management should be used.
- Local authorities and other relevant agencies should prioritise the construction/upgrade of wastewater treatment plants and collection systems based on the significance of environmental impacts. Local authorities must ensure effluent from waste water treatment plants (WWTPs) does not adversely impact on receiving waters. Some WWTPs also require upgrading under the Urban Waste Water Treatment Directive. Adequate provision for urban wastewater treatment and appropriate monitoring and management of plants is required to allow for the full environmental benefit of the large expenditure on wastewater treatment to be realised. Local authorities should carry out chemical and biological assessment of receiving waters above and below each WWTP to assess their impacts on receiving waters. Stormwater overflows should also be assessed. Where problems are found a programme of measures to address these should be developed and undertaken. The Agency recommends that phosphorus removal be considered for all plants discharging to freshwaters.
- Local authorities should increase co-operation between Planning, Environment and Water Services sections and consider water quality issues as a key factor when considering future development. Particular attention should be paid to the potential impact of discharges from new developments on receiving waters, especially on water bodies with limited assimilative capacity. In the context of sustainable development, such discharges should only be facilitated where it can be demonstrated that they will not cause environmental pollution. Local authorities should have regard to Groundwater Protection Schemes developed by the Geological Survey of Ireland in preparation of County Development Plans.



- Greater efforts are required in monitoring and enforcement of local authority discharge licences, and in addressing unlicensed discharges. Local authorities should have regard to the relevant Department of Environment Heritage and Local Government (DEHLG) circular L8/03 on this matter. In addition, local authorities should have regard to Minimum Criteria for Environmental Inspections (MCEI) requirements.
- Local authorities should prioritise catchments for farm survey work and ensure that there are adequate resources to carry out follow-up enforcement work. There needs to be dedicated local authority teams on the ground addressing pollution issues throughout the country, and enhanced collaboration with other enforcement agencies (e.g., Department of Agriculture and Food (DAF), fisheries, EPA, Forest Service, National Parks and Wildlife Service, other local authorities).
- Local authority farm surveys generally focus on farmyards. However farmyard surveys may not always be enough to yield significant water quality benefits due to high soil phosphorus levels, poor landspreading practice, poaching, cattle access to rivers, lack of riparian buffer zones etc. In these circumstances local authorities need to consider additional measures including more widespread application of soil testing and nutrient management planning, focussing on identifying and controlling 'hot-spot' sources of phosphorus loss, carrying out river walks and aerial surveys, restricting animal access to rivers, and reviewing of waste disposal practices from intensive agricultural enterprises.
- Local authorities should implement national Nitrates Directive requirements and increase collaboration with DAF in relation to cross-compliance checks. Local authorities should co-ordinate inspection activities with inspections carried out by other public authorities.
- Local authorities should survey and upgrade surface water and foul sewer drainage systems to effectively manage urban runoff and to rectify misconnections.
- Local authorities should control septic tanks through the planning process and through survey and assessment. Greater use of EPA Guidelines on the installation and management of single house wastewater treatment systems is recommended. Local authorities should have regard to DEHLG circular SP 05/03 and carry out surveys of septic tanks in high risk areas where pollution problems are suspected. Development Plans should include measures to improve operational capacity of single house wastewater treatment systems.
- Local authorities should control use of sewage sludge in accordance with EPA recommendations.
- Local authorities should exercise greater control over water abstraction activities and ensure significant environmental impacts are avoided.

- Local authorities should liaise with the Forest Service where forestry activities are suspected to be having a negative impact on water bodies.
- Local authorities should review current methods of handling and disposal of water treatment sludges to ensure that current practice is not in contravention of the Waste Management Act, 1996. Direct disposal of sludges to water bodies is not acceptable.

## 1. Introduction

EPA reports have clearly documented that surface water quality in Ireland has declined over the last thirty years, despite a slight improvement reported in recent years (Toner *et al.*, 2005). Long-term monitoring of 2900km of river channel has shown a reduction in the length of unpolluted waters from 84 per cent in 1971 to 60 per cent in the 2001-2003 review period. More recent monitoring of a larger, considerably more representative baseline of 13,200 km indicates that the length of unpolluted river channel has declined from 77 per cent in 1987-90 to 69 per cent in the 2001-2003 review period. The Agency has identified eutrophication as the major threat to water quality in Ireland, with the basic cause in most cases likely to be excess phosphorus inputs.

In 1997, the Government published a strategy document *Managing Ireland's Rivers and Lakes – A Catchment Based Strategy Against Eutrophication* (DoE, 1997) which set out Ireland's pollution reduction programme in respect of phosphorus. The Strategy identified a long-term target of improving all unsatisfactory waters in rivers and lakes to a level consistent with the beneficial uses of the water. Interim quality standards were also identified, which are to be achieved generally over a ten-year time frame. In order to give effect to these interim quality standards and to meet, in part, the requirements of the Dangerous Substances Directive (CEC, 1976), the Local Government (Water Pollution) Act, 1977 (Water Quality Standards for Phosphorus) Regulations, 1998, were introduced. These Regulations were unique in Europe in their inclusion of direct ecological assessment of the impact of eutrophication (Lucey *et al.*, 1999). This ecological approach foreshadowed the introduction of the EU Water Framework Directive (CEC, 2000), which strongly emphasises ecological assessment and sets a target of good ecological quality for all of the Community's surface waters, to be met by 2015.

The Regulations require that water quality be maintained or improved by reference to the biological quality rating (rivers) or trophic status (lakes) assigned by the Agency in the 1995-97 review period or at the first occasion thereafter. This represents the baseline water quality data. Where water quality is deemed unpolluted (i.e., a river biological quality rating of Q4, Q4-5 or Q5, or an oligotrophic / mesotrophic lake status has been assigned by the Agency), the Regulations require that the existing water quality be maintained. Where quality has been found to be unsatisfactory, the Regulations require that the water be improved by 2007 at the latest for waters surveyed by the EPA in the 1995-97 period and within a maximum of ten years for waters first surveyed after 1997. The degree of improvement required is based on the baseline quality and on the standards prescribed by the Regulations. For more seriously polluted lakes and rivers, the targets set, if attained, may not necessarily ensure that these waters are of satisfactory quality. This takes into account the fact that recovery may take a long time in some catchments, e.g., where high soil phosphorus levels are contributing to water quality deterioration.

In the case of rivers, the standards prescribed in the Regulations may be met by achieving either the target biological quality rating or the target median molybdate-reactive phosphorus (MRP) concentration (Table 1). In the case of lakes, the standards

prescribed in the Regulations may be met by achieving either the target trophic status classification or the target average total phosphorus concentration (Table 2). A six year extension to the period allowed to reach compliance with the Regulations is permissible in exceptional circumstances.

The target river standards specified in the Regulations are based on a well-established relationship between ecological quality in Irish rivers and phosphate levels (Table 1). Examination of measurements recorded at river stations in surveys since 1983 have revealed a strong statistical relationship between biological Q-ratings and MRP concentrations in Irish rivers in general (McGarrigle *et al.*, 1992; Lucey *et al.*, 1999). The empirical relationship suggests that, once annual median MRP values exceed 30 µg P/l, there is a strong statistical likelihood that the river reach in question will have a significant eutrophication problem. Thus it is likely that the ecology of such reaches will be adversely affected, with altered floral and faunal communities. Typical effects include excessive algal and macrophyte growth with consequent reduced dissolved oxygen values during the hours of darkness and the loss of sensitive macroinvertebrate species, including certain mayflies and stoneflies. Salmonid fish populations are generally not sustainable in such eutrophic rivers. Lakes into which such rivers flow will be at risk of algal blooms. However, as this statistical relationship has relatively wide confidence limits, individual stations with annual median MRP concentrations greater than 30 µgP/l will not necessarily show these biological effects in every case (Lucey *et al.*, 1999).

The target lake standards are based on the Agency's classification for lakes which, in turn, is derived from a scheme proposed by the Organisation for Economic Co-operation and Development (OECD, 1982). The baseline trophic status of the water body, which determines the target to be achieved, is defined solely by a biological parameter, in this case annual maximum chlorophyll *a* concentration. The chlorophyll concentration is a measure of the planktonic algal biomass, the feature primarily affected by eutrophication in most lakes. The target total phosphorus concentrations that are required for mesotrophic, eutrophic and hypertrophic lakes are more onerous than the corresponding values for mesotrophic and eutrophic lakes proposed in the OECD scheme (Table 2).

The Regulations require that the Agency and the local authorities take all such steps as may be appropriate in the discharge of their functions to secure compliance with the quality standards specified in the Regulations. The local authorities were required to submit a Measures Report to the Agency by 31 July 1999, setting out the measures to be taken to meet the prescribed standards (Table 3). This was to be followed up by the submission of an Implementation Report to the Agency by 31 July 2000 and every two years thereafter until 2008. The Agency has published a number of reports relating to the Regulations (Clenaghan *et al.*, 2000, 2001; Clenaghan, 2003). This report is the third of a series of National Reports on the Implementation of the Regulations, which the Agency must publish every two years until 2009. This report is based largely on Implementation Reports that the local authorities were obliged to submit to the Agency by 31 July 2004.

**Table 1 Phosphorus Regulations target values for Irish rivers**

If	Then	
	Either The minimum Q-value <sup>1</sup> to be achieved is:	Or The median molybdate-reactive phosphate concentration <sup>2</sup> (µgP/l) to be achieved is:
5	5	15
4-5	4-5	20
4	4	30
3-4	4	30
3	3-4	50
2-3	3	70
≤2	3	70

<sup>1</sup>Biological Quality Rating (Q-value) as assessed by EPA staff during National River Monitoring Programmes.

<sup>2</sup>Molybdate-Reactive Phosphate (MRP) median concentration to be determined as a minimum of 10 samples taken at intervals of four weeks or longer in any twelve consecutive month period. Where the requisite number of samples has not been taken within such a period, the median concentration shall be determined from sampling conducted over such period, being a period not exceeding 24 months, as required to obtain a minimum of 15 samples taken at intervals of four weeks or longer.

**Table 2 Phosphorus Regulations target values for Irish lakes**

If	Then	
	Either The minimum target Trophic Status <sup>1</sup> to be achieved is:	Or The average total phosphorus concentration <sup>2</sup> (µg P/l) to be achieved is:
Satisfactory		
Ultra-Oligotrophic	Ultra-Oligotrophic	<5
Oligotrophic	Oligotrophic	>5<10
Mesotrophic	Mesotrophic	>10<20
Unsatisfactory		
Eutrophic	Mesotrophic	>10<20
Hypertrophic	Eutrophic	>20<50

<sup>1</sup>Trophic status means the trophic status for any part of a lake assigned by the Agency during National Lake Monitoring Programmes.

<sup>2</sup>Average total phosphorus concentration to be determined as a minimum of 10 samples taken at intervals of four weeks or longer in any twelve consecutive month period. Where the requisite number of samples has not been taken within such a period, the average concentration shall be determined from sampling conducted over such period, being a period not exceeding 24 months, as required to obtain a minimum of 15 samples taken at intervals of four weeks or longer.

**Table 3 Reporting Obligations under the Phosphorus Regulations**

<b>Local Authority Reports</b>	<b>EPA Reports</b>
31 July 1999 (Measures)	Synthesis Report of Measures Reports (not a statutory requirement) (Clenaghan <i>et al.</i> , 2000)
31 July 2000 (Implementation)	30 April 2001 (National Implementation) (Clenaghan <i>et al.</i> , 2001)
31 July 2002 (Implementation)	30 April 2003 (National Implementation) (Clenaghan, 2003)
31 July 2004 (Implementation)	30 April 2005 (National Implementation)
31 July 2006 (Implementation)	30 April 2007 (National Implementation)
31 July 2008 (Implementation)	30 April 2009 (National Implementation)

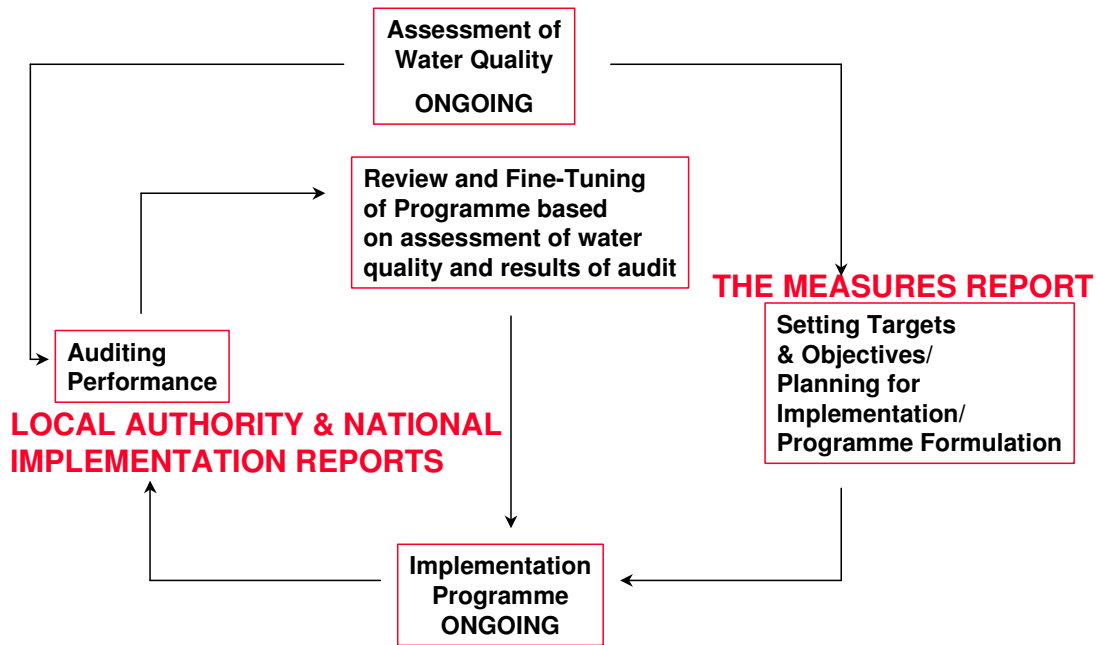
## 2. Implementation Reports - General Information

The Implementation Reports are generally divided into a number of sections based on the recommendations of the EPA Guidance Note (EPA, 2000a). The Implementation Reports consisted of sections on current water quality in the local authority functional area; an update on implementation of measures proposed in the Measures Report (presented in tabular format); and a description of progress to date. It was recommended that any problems encountered in implementation of the Regulations, and future plans or new directions that the local authority considered necessary, should also be addressed in the reports.

The EPA Guidance Note was used as a template for the majority of Implementation Reports. This helped to ensure consistency of reporting and that relevant information would be included in the reports. The local authorities generally supplied the information requested. However, there was considerable slippage on the statutory submission date of Implementation Reports by most local authorities (Table 8).

Under Article 3(9) of the Regulations, the period set for compliance (i.e., 2007) may be extended for a period not exceeding six years for any part of a river or lake, if, but only if, the relevant local authority or, as the case may be, the Agency is satisfied that certain exceptional circumstances exist, as laid out in the Regulations. Four local authorities state that they may or will need Article 3(9) extensions to comply with the Regulations. These are Cork, Limerick and Monaghan County Councils and Dublin City Council. Cork County Council has stated that Article 3(9) extensions may be required at 51 river stations and six lakes identified in the Implementation Report. Monaghan County Council has stated that it needs an Article 3(9) extension for the entire county for six years. Limerick County Council has stated that it requires an Article 3(9) extension for 58 stations in the county for six years. Dublin City Council has stated that it requires Article 3(9) extensions at all stations in its functional area (time period not specified). The reasons for these time extensions are set out in the relevant local authority Measures and Implementation Reports.

All of the local authorities that have submitted Reports to the Agency have endorsed the environmental management systems approach to the implementation of the Regulations as recommended in the EPA Guidance Notes. This approach operates on the basic principle of **continual improvement**, which is at the heart of the Regulations and the overall national strategy to combat eutrophication. The common principles underpinning an environmental management system are outlined in Figure 1, adapted to the requirements of the Regulations.



**Figure 1 Generalised environmental management systems approach adapted to requirements of the Regulations**

On an operational level the environmental management system consists of:

- initial review (i.e., of physical background, water quality, pressures on water resources, monitoring programmes etc., as carried out for the Measures Reports);
- formulation of measures and targets;
- formulation of an environmental management programme or, in this case, an implementation programme for achieving the targets;
- assignment of responsibility for achieving targets and implementing actions;
- implementation of the programme;
- auditing the performance of the programme; and
- review and fine tuning of the programme until the standards are met.

The environmental management programme is often described as the engine for continual improvement. However, targets will only be met by keeping the system dynamic and subjecting the system to periodic auditing to assess the relative success of measures chosen for meeting the targets. Auditing, in turn, provides information that can be used for reviewing and fine tuning the system so that changes or modifications can be made where necessary. The Regulations are particularly suited to an environmental management systems approach given the requirement that local authorities must report every two years to the Agency on the implementation of the Regulations. The Agency recommends that a system audit be conducted prior to preparation of each Implementation Report so that any changes or modifications necessary to meet the standards can be included in the updated report. New measures are likely to emerge over the coming years, for instance, through new legislation or the creation of new initiatives.



Each local authority will need to keep abreast of changes and developments that might impact on the implementation of the Regulations.

On a related note, consultants have developed a FÁS training programme for the introduction of Environmental Management Systems (EMS) in local authorities. The development of the training programme was supported by a committee chaired by South Tipperary County Council, with representation from the DEHLG, FÁS, EPA, Cork County Council and SIPTU. It has been designed to assist local authorities in implementing the EU EMAS (Environmental Management and Audit Scheme) Regulation. South Tipperary County Council was used as the pilot local authority for the development of this programme. The Council has put in place the EMS in its Planning, Environment and Waste Management Sections. Implementation of the EMS should lead to more efficient use of resources and better overall performance with regard to the environmental obligations of the Council.

### 3. Water Quality Review

Before discussing current trends in water quality at river and lake monitoring stations a number of important points need to be stressed.

Firstly, all of the analyses of river water quality in this report are based on biological data collected by the EPA at river monitoring stations since 1 January 1995 and published in subsequent annual reports (e.g., Clabby *et al.*, 2002, 2003, 2004); and on current median MRP data collected at these monitoring stations (by the EPA and local authorities) which meets the sampling criteria specified in the Regulations. In certain cases, where median MRP data were not provided in local authority Implementation Reports, these data were obtained from recent EPA regional laboratory (Kilkenny, Monaghan and Castlebar) reports compiled for certain local authorities (in the south-east, north-east and west of the country respectively). Some local authorities have supplemented their MRP data with information collected by the River Basin District Projects under the Water Framework Directive. With regard to lakes, the data used in this report derives solely from the Water Quality in Ireland 2001-2003 report (Toner *et al.*, 2005).

Secondly, in order to simplify assessment of local authority compliance with water quality standards for 'parts of rivers', as required by the Regulations, the results presented in this report are based on trends in water quality **at the monitoring stations**. *Water Quality in Ireland* reports published by the Agency primarily analyse trends in river water quality based on interpolation of conditions **between monitoring stations** i.e., based on calculations of length of river channel in each water quality class. This approach is not used in this report given the complexity of calculating trends at a local authority level using this method. Therefore the definitive account of national and River Basin District trends in water quality, based on channel length analyses, is published in the *Water Quality in Ireland 2001-2003* report (Toner *et al.*, 2005).

Thirdly, the review of water quality at river monitoring stations in this report is based on the various categories of Q-values and MRP levels specified in the Regulations. The review of water quality based on these criteria, and the approach of using the better of either the biological or phosphorus monitoring results to determine water quality compliance status, differs somewhat from EPA analysis in *Water Quality in Ireland* reports, which has primarily been based on biological data. Similar differences exist between this report and *Water Quality in Ireland* reports in analyses of trends in lake water quality. *Water Quality in Ireland* reports primarily utilise information on chlorophyll *a* to determine lake water quality. In this report, the better of either the chlorophyll *a* or total phosphorus monitoring results is used to determine lake water quality compliance status, as required by the Regulations.

The responsibility for meeting the targets set in the Regulations lies principally with the local authorities, therefore the focus in this report is primarily on trends in water quality at river monitoring stations or lakes in each local authority functional area, as well as on national trends. The baseline status of river water quality at monitoring stations in each local authority area is presented in Table 4. It is important to note that the baseline data

is based on Q values only, as required by the Regulations. The compliance analyses in this report is carried out on the 3159 stations for which there are either Q data available in the 2001-03 period or MRP data available in the 2002-2003 period (Table 5). (Approximately 25 per cent of stations were monitored for MRP in the 2002-03 period in accordance with the sampling requirements of the Regulations, compared to just 10 per cent of stations in the 1998-2000 period.)

This report focuses on both the number and percentage of stations in each local authority and nationally which are **compliant** with the Regulations and compares this with the baseline (generally 1995-97) period. Compliance of river water quality at monitoring stations with the Phosphorus Regulations may be based on the better of either the biological water quality or the MRP levels. The target river water quality to be attained at most stations (or 'parts of rivers') by 2007 is presented in Table 6 (those stations first assigned a biological quality rating after 1997 have ten years to meet the target set in the Regulations).

The current monitoring data from the 2001-03 period is also analysed based on Q-values only (Table 5), to provide more accurate comparison with the comparable baseline data (Table 4). The comparison includes an examination of the number and percentage of stations in each local authority and nationally which meet the biological targets of the Regulations in the two time periods; and also a comparison of the number and percentage of stations in each local authority and nationally which are of satisfactory status in the two time periods, i.e., of biological status Q4 or better.

Percentage compliance in the baseline survey effectively equates to the percentage of stations which were of satisfactory status at this time. However, in the subsequent surveys, it is important to note that the terms compliant and satisfactory are not equivalent. It is possible for water quality at a station to be compliant with the Regulations but of unsatisfactory status, e.g., if the water quality has improved from Q3 to Q3-4. Equally it is possible for the water quality at a station to be satisfactory but not compliant, e.g., if the water quality has declined from Q5 to Q4-5.

Current monitoring from the 2001-03 period indicates that, in the case of rivers, the water quality at 63.4 per cent of the monitoring stations nationally is compliant with the Regulations i.e., the water quality at these stations meets the biological and/or the phosphorus targets in the Regulations (Table 5, Figure 2). This represents an increase of 3.4% in compliance from the baseline period (and an increase of 2.8% in compliance from the 1998-2000 period). This may largely be accounted for by a substantial increase in MRP monitoring.

Local authorities with a relatively high level of compliance (> 70 per cent of river stations compliant) with the Regulations are Dublin City, Cavan, South Dublin, Roscommon, Cork County, Westmeath, Kildare and Mayo (Figure 2). Local authorities with a relatively low level of compliance (< 50 per cent of river stations compliant) with the Regulations are Monaghan, Dun Laoghaire-Rathdown, Offaly and Kilkenny. Marked increases (>30%) in compliance between the baseline and 2001-03 periods are apparent

in Dublin City, Kildare, Fingal, Westmeath, South Dublin and Meath. These increases are partly due to increased monitoring for MRP and in some cases (most notably Dublin City) reductions in MRP levels. It should be noted that, considerably fewer stations meet the biological targets of the Regulations in Cavan, Westmeath, Kildare, Dun Laoghaire-Rathdown, Dublin City and South Dublin, than are compliant with the Regulations (Figure 2). These local authorities have achieved compliance with the Regulations at a relatively large proportion of their river monitoring stations based on MRP levels. A significant decline (>20%) in compliance with the Regulations was apparent in Donegal and Wicklow. This can be partly explained by the significant loss of high quality (Q5 and/or Q4-5 stations) in these counties.

Assessment of compliance with the biological targets of the Regulations probably gives a better indication of trends in overall water quality status. A total of 56.3 per cent of river stations meet the biological targets of the Regulations (Table 5, Figure 2). This represents a decline of 3.7% in the number of stations meeting the biological targets of the Regulations from the baseline 1995-1997 period (and a decline of 2.2% in the number of stations meeting the biological targets of the Regulations from the 1998-2000 period). Counties with a relatively high percentage of stations meeting the biological targets (>60 per cent) include Mayo, Cork County, Sligo, Waterford County, Kerry, Galway, Carlow, Roscommon, South Tipperary and Leitrim. Counties with a relatively low percentage of stations meeting the biological targets (<40 per cent) include Dublin City, Dun Laoghaire Rathdown, Monaghan and Westmeath. Fingal, Kildare, Meath, Wexford and Carlow exhibit a notable increase (>10%) in the percentage of stations meeting the biological targets of the Regulations between the baseline and 2001-2003 periods. Donegal, Wicklow, Leitrim, Dun Laoghaire Rathdown, Cavan, Clare, Kerry, Sligo and Waterford all recorded moderate declines (>10%) in the number of stations meeting the biological targets of the Regulations since the baseline (Figure 3).

Despite the decline in the number and percentage of stations meeting the biological water quality target of the Phosphorus Regulations since the baseline period, there are still a greater percentage of stations currently of satisfactory status (i.e., Q4, Q4-5 or Q5) than there were in the baseline survey (61.4 per cent as compared to 60.0 per cent). This apparent disparity is partly explained by the decline in high quality stations, which nevertheless remain of satisfactory status. Local authorities with a high percentage of satisfactory stations (>70 per cent) generally occur in the west and south of the country (Figure 4). Local authorities with significant improvements in biological water quality since the Regulations were introduced include Kildare, Wexford, Longford, Roscommon, Carlow, North Tipperary, Fingal and Galway. Those with a significant decline in the percentage of satisfactory stations include Dun Laoghaire Rathdown, South Dublin, Offaly, Westmeath, Wicklow and Monaghan (Figure 5).

Percentage changes in compliance at monitoring stations of the Dublin local authorities (i.e., Dublin City, Dun Laoghaire-Rathdown, Fingal and South Dublin) must be treated with some degree of caution, as there are very few monitoring stations in their functional areas (<20). Thus changes in water quality at a few stations can result in large percentage changes.

The decline in the number and percentage of river stations of highest biological water quality (Q5), which was highlighted in previous Agency reports (e.g., Clenaghan *et al.*, 2001), is continuing (down from 4.6 per cent of stations in the baseline 1995-1997 period to 2.7 per cent of stations in 2001-03) (Figure 6). Similar analysis also reveals a decline of 1.4 per cent in stations of Q4-5 status between the baseline and current monitoring periods (from 21.5 per cent to 19.1 per cent). Many of these stations represent relatively pristine conditions and their protection is crucial to the survival of pollution sensitive species and important diverse and balanced invertebrate communities. These stations may also be very important as reference sites in the context of implementation of the Water Framework Directive.

Stations rated Q5 and Q4-5 are primarily found in river stretches with low levels of catchment pressures. These waters provide dilution for downstream rivers and lakes and are vital in maintaining high water quality. The decline in the quality of these waters may deleteriously affect attempts to improve the quality of polluted waters downstream. It is very important that local authorities identify the reason for the ongoing decline in these high quality waters and take the necessary measures to protect and conserve them.

Since the last report 209 additional lakes have been assigned baseline values, with 530 lakes now assigned targets under the Regulations (Table 7, Appendix 1.2). Updated trophic status information is available on 496 of these lakes (with updated phosphorus information also available on 43 of them). 401 of these lakes currently comply with the targets set in the Regulations and the remaining 95 do not. Counties with a relatively large number of non-compliant lakes (>4) include Monaghan (31), Cavan (14), Clare (14), Leitrim (9), Cork (7), and Longford (6). Agricultural activities are considered to be the source of the nutrient enrichment affecting most of the non-compliant lakes but point sources including sewage discharges are involved in some cases.

It should be noted that many of the lakes in the Shannon system are infested with the zebra mussel *Dreissena polymorpha*, which has been responsible for much of the reduction of the chlorophyll concentrations recorded in recent years. In addition, while the open waters of the large western lakes showed low or moderate levels of planktonic algae, there is evidence of localised nutrient enrichment in certain littoral areas. Trends in lake trophic status are discussed in more detail in the recent EPA *Water Quality in Ireland 2001-2003* report (Toner *et al.*, 2005).

The EPA has reported elevated levels of phosphorus in groundwaters in many parts of the country (Toner *et al.*, 2005). Whilst groundwater is not specifically covered in the Regulations, it may contribute to eutrophication of surface waters where elevated MRP levels exist, particularly where groundwaters provide significant amounts of baseflow in the summer months.

**Table 4 Baseline number of local authority river stations in each biological quality rating.**

(\*River stations Q4, Q4-5 or Q5; \*\*Correcting for river stations bordering two local authority areas).

Either MRP Target ( $\mu\text{g P/l}$ ) Or Q-value Target Baseline Status	15 Must retain quality Q5	20 or improve Q4-5	30 or improve Q4	30 Improve to Q4 Q3-4	50 Improve to at least Q3-4 Q3	70 Improve quality to Q2-3	70 Improve quality to at least Q3 Q $\leq$ 2	Total	% Satisfactory (biology)*
Carlow	2	12	16	16	11	1	0	58	51.7
Cavan	7	24	26	24	16	4	0	101	56.4
Clare	15	28	71	19	22	7	1	163	69.9
Cork	5	118	168	57	24	3	1	376	77.4
Donegal	29	86	65	20	17	3	11	231	77.9
Dublin City	0	0	0	0	3	0	2	5	0.0
Dublin South	0	4	4	0	5	3	0	16	50.0
Dun Laoghaire Rathdown	0	0	2	0	3	1	0	6	33.3
Fingal	0	0	0	2	11	3	2	18	0.0
Galway	13	40	82	34	43	10	5	227	59.5
Kerry	12	70	75	28	15	1	3	204	77.0
Kildare	0	1	16	33	23	6	6	85	20.0
Kilkenny	2	3	33	31	23	1	2	95	40.0
Laois	3	12	33	30	17	2	2	99	48.5
Leitrim	10	29	31	11	5	2	0	88	79.5
Limerick	5	13	42	30	31	7	4	132	45.5
Longford	1	2	11	13	8	0	2	37	37.8
Louth	0	7	9	9	13	1	0	39	41.0
Mayo	14	71	96	28	29	4	4	246	73.6
Meath	0	0	23	39	33	4	6	105	21.9
Monaghan	1	11	9	11	28	5	2	67	31.3
Offaly	5	8	30	27	20	4	4	98	43.9
Roscommon	0	13	52	16	26	10	3	120	54.2
Sligo	2	42	31	10	8	1	1	95	78.9
North Tipperary	5	10	29	37	35	3	2	121	36.4
South Tipperary	2	14	55	19	21	3	0	114	62.3
Waterford	2	28	29	10	9	1	0	79	74.7
Westmeath	0	5	14	35	10	0	4	68	27.9
Wexford	0	11	32	30	28	4	2	107	40.2
Wicklow	12	33	34	12	10	0	2	103	76.7
Preliminary Total	147	695	1118	631	547	94	71	3303	
Revised Total**	144	679	1072	590	518	89	67	3159	
% of Revised Total	4.6	21.5	33.9	18.7	16.4	2.8	2.1	100.0	60.0

**Table 5 Number of local authority river stations in each biological quality status rating in the 1998-2003 surveys, the number of stations meeting the biological targets of the Regulations and the number of stations compliant with Regulations.**

(\*River stations Q4, Q4-5 or Q5; \*\*Correcting for river stations bordering two local authority areas).

Current Q-value Status	Q5	Q4-5	Q4	Q3-4	Q3	Q2-3	Q≤2	Number of Stations sampled for Q	% of Stations Satisfactory (biology only)*	No. of Stations Meeting Biological Targets of Regulations	% of Stations Meeting Biological Targets of Regulations	Total number of stations sampled Q/MRP	No. of Stations Compliant with Regulations	% of Stations compliant with Regulations
Carlow	3	9	22	21	3	0	0	58	58.6	37	63.8	59	39	66.1
Cavan	5	16	33	25	16	5	1	101	53.5	42	41.6	109	92	84.4
Clare	5	27	82	19	25	3	2	163	69.9	91	55.8	165	92	55.8
Cork	2	91	212	44	23	1	3	376	81.1	258	68.6	377	278	73.7
Donegal	11	75	96	15	17	4	13	231	78.8	121	52.4	231	121	52.4
Dublin City	0	0	0	0	2	1	2	5	0.0	0	0.0	7	6	85.7
Dublin South	1	2	3	4	5	1	0	16	37.5	7	43.8	18	15	83.3
Dun Laoghaire Rathdown	0	0	1	1	2	2	0	6	16.7	1	16.7	10	4	40.0
Fingal	0	0	1	3	13	1	0	18	5.6	8	44.4	18	9	50.0
Galway	4	47	96	41	28	9	2	227	64.8	145	63.9	227	145	63.9
Kerry	12	55	88	30	14	4	1	204	76.0	131	64.2	206	137	66.5
Kildare	0	5	24	19	29	3	5	85	34.1	39	45.9	88	62	70.5
Kilkenny	1	3	32	43	12	1	3	95	37.9	43	45.3	98	46	46.9
Laois	1	14	33	32	17	0	2	99	48.5	51	51.5	100	66	66.0
Leitrim	4	30	35	10	7	2	0	88	78.4	53	60.2	90	58	64.4
Limerick	2	9	49	35	32	3	2	132	45.5	67	50.8	132	68	51.5
Longford	0	3	15	10	6	2	1	37	48.6	17	45.9	37	23	62.2
Louth	0	4	13	10	11	0	1	39	43.6	16	41.0	44	26	59.1
Mayo	10	72	106	36	17	4	1	246	76.4	174	70.7	247	174	70.4
Meath	0	0	26	43	25	10	1	105	24.8	44	41.9	109	59	54.1
Monaghan	0	6	11	6	37	6	1	67	25.4	17	25.4	67	26	38.8
Offaly	3	6	25	36	26	1	1	98	34.7	42	42.9	98	42	42.9
Roscommon	0	26	48	21	19	5	1	120	61.7	76	63.3	123	97	78.9
Sligo	5	34	39	11	4	1	1	95	82.1	64	67.4	95	65	68.4
North Tipperary	0	15	36	37	30	2	1	121	42.1	56	46.3	121	79	65.3
South Tipperary	1	19	47	27	16	4	0	114	58.8	71	62.3	114	76	66.7
Waterford	3	18	38	13	6	0	1	79	74.7	51	64.6	79	53	67.1
Westmeath	0	2	12	29	22	2	1	68	20.6	17	25.0	71	51	71.8
Wexford	2	9	47	25	21	2	1	107	54.2	62	57.9	108	65	60.2
Wicklow	11	22	39	17	14	0	0	103	69.9	56	54.4	104	57	54.8
Preliminary Total	86	619	1309	663	499	79	48	3303	-	1857	-	3352	2131	
Revised Total**	84	602	1253	624	471	77	48	3159	61.4	1777	56.3	3204	2030	63.4
% of Total	2.7	19.1	39.7	19.8	14.9	2.4	1.5	100						

**Table 6 Target number of local authority river stations in each biological quality rating or median MRP level category.**

(\*River stations Q4, Q4-5 or Q5 or median MRP  $\leq 30\mu\text{g P/l}$ ; \*\*Correcting for river stations bordering two local authority areas).

Either MRP Target ( $\mu\text{g P/l}$ ) Or Q-value Target	15 Q5	20 Q4-5	30 Q4	50 Q3-4	70 Q3	Total	% Satisfactory (biology or MRP)*
Carlow	2	12	32	11	1	<b>58</b>	79.3
Cavan	7	24	50	16	4	<b>101</b>	80.2
Clare	15	28	90	22	8	<b>163</b>	81.6
Cork	5	118	225	24	4	<b>376</b>	92.6
Donegal	29	86	85	17	14	<b>231</b>	86.6
Dublin City	0	0	0	3	2	<b>5</b>	0.0
Dublin South	0	4	4	5	3	<b>16</b>	50.0
Dun Laoghaire Rathdown	0	0	2	3	1	<b>6</b>	33.3
Fingal	0	0	2	11	5	<b>18</b>	11.1
Galway	13	40	116	43	15	<b>227</b>	74.4
Kerry	12	70	103	15	4	<b>204</b>	90.7
Kildare	0	1	49	23	12	<b>85</b>	58.8
Kilkenny	2	3	64	23	3	<b>95</b>	72.6
Laois	3	12	63	17	4	<b>99</b>	78.8
Leitrim	10	29	42	5	2	<b>88</b>	92.0
Limerick	5	13	72	31	11	<b>132</b>	68.2
Longford	1	2	24	8	2	<b>37</b>	73.0
Louth	0	7	18	13	1	<b>39</b>	64.1
Mayo	14	71	124	29	8	<b>246</b>	85.0
Meath	0	0	62	33	10	<b>105</b>	59.0
Monaghan	1	11	20	28	7	<b>67</b>	47.8
Offaly	5	8	57	20	8	<b>98</b>	71.4
Roscommon	0	13	68	26	13	<b>120</b>	67.5
Sligo	2	42	41	8	2	<b>95</b>	89.5
North Tipperary	5	10	66	35	5	<b>121</b>	66.9
South Tipperary	2	14	74	21	3	<b>114</b>	78.9
Waterford	2	28	39	9	1	<b>79</b>	87.3
Westmeath	0	5	49	10	4	<b>68</b>	79.4
Wexford	0	11	62	28	6	<b>107</b>	68.2
Wicklow	12	33	46	10	2	<b>103</b>	88.3
Preliminary Total	147	695	1749	547	165	3303	
Revised Total**	<b>144</b>	<b>679</b>	<b>1662</b>	<b>518</b>	<b>156</b>	<b>3159</b>	
% of Revised Total	<b>4.6</b>	<b>21.5</b>	<b>52.6</b>	<b>16.4</b>	<b>4.9</b>	<b>100.0</b>	<b>78.7</b>



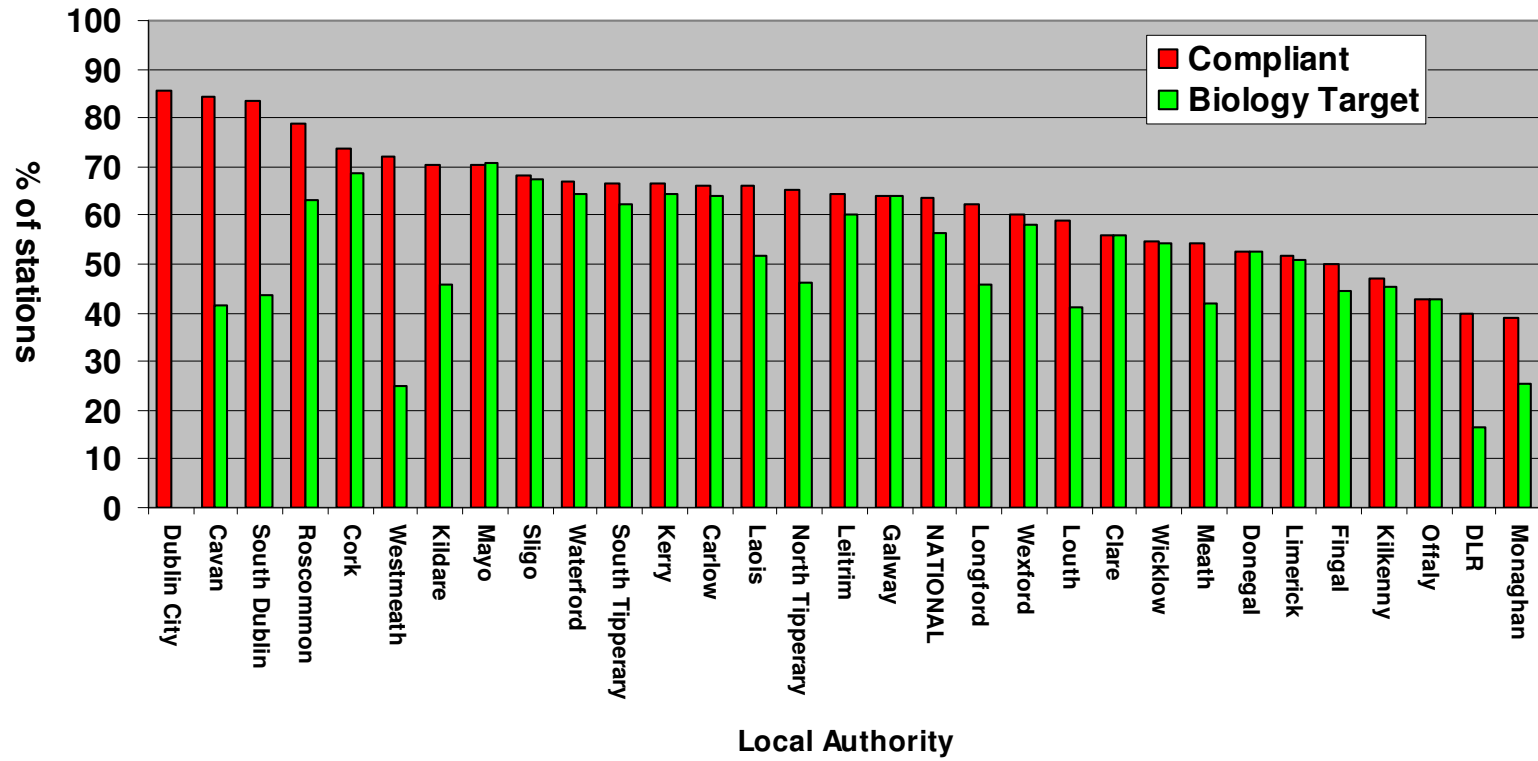


Figure 2 Percentage of local authority river stations compliant with the Phosphorus Regulations in 2001-03 and percentage of local authority river stations meeting biological targets of the Regulations (refer to Table 1 for relevant targets).

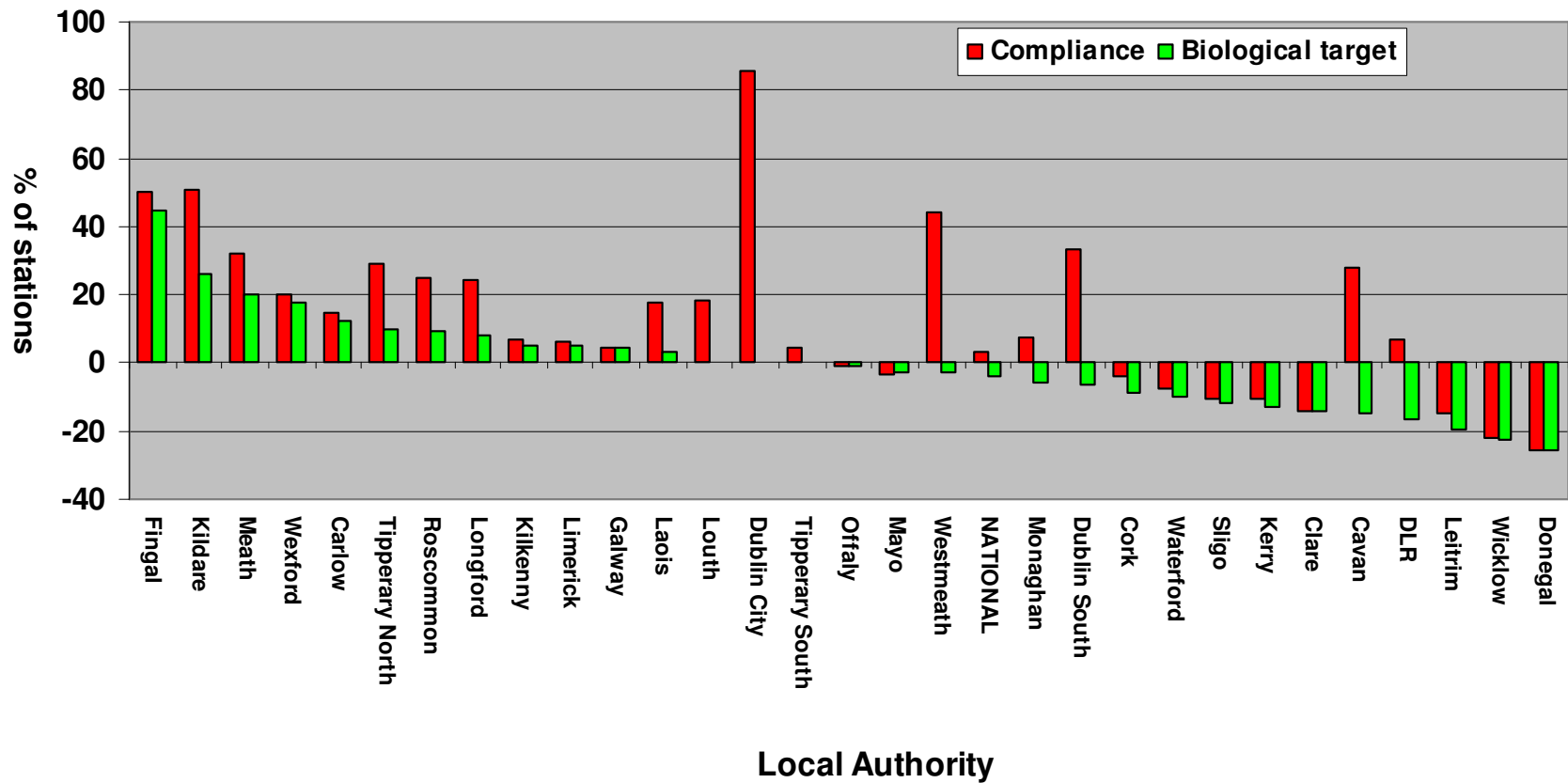


Figure 3 Percentage change in both number of river stations compliant with the Regulations, and also in number of river stations meeting the biological targets of the Regulations, comparing results from 2001-03 period to the baseline (generally 1995-97) period (ranked according to change in compliance with biological target).

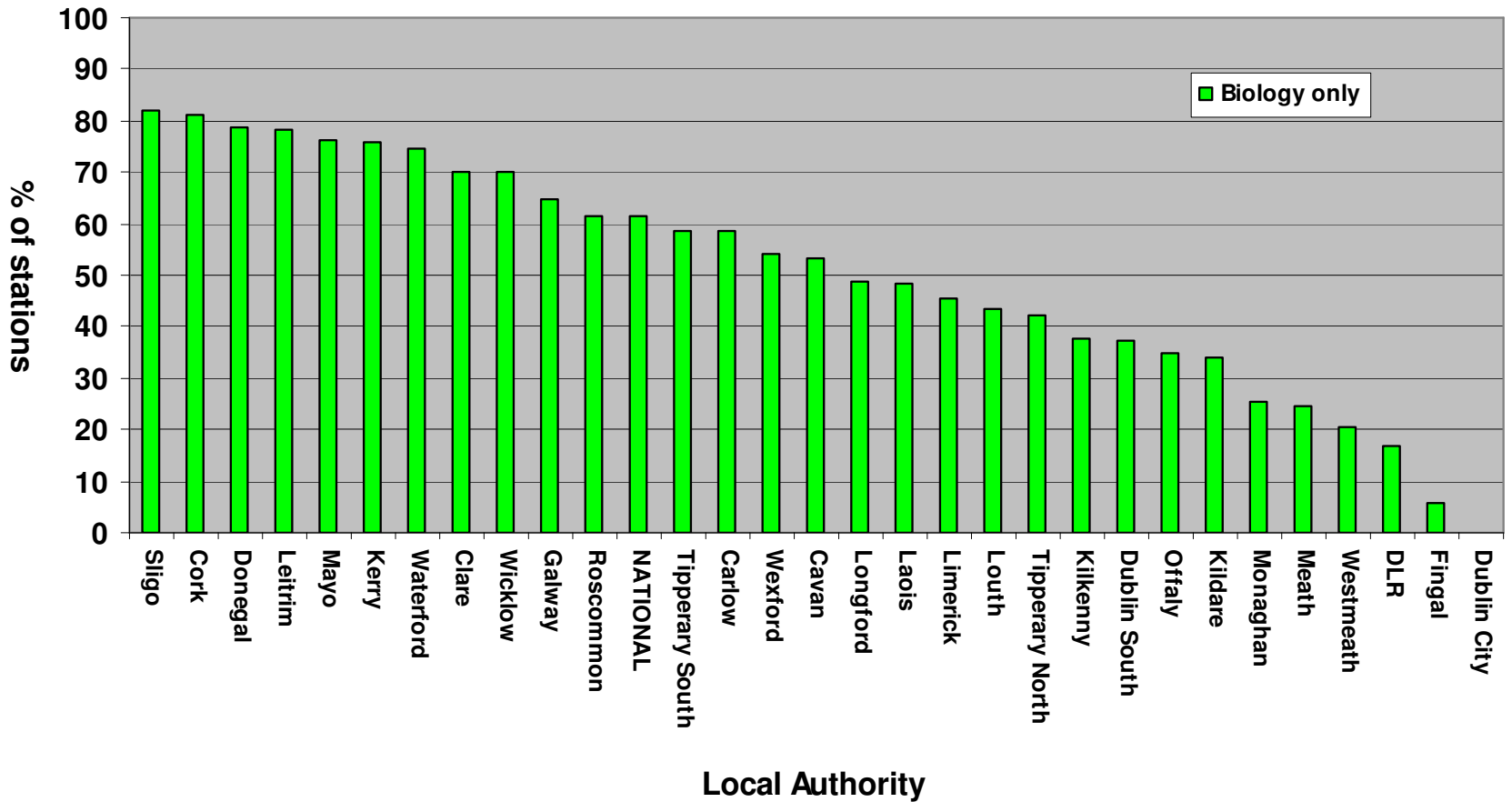


Figure 4 Percentage of local authority river stations with satisfactory biological water quality in 2001-03.

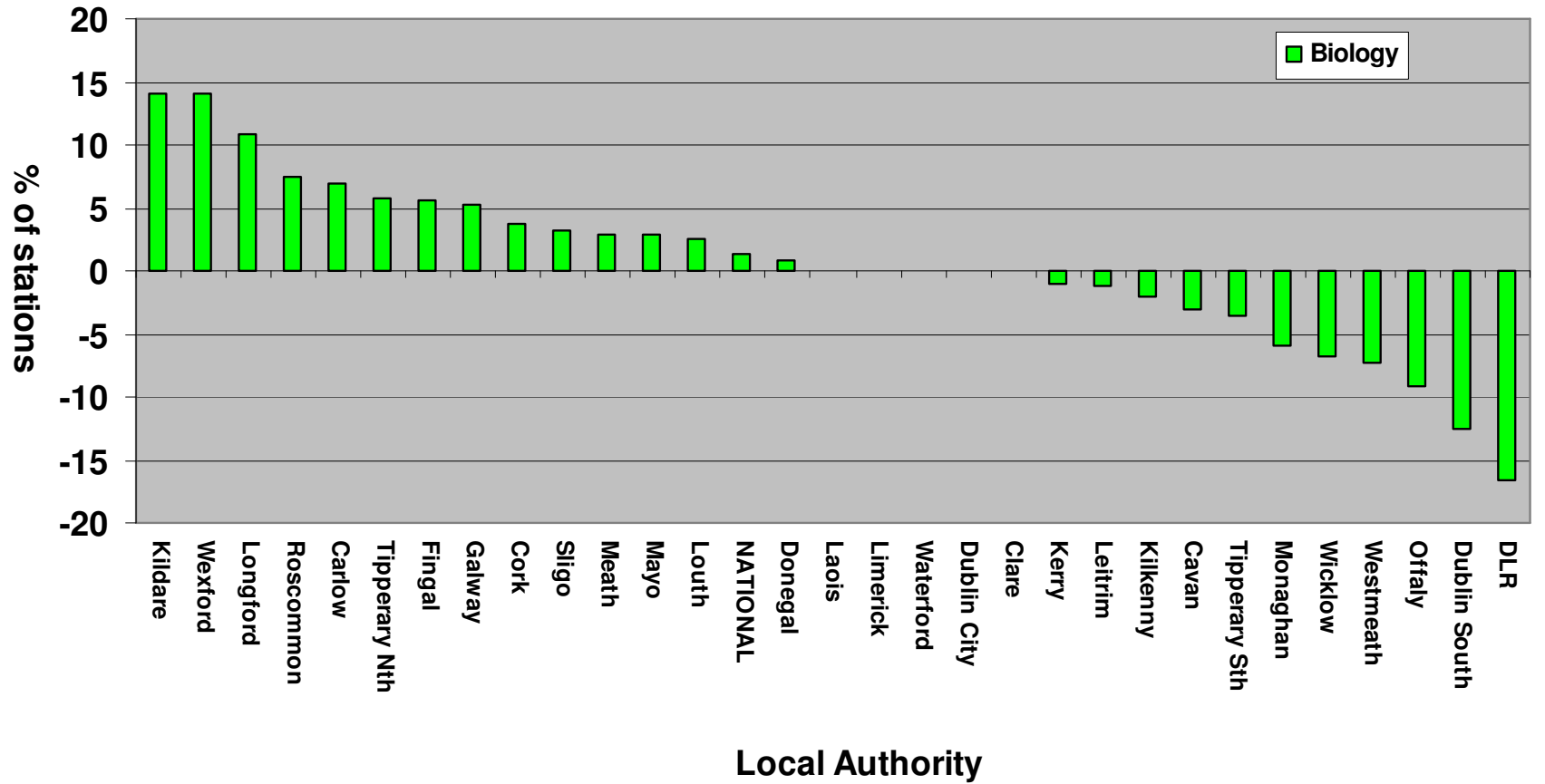
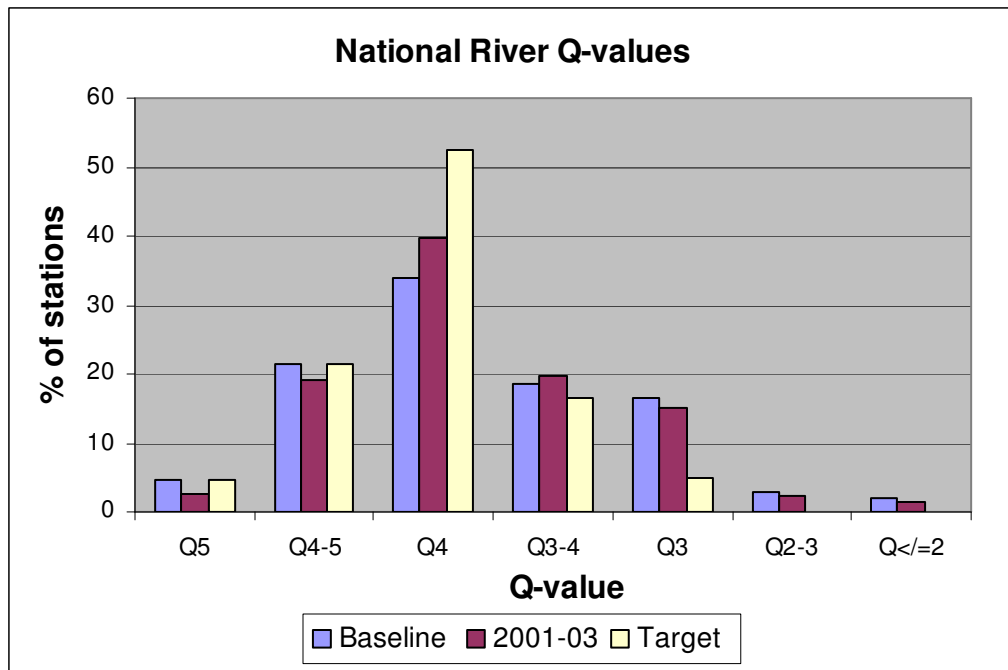


Figure 5 Percentage change in number of river stations with satisfactory biological water quality, comparing results from 2001-03 period to baseline 1995-97 period.



**Figure 6 National baseline, 2001-03 and target data on Q-values at all river monitoring stations monitored for biological water quality.**

**Table 7 Number and percentage of lakes in each local authority area compliant with the Regulations.**

(\*Correcting for lakes occurring in more than one local authority area).

<b>Local Authority</b>	<b>Total number of lakes</b>	<b>Number of lakes resampled</b>	<b>Number of resampled lakes Compliant</b>	<b>% of resampled lakes Compliant</b>
Carlow	0	-	-	-
Cavan	22	22	8	36.4
Clare	69	65	51	78.5
Cork	25	24	17	70.8
Cork City	1	0	-	-
Donegal	104	99	96	97.0
Dublin City	0	-	-	-
Dublin South	0	-	-	-
Dun Laoghaire Rathdown	0	-	-	-
Fingal	0	-	-	-
Galway	99	81	79	97.5
Kerry	15	15	14	93.3
Kildare	0	-	-	-
Kilkenny	0	-	-	-
Laois	0	-	-	-
Leitrim	30	30	21	70.0
Limerick	2	2	2	100.0
Longford	10	10	4	40.0
Louth	1	1	0	0.0
Mayo	25	24	21	87.5
Meath	8	8	4	50.0
Monaghan	53	52	21	40.4
Offaly	1	1	1	100.0
Roscommon	32	32	32	100.0
Sligo	13	13	12	92.3
North Tipperary	1	1	1	100.0
South Tipperary	0	-	-	-
Waterford	13	13	10	76.9
Westmeath	13	12	10	83.3
Wexford	0	-	-	-
Wicklow	10	8	8	100.0
<b>Preliminary Total</b>	<b>547</b>	<b>513</b>	<b>412</b>	<b>80.3</b>
<b>Revised total*</b>	<b>530</b>	<b>496</b>	<b>401</b>	<b>80.8</b>

## 4. Review of Measures Implementation

Implementation programmes were requested from local authorities for:

- a) the functional area as a whole; and,
- b) each river/lake catchment.

The EPA Guidance Notes (EPA, 1999a, 2000a) list an array of measures that are available to local authorities to protect and improve water quality. The measures proposed by the local authorities are separated into five major categories (Table 8):

- planning, control and enforcement measures including: water quality management planning; planning and control measures for point sources; planning and control measures for non-point sources; and, general enforcement measures;
- monitoring measures;
- consultative and co-operative measures;
- public education and advisory measures; and
- other agri-environmental and miscellaneous measures.

The total number of local authorities proposing to apply a particular measure is indicated at the end of each row of Table 8. The Implementation Reports enable local authorities to provide an update on the implementation of measures proposed in the Measures Reports. The Implementation Reports also allow local authorities to re-evaluate proposed measures and alter these, or propose new measures, where experience dictates that the original measures are either no longer necessary or practical. Ultimately, the success or otherwise of measures implemented will be determined by the water quality monitoring results. The local authorities have provided updates on the implementation of a wide range of proposed measures and the main points are discussed below.

**Table 8 Measures being implemented or proposed to be implemented by local authorities**

(O = ongoing; S = short term, by 2006)

Local Authorities	Carlow	Cavan	Clare	Cork	Cork City	Donegal	Dublin City	DLR	Galway City & Co	Fingal	Kerry	Kildare	Kilkenny	Laois	Leitrim	Limerick	Limerick City	Longford	Louth
<b>Date Implementation Report Received by EPA</b>	10/12/04	2/9/04	30/8/04	26/10/04	20/8/04	27/9/04	27/10/04	22/10/04	14/12/04	3/8/04	26/11/04	6/8/04	2/9/04	4/8/04	21/12/04	28/1/05	2/12/04	23/12/04	9/12/04
<b>Planning, Control and Enforcement Measures</b>																			
<b>a) Water quality management planning</b>																			
Prepare/implement/review catchment management plans	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Groundwater / aquifer protection schemes	O							S		S		O		O					S
Implement Waste Management Plans												O		O					
Implement Sludge Management Plan										S	O		S	O					
Improved integration of planning and water quality functions			O	O					O		O		O		O				O
<b>b) Planning and Control Measures - point source discharges</b>																			
Issue / Review Section 4 licenses	O	O	O	O		O	O		O	O	O	O	O		O	O	O		O
Issue / Review Section 16 licenses	O	O	O	O		O	O	O	O	O	O	O	O		O	O	O		O
Upgrade/construct WWTPs	O	O	O	O		O	O	O	O	O	O	O	O		S	O	O		S
Upgrade surface water and foul sewer collection systems		O	O	O			O	O		O	O	O	O		S		O		O
Inspection of non-licensed discharges			O	O			S	O	O	O	O	O	O						S
Misconnections surveys							O	O		S		O							S
Improve controls on septic tanks	O	O	O						O	O	O	O	O		S	O	O		S
Review abstractions																			S
Farm surveys	O	O	O	O		O			O	O	O	O	O		O	O			S
Use of wetlands to control phosphorus							O												S
Upgrade municipal waste facilities		O				O					O	O		O	O				O
<b>c) Planning and Control Measures - non-point source discharges</b>																			
Agricultural Bye-laws		O		O															
Other relevant bye-law		O																	
Nutrient Management Planning	O	O	O	O				S							O	S			O
Best farm management planning																			
Increase controls on forestry		O		O		O		S			O		S	O	O	O			
Controls on peat extraction industry																			
LA reviewing IAE activities			O	O								S				O			
<b>d) General Enforcement Measures</b>																			
Active enforcement of Water Pollution Acts		O	O	O		O		O	O		O	O			O	O			O
Pollution Complaints Database				S					O			O							
<b>Monitoring Measures</b>																			
Increase hydrometric monitoring programme							O					O		O					S
Increase river chemical monitoring programme	O	O	O	O				O		O	O	O		O	O	O		O	O
Undertake river biological monitoring programme		O	O				S	S							O	O			
Increase lake monitoring programme		O	O	O	O	O					O				O	O			
Increase groundwater monitoring											O					O			
Increase point source monitoring (of WWTPs/industry etc.)		O	O	O						O	O	O		S	O	S	O		
Improve monitoring/laboratory equipment/procedures											O	O							
Undertake hot spot catchment studies / pollution investigations		O	O	O		O		O			O	O	O	O	S	O			S
Establish database of soil P levels															O	O			
Development/use of GIS for catchment management				O				S	S	S	S	O		O	S	O			S
<b>Consultative and Cooperative Measures</b>																			
Participation in catchment management committees	O	O	O	O		O	O	O	O	O	O	O	O	O	O	O	O		O
Liaison with EPA/LAs/Teagasc/farmers/fisheries/forestry etc.	O	O	O	O		O	O	O	S	O	O	O	O	O	O	O			O
<b>Public Education and Advisory Measures</b>																			
General public education campaigns		S		O		O		S	O	S		O	S	O	O				S
Sectoral education programmes		O		O								O		O		O			
Appoint environmental Education Officer/Public awareness Officer	O	O				O			O		O	O							
<b>Other National Agri-Environmental and Miscellaneous Measures</b>																			
Research relating to agricultural waste management / water quality			O									O							
Promote Agri-environment schemes (REPS, CFP etc.)	O	O	O	O					O		O	O	O			O			
Appoint additional staff for Regulations implementation		O	O	O								O		O	O	O			S



**Table 8 continued. Measures being implemented or proposed to be implemented by local authorities**

(O = ongoing; S = medium term, by 2006)

Local Authorities	Mayo	Meath	Monaghan	Offaly	Roscommon	Sligo	South Dublin	North Tipperary	South Tipperary	Waterford	Waterford City	Westmeath	Wexford	Wicklow	Total
<b>Date Implementation Report Received by EPA</b>	14/1/05	27/1/05	19/11/04	3/8/04	12/11/04	13/12/04	7/1/05	01/09/04	28/09/04	25/11/04	24/09/04	30/09/04	22/10/04	20/10/04	
<b>Planning, Control and Enforcement Measures</b>															
<b>a) Water quality management planning</b>															
Prepare/implement/review catchment management plans	O	O	O	O	O	O	O	O	O	O	O	O	O	O	34
Groundwater / aquifer protection schemes			O	O	S		O	O	O	O		O	O		13
Implement Waste Management Plans					O	O			O	O					6
Implement sludge management plan	O		O	O	S	O		S		O					12
Improved integration of planning and water quality functions	O		O		O					O		O		O	13
<b>b) Planning and Control Measures - point source discharges</b>															
Issue / Review Section 4 licenses		O	O	O	O	O	S	O	O	O		O	O	O	27
Issue / Review Section 16 licenses		O		O	O	O		O	O	O		O	O	O	23
Upgrade/construct WWTPs	O	O	O	O	O	O	O	O	O	O	O	O	O	O	32
Upgrade surface water and foul sewer collection systems	O	O	O		O	O	O	O			O	O		O	22
Inspection of non-licensed discharges			O	O				O	O	O	O	O	O		19
Misconnections Survey							S			O	O				7
Improve controls on septic tanks		O		O	S	S			O			O	O	O	20
Review abstractions			O	O										O	4
Farm surveys	O	O	O	O	O	O		O	O	O		O	O	O	27
Use of wetlands to control phosphorus					O	O				O			O		4
Upgrade municipal waste facilities	O		O	O	O					O	O				13
<b>c) Planning and Control Measures - non-point source discharges</b>															
Agricultural Bye-laws				O				O				O			5
Other relevant bye-law															1
Nutrient Management Planning			O					O	O	O		O			13
Best farm management planning										O				O	2
Increase controls on forestry	O					O		O	O	O				O	15
Controls on peat extraction industry				S								O			2
LA to review IAE activities									O						5
<b>d) General Enforcement Measures</b>															
Active enforcement of Water Pollution Acts		O	O	O		O		O	O	O	O	O	O	O	22
Pollution Complaints Database												O			4
<b>Monitoring Measures</b>															
Increase hydrometric monitoring programme									O				O		6
Increase chemical river monitoring		O	O		O	O	S	O		O	O	O	O	O	24
Undertake river biological monitoring programme			O					O							8
Increase lake monitoring programme	O		O			O				O		O	O		14
Increase groundwater monitoring															2
Increase point source monitoring (of WWTPs/industry etc.)		O						O	O	O		O	O	O	17
Improve monitoring/laboratory equipment/procedures		O				O		O	O	O					7
Undertake hot spot catchment studies / pollution investigations	O		O		S	O		O	O	O	O	O	O	O	24
Establish database of soil P levels			O									O			4
Development/use of GIS for catchment management			O					O	O				O	O	15
<b>Consultative and Cooperative Measures</b>															
Participation in catchment management committees		O	O	O	O	O	O	O	O	O	O	O	O	O	29
Establish liaison with other parties EPA/LAs/Teagasc/farmers/fisheries etc.		O	O	O	O	O	O	O	O	O	O	O	O	O	29
<b>Public Education and Advisory Measures</b>															
General public education campaigns			O		O	O	S	O		O		O	O		19
Sectoral education programmes			O	O	O	O		O	S	O		O			12
Appoint environmental Education Officer/Public awareness Officer			O	O	O	O		O	O	O				O	15
<b>Other National Agri-Environmental and Miscellaneous Measures</b>															
Research relating to agricultural waste management / water quality	O			O											4
Promote Agri-environment schemes (REPS, CFP etc.)		O		O	O	O		O				O	O		17
Appoint additional staff for Regulations implementation			O	O					O	S					12

## **4.1 Planning, Control and Enforcement Measures**

Local authorities have a wide array of tools available to implement planning, control and enforcement measures. The primary legislation that supports these measures includes:

- The Planning and Development Act 2000
- The Water Pollution Act 1977 and 1990
- The Waste Management Act 1996

### ***4.1.1 Water Quality Management Planning***

Water quality management planning is a key measure available to local authorities in the implementation of the Phosphorus Regulations. It is now widely accepted that a catchment-based approach to water quality management is appropriate as set out in Government policy and in the EU Water Framework Directive (WFD). All of the local authorities are involved in water quality management planning through implementation of the WFD. This Directive, which came into force in December 2000, requires Member States to draw up River Basin Management (RBM) Plans by 2009. The aim of these plans will be to provide a holistic approach, within each River Basin District (RBD), to the management of surface inland, estuarine and coastal waters, groundwaters, and terrestrial ecosystems dependant on the aquatic environment. Programmes of measures identified in the RBM Plans as necessary to achieve the targets of the Directive must be operational by 2012. The general aim of the Directive is to prevent deterioration of water status and achieve good water status (as defined) by 2015.

At a national level, the Directive is being implemented through a National Co-ordination Group that includes Government Departments and Agencies with responsibility for water protection and management. There are a number of Technical Working Groups focussing on national implementation of particular aspects of the Directive and, in 2004, the EPA convened a Technical Co-ordination Group. Irish representatives also take part in the North-South Working Group on Water Quality, in the UK Technical Advisory Group on the WFD and in the EU Strategic Co-ordination Group (including various technical working groups). WFD activities ongoing at a national level are described on the website [www.wfdireland.ie](http://www.wfdireland.ie).

Eight RBDs have been established in Ireland, north and south (including three cross-border RBDs). The European Communities (Water Policy) Regulations, 2003, (S.I. No. 722 of 2003) identify seven RBDs which are wholly or partly within the state. The Regulations require local authorities, acting jointly in relation to each RBD, to establish environmental objectives and programmes of measures to achieve those objectives, to make river basin management plans and to establish river basin district advisory councils (which should include relevant interested parties). The EPA is responsible for a number of technical aspects relating to implementation of the Directive, including the formulation of monitoring programmes (which must be operational by the end of 2006). In addition, the Regulations identify other public bodies that are required to assist in the implementation process.

River Basin Management Projects, involving environmental consultants, have been established in each RBD to facilitate implementation of the WFD. Local authorities

have the primary role in promoting, establishing and implementing the RBM Projects. Approximately €50 million has been provided by central government to the local authorities to assist with initial implementation of the Directive. Work commenced in 2002 on the South Eastern RBM Project; in 2003 on the Shannon and Eastern RBM Projects; and in 2004 on the Western and South Western RBM Projects. The North-South Shared Aquatic Resource (NS-SHARE) Project also commenced in 2004 and is developing and implementing working tools for water management in the North West and Neagh-Bann International RBDs and also in the North Eastern RBD, which lies wholly within the North of Ireland.

The overall objective of the RBM projects is to establish an integrated monitoring and management system for all waters within a RBD, to develop a dynamic programme of management measures and to produce a RBM Strategy for each RBD. The programme of measures will take account of all significant pressures on aquatic ecosystems and groundwater. It is envisaged that each RBM Strategy will serve as a major input to the development of RBM Plans, as required by the Directive. The local authorities must establish a River Basin District Advisory Council within each RBD, consisting of representatives of participating local authorities and of other interested parties.

The competent authorities (local authorities and EPA) and other relevant state agencies have collaborated in producing a National Characterisation Report by December 22, 2004 to meet obligations under Article 7 of the Irish Regulations (S.I. 722, 2003). The EPA submitted a National Summary Characterisation Report to the European Commission on March 22, 2005. This report includes: an analysis of River Basin District characteristics (including the physical, chemical and biological nature of the surface and groundwater); a review of the impact of human activity on the status of surface waters and on groundwater; and an economic analysis of water use. Data on pressures were used to help assess the risk of water bodies not achieving the objectives of the Directive. The report is available on [www.wfdireland.ie](http://www.wfdireland.ie).

Tasks currently being undertaken include further refinement of the characterisation process, the formulation of monitoring programmes and the participation in intercalibration exercises related to classification systems. The next main task following will be the consideration of measures needed to meet the objectives of the Directive in those water bodies not achieving or at risk of not achieving good status. In this regard consultants in each River Basin District are drawing up a specification for further work which will form the basis of a programme of measures to deal with particular pressures. For example the Western RBD project is examining issues relating to forestry; the South Western RBD project is examining issues relating to industrial/municipal regulation, dangerous substances, marine morphology, artificial water bodies and heavily modified water bodies; the Eastern RBD project is examining issues relating to abstraction, urban pressures, diffuse mobile organics and economics; and the Shannon and South Eastern RBD projects are examining issues relating to freshwater morphology and chemical water quality standards for all waters. A detailed description of work ongoing nationally in relation to implementation of the WFD is presented in the Water Quality in Ireland 2001-2003 report (Toner *et al.*, 2005).

Many local authorities have already been involved in the Water Quality Monitoring and Management Systems (WQMMS) established for Lough Derg / Lough Ree (KMM, 2001), and the Three Rivers Project (MCOS, 2002). The Final Report of the Lough

Leane Monitoring and Management Project was published in December 2003 (KMM & Pettit, 2003). In addition, water quality management plans already exist for many river catchments around the country (Fanning *et al.*, 1999). Fingal and Meath County Councils propose to produce a Water Quality Management Plan for the Broadmeadow Estuary and catchment to tackle eutrophication in the estuary. Information derived from the WQMMS and other plans are being used by the new RBM Projects.

The participation of local authorities in the RBM projects should assist them in achieving the objectives of the Phosphorus Regulations. However, it is important that local authorities act on the wide array of information already available to them on pollution blackspots and suspected causes to ensure compliance with the prescribed standards in the Phosphorus Regulations by 2007.

#### ***4.1.2 Groundwater Protection Schemes***

The interdependency between groundwater and surface waters means that even relatively low levels of phosphorus in groundwater may lead to a problem in surface water if there is significant groundwater baseflow to a river, particularly in times of low flow. The Geological Survey of Ireland (GSI) has completed, or is nearing the completion of, a number of groundwater protection schemes for various local authorities and is planning to have developed such schemes for much of the country by 2010 (McGarrigle *et al.*, 2002).

Groundwater protection schemes provide guidelines for the planning and licensing of activities that could pose a risk to groundwater resources. The schemes provide a land surface zoning map which outlines areas in which groundwater is vulnerable to pollution and areas that have a good groundwater potential. These maps can be used to assess the acceptability of a particular activity with regard to potential hazard and groundwater source protection. The schemes are also a guide in identifying works that should be carried out to protect groundwater sources. Regard should be had to these schemes in the preparation of County Development Plans. The WFD and the setting up of RBM Projects requires vulnerability assessment to be undertaken as well as the delineation of resource and source protection zones. The groundwater protection responses for landfills, landspreading of organic wastes and for wastewater treatment systems for single houses put measures in place to reduce the risk of phosphorus and other pollutants entering groundwater (DELG *et al.*, 1999). The EPA has recently issued further guidance on the landspreading of organic wastes (EPA, 2004) and is currently in the process of developing guideline values for the assessment of groundwater quality in Ireland (EPA, 2003a).

#### ***4.1.3 Waste Management***

In Ireland, waste generation and resource use are increasing in tandem with increasing consumption of goods and services and increased economic activity generally. Various initiatives are being taken to address this issue including the commencement of a National Waste Prevention Programme in 2004. All parts of the country are subject to regional waste management plans and a *National Hazardous Waste Management Plan* (EPA, 2001a). The implementation of these plans must be accelerated and subject to regular review and updating, particularly in the light of the current national deficit in landfill and thermal treatment capacity (EPA, 2004b).

The operating standard of waste facilities has improved substantially due to the enforcement of licences and permits, and emissions from licensed landfills have decreased accordingly. However, notwithstanding an increasingly professionalised and licensed waste sector, significant instances of illegal dumping of waste have been detected. Enforcement action in this area is now seen as a priority and, in 2003, the DEHLG announced allocations of €7 million to local authorities in support of a five-year programme of law enforcement in relation to waste activities. The €7 million is being made available from the Environment Fund, drawn from the proceeds of the plastic bags and landfill levies. The grants are being made available to local authorities specifically to meet the costs of additional enforcement staff, and related overheads. The Office of Environmental Enforcement (OEE), which was established in 2003, is helping to coordinate and support this activity. In addition, a number of important enforcement-related changes in the law have been provided for in the Protection of the Environment Act 2003. On a related initiative, the OEE has recently issued a report on the nature and extent of unauthorised waste activity in Ireland, with an accompanying action plan detailing measures needed to tackle the issues raised.

#### ***4.1.4 Sludge Management Plans***

Twelve local authorities propose the preparation or implementation of sludge management plans. The EPA has found that sampling programmes at some local authorities where sewage sludge is reused in agriculture are either non-existent or in need of improvement, and there is inadequate maintenance of sludge registers. All local authorities should have regard to EPA recommendations in relation to management of sewage sludge (Smith *et al.*, 2004).

Offaly County Council has adopted a sludge management plan. In the context of recommendations in the plan relating to landspreading and increased sludge production over the coming years, management procedures will be introduced to effectively limit phosphorus inputs to surface water bodies and to ensure disposal of sludge in a sustainable manner. Sludge holding facilities are being constructed at Edenderry, Co. Offaly, to serve as a hub centre for the surrounding villages in the area. Sludge treatment facilities utilising mechanical dewatering have been set up at Clonaslee Water Treatment Plant. A Scientific Officer has been employed to carry out research into alternative sludge disposal methods.

Kildare County Council propose to examine the management of non-hazardous sludges produced by agriculture, industry, water treatment and wastewater treatment processes, with reference to the Kildare Sludge Management Plan, to ensure that disposal methods for these sludges or their by-products do not affect water quality. All industries in the county generating sludges will be audited to ensure that sludge is collected and disposed of in accordance with the Waste Management Act.

Laois County Council has adopted a sludge management plan which is primarily being implemented through the Water Services Section in the treatment of sludges from treatment plants. The Council has adopted bye-laws under the Water Pollution Acts (1977-1990) to control the spreading of industrial organic sludges in the county. The bye-laws will be implemented when a suitable database recording system has been established.

The Roscommon County Council sludge management plan proposes sludge reception centres at Monksland, Boyle, Castlerea, Roscommon and Ballaghadereen. The centre at Roscommon will also form a hub treatment centre. Consultants have been appointed to review, upgrade and implement provisions in the plan.

#### ***4.1.5 Planning and Water Quality***

Thirteen local authorities propose closer integration of the planning process with responsibilities for protecting water quality generally, through strengthening the referral process between the Planning and Environment sections of the local authority. Environment Sections now frequently receive planning applications that involve environmental emissions for consideration. It is important that environmental concerns, such as any direct discharges to waters, are addressed at the application stage. In addition, local authorities should have regard to DEHLG Circular SP 05/03 which relates to groundwater protection and the planning system.

The Planning Department in Cork County Council refers planning applications for housing estate developments to the Environment Department for consideration at the planning stage, prior to the requirement for a water discharge licence under the Water Pollution Act. This allows the application to be reviewed more fully in terms of the Phosphorus Regulations particularly in relation to housing density, treatment facility requirements and the capacity of the receiving waters. The Environment Department is working with the Forward Planning section of the Planning Department in the future development of ten Local Area Plans for the county, as required under the Planning and Development Act, 2000. This will be with particular reference to 200 key towns and villages in the county, the receiving waters for projected effluent discharges from identified zoned land, and the requirements of the Phosphorus Regulations. This is a significant improvement in the development of a strategic approach to cross-functional issues between the Environment and Planning Departments. The Environment Department also plan to utilize the newly established Council Geographical Information System (GIS) Planning Enquiry system to identify current and historical planning developments in areas where the causes of deteriorating water quality are not clear.

Cork County Council notes that agricultural planning applications have substantially increased since 2000 (100 applications) to 350 in 2003, mainly driven by the availability of grant aid for agricultural developments and the increasing uptake of the Rural Environment Protection Scheme (REPS). Cork County Council applies restrictions in landspreading of farm slurries or other organic manures which are in line with BATNEEC guidance in the appraisal of all agricultural planning applications. Cork County Council is carrying out a survey of pig production units ongoing in the county to establish operative status and location of spreadlands.

Wicklow County Council proposes to improve communications between the relevant sections within the Council, e.g., Planning, GIS, Water Services and Environment by introducing inter-departmental review meetings so that all parties are aware and informed of the priority water quality issues and the measures that need to be undertaken by the various sections within the Council. Three local authorities (Kerry, Mayo and Waterford County Councils) propose to incorporate water quality concerns into their County Development Plans.

#### ***4.1.6 Discharge Licensing and General Enforcement***

The majority of local authorities have indicated that they will make greater use of powers under the Water Pollution Acts in issuing, enforcing and reviewing section 4 and section 16 discharge licences, and in issuing and enforcing section notices to prevent pollution. Many local authorities have made substantial progress in reviewing discharge licences and are now ensuring that discharge licences contain a condition limiting phosphorus discharge, where appropriate (e.g., Westmeath, Wexford County Councils). However, monitoring and enforcement of discharge licences remains an issue for many local authorities. EPA audits indicate that, despite improvements in discharge licensing, in some cases there is an absence of a scheduled trade effluent monitoring programme; there is an inconsistency between the limits set in trade effluent discharge licences and the follow-up enforcement monitoring; and breaches of discharge licences are not pursued by some local authorities (Smith *et al.*, 2004). Local authorities should consider implementing MCEI requirements (EP & EC, 2001). For additional information on the licensing of industrial discharges local authorities are advised to consult the EPA manual on Characterisation of Industrial Waste Waters (EPA, 1998). Local authorities should also have regard to DEHLG Circular L8/03 (Water Services Policy). One issue that should receive particular attention in the near future is the issue of garbage grinders, which place an additional biological load on wastewater treatment systems.

Some local authorities have issued a significant number of Section 12 notices, though relatively few local authorities have reported taking legal action against polluters (Table 9). Nineteen local authorities have proposed carrying out surveys for unlicensed discharges and progress is being made in certain areas towards licensing of smaller businesses such as service stations, hotels and restaurants (e.g., in Kildare), golf courses/clubhouses (e.g., Fingal), fast-food outlets (e.g., North Tipperary) and garages (e.g., Cork County). South Tipperary County Council has conducted surveys of sheep dips and quarries in the county. Waterford County Council is currently processing a Section 4 discharge licence for one quarry site, which will be used as a template for the control of other sites in the county. In this case the Council has reported that diffuse run-off generated from the quarry site during rainfall events far outweighed any point source discharges, in terms of quantity and quality (suspended solids). This situation is likely to be repeated at other similar sites and will need to be addressed.

The four Dublin local authorities currently hold over 700 discharge licences under the Water Pollution Acts (and the EPA have issued approximately 80 Integrated Pollution Prevention and Control (IPPC) or Waste Management licences in the region). Dublin City Council report that there is currently no discharge licensing of offices, shopping centres, schools and colleges, hotels, financial centres, sports centres, army barracks and prisons. However, the Council is now actively considering the licensing of hotels.

In Kildare County Council, designated technical and administrative staff deal with licence applications in the Environment Section. Each licence application involves consultation with the Planning and/or Water Services Departments, where necessary. The priority is always to ensure that the quality of the receiving water is not compromised and that there is a mechanism in place to control and manage chemical and biological loadings placed on municipal wastewater collection and treatment systems. The Council proposes that prior to new applications for a licence being submitted,

discussions will be held with the applicant to ensure that all relevant information is included. Enforcement is an important tool and each licensed premises is inspected at regular intervals in accordance with the Council's annual monitoring programme. A thorough site inspection is carried out during which a sample of the discharge is taken for independent analysis. On receipt of the certificate of analysis a report on the inspection is compiled. Each company is notified of the results and whether it is in breach of its licence conditions. Sampling and on-site inspections of all Section 4 and Section 16 licensed activities is being carried out in accordance with an annual monitoring programme. Where activities are identified as being high-risk in relation to eutrophication potential the frequency of site inspections is increased. The policy of the Council is to liaise with the licensee following each inspection and make recommendations where necessary. This approach has been successful and a number of premises have significantly improved their effluent treatment or installed appropriate monitoring equipment. Where a licensee is continuously in breach of licence conditions and has ignored instruction from the Council to address the matter, legal proceedings under the Water Pollution Acts are recommended. At present a number of prosecutions are being considered.

In Clare County Council an Assistant Scientist post has been created for the issue of Section 16 licences for the county, with particular reference to the Shannon Industrial Estate. In addition, the Council are requiring activities with significant unlicensed commercial discharges to apply for Section 4 discharge licences. Phosphate free detergents are specified in licence conditions where relevant. The Environment Section is also working very closely with the Planning Section in relation to planning application guidance, assessment of relevant planning applications and single house treatment system site assessments, where relevant. This close interaction is essential throughout the country if the goal of sustainable development is to be achieved.

Offaly County Council have engaged a technician full-time in the licensing of premises under the Water Pollution Acts and, following a survey of manufacturing/commercial activities in the county, has issued 22 new discharge licences. Cork County Council require new licensees, where relevant, to have in place and available for inspection, operating procedures and training requirements for staff involved in effluent control.

It is an offence under the Shannon Navigation Bye-laws to discharge sewage from a boat directly to the River Shannon or Shannon/Erne Waterway. Leitrim County Council proposes improved liaison with Waterways Ireland in regard to the improved implementation of this bye-law. Leitrim County Council also proposes improved environmental control of marinas including the provision of pump-out facilities.

#### ***4.1.7 Pollution Incidents / Complaints***

The OEE and the European Commission receive a significant number of complaints in relation to Local Authority performance of statutory duties each year. Dealing with complaints about environmental protection matters is an on-going issue for both local authorities and the OEE and there is a need for a consistent and transparent approach to dealing with and resolving complaints in an effective and timely manner. This will require the adoption and implementation by local authorities of a standard approach to complaints handling and resolution. If local authorities deal with complaints in an



adequate and timely manner then this should result in a reduction of complaints being made to both the OEE and the EU Commission.

The OEE established an enforcement network to deal with the issue of complaints in 2005. The initial focus of the Complaint Investigation Working Group has been on the development of a procedure for complaints handling and resolution and arranging for the implementation of this procedure by all local authorities. The working group will monitor the implementation of the procedure and assist with overall co-ordination of complaint handling and resolution by local authorities. Pollution incidents can result in significant damage to aquatic life. The EPA reports that there were 147 fish kills in the 2001-2003 period (Toner *et al.*, 2005), which is unacceptably high.

**Table 9 Selected actions undertaken by local authorities in July 2002- July 2004 period to improve water quality**

(Numerical data is based on information submitted in local authority Implementation Reports. Where local authorities or data are not reported on in the table, this is due to the absence of specific information in the Implementation Reports.)

Local Authorities	Car-low	Cavan	Clare	Cork	Dublin City	DLR	Gal-way	Kerry	Kil-dare	Kil-kenny	Laois	Leitrim	Lime-rick	Meath	Mon-aghan	North Tipp.	Offaly	Sligo	South Tipp.	Water-ford City	Water-ford Co.	West-meath	Wex-ford	Wick-low
Section 3s issued							1																	
Section 4s Issued	24	8							20			10	4		5		5		1		5			10
Section 4s Reviewed			1				80		7	1					9				1		15	48	50	
Total active Section 4s	27		47			1							16		22			17				48	50	62
Section 16s Issued	14					78			41	12		3	6				17		3		2			1
Section 16s Reviewed					10	10			9										8		15			
Total active Section 16s	22												32										15	9
Farm Surveys				1430			270	630		50	600	40	740		738	676	280	146	641		77	196	90	78
Section 12 Warnings Issued			45	831											210						22	720	4	
Section 12s Issued			66	121		15	9	134	68			21	118	44	22		57		42	53	9	55	13	2
Section 23s Issued			12	20															48				12	
Legal action (total)			12				1		2			4	24		1				4			4		
Septic tanks surveyed							110						>27	>100									40	
Misconnection/con nections surveys					3798	829																		
Other investigations								275																

#### ***4.1.8 Waste Water Treatment***

Raw sewage and poorly treated wastewater discharges from municipal waste water treatment plants (WWTPs) can have a serious impact on receiving waters. Significant progress is being made nationally in the area of waste water treatment, due to the increased level of funding made available by the DEHLG for capital works. The Water Services Investment Programme 2004-2006 comprises 869 water and sewerage schemes at different stages of development and has a total investment value of €5 billion. Almost all local authorities propose the construction or upgrading of WWTPs, with most of these proposing the installation of phosphorus removal facilities at all or a number of plants in their functional area.

The DEHLG commissioned a National Urban Waste Water Study in 2002, which produced an inventory of all sewage catchments of 2,000 population equivalents (p.e.) or more (excluding the Greater Dublin Area). This study, published in 2005, is the most extensive examination to date of public waste water infrastructure outside of the Dublin Region. It forms a thorough and comprehensive analysis of national waste water infrastructure of each of the 170 catchments in the 30 sanitary authorities covered, and will provide a detailed picture of the position in each local authority area for the base year of 2002. The Study is a valuable assessment which will underpin the strategic development of national waste water infrastructure. It will assist the evaluation of current strategies and support and inform the determination of future priorities, policy development and investment in waste water infrastructure.

Approximately 17 per cent of WWTPs (serving above 500 population equivalents) discharging to sensitive waters (as defined in the Urban Waste Water Treatment Regulations, 2001) have nutrient reduction facilities (Smith *et al.*, 2004). WWTPs incorporating phosphorus removal have been installed in a number of locations including in the Shannon, Boyne, Liffey, Suir and Lough Leane catchments in the late 1990s due to particular eutrophication problems in these areas. Eutrophication may remain a problem in many rivers and lakes unless phosphorus removal facilities are incorporated in plants. The installation of phosphorus removal in Ballyjamesduff WWTP (Co. Cavan) and Osberstown WWTP (Co. Kildare) has resulted in significant improvements to water quality in the Mountnugent and Liffey Rivers respectively. In addition, the reduction in the percentage of seriously polluted waters since 1995-97 is largely attributed to better sewage treatment plant performance (Toner *et al.*, 2005).

However, reduction in water quality due to discharges from ineffective WWTPs remains a problem in many areas. In a review of the performance of selected sewage treatment plants the EPA has noted that poor performance and overloading of plants may continue to cause water quality problems even where phosphorus removal is installed (Toner *et al.*, 2005). Exceedances of effluent standards and deficiencies in monitoring regimes at many WWTPs have also been reported. Non-compliance with the Urban Waste Water Treatment Regulations is particularly problematical at smaller WWTPs (<15,000 p.e.) (Smith *et al.*, 2004). It is thought that storm overflows, urban runoff and un-intercepted wastewaters are a particular problem in many areas. Recent EPA monitoring indicates

that 24 locations continue to be seriously polluted by municipal discharges, while some 200 others are moderately polluted below towns and villages (Toner *et al.*, 2005). It is important to emphasise that Article 5 of the Urban Waste Water Treatment Regulations, 2001, place more stringent requirements on the quality of WWTP effluent where receiving waters fail to meet standards in other community Directives.

The DEHLG has launched a Performance Management System (PMS) for WWTPs in 2002, which was developed by the Water Services National Training Group. This is a management tool for local authorities to manage the Operation and Management phase of Design Build Operate contracts. It is also recommended as a management tool for local authorities in their own operation of treatment plants. This PMS should contribute to improved environmental and performance management of WWTPs.

Small streams and rivers are particularly susceptible to the adverse affects of even high quality treated sewage effluents. Low levels of dilution available in these rivers render them particularly vulnerable to eutrophication. Many of these streams and rivers are important nursery streams for salmonids and support diverse macroinvertebrate communities. There is increasing pressure on some local authorities to allow sewage effluent to be discharged into smaller rivers (as a result of development pressure). In the context of sustainable development, this should only be facilitated where it can be demonstrated that such discharges will not cause environmental pollution. Each proposal needs to be assessed based on its merits. Nutrient removal should be considered in all such proposals. Further options available to local authorities / developers may include piping such discharges to rivers with larger dilution capacity (long outfalls) or the use of integrated constructed wetlands to polish final treated effluents. There needs to be close co-operation between the Environment, Planning and Sanitary Services sections of local authorities to ensure that development is carried out in a sustainable manner. In this regard, it is worth noting that ineffective wastewater treatment (or lack of enforcement of discharge licences) weakens the local authority case when presenting educational programmes or seeking co-operation from other sectors to tackle water quality issues.

Local authorities should take into consideration the requirements of the Phosphorus Regulations when preparing their priority list for schemes to be undertaken as required by the Urban Waste Water Treatment Regulations and DEHLG Circular Letters L11/03 and L13/03. The Environment Section of Monaghan County Council carried out a survey of WWTPs and collection systems in the county in 2002, in liaison with the Water Services Section, and compiled a report. This report examined the impact of WWTPs and urban areas on receiving waters and recommended appropriate actions needed to protect receiving waters. The report highlights the negative impact of unsewered discharges and stormwater overflows on a number of river systems. This proactive approach is to be highly commended. It is very important that the Water / Sanitary Services, Environment and Planning Sections of local authorities work together when preparing Assessment of Needs reports for WWTPs to be constructed / upgraded. When prioritising the construction / upgrading of WWTPs, one of the primary determinants should be the extent to which the sewage is having a detrimental impact on the receiving environment.

Similarly Water Services South Cork Rural of Cork County Council has appointed consulting engineers to carry out an environmental assessment of wastewater discharges in selected catchments. In addition, Cork County Council established a Service Indicator Environment Group in 2004, involving Environment and the four Water Services Divisions in the local authority. One service indicator relates directly to the requirements of the Phosphorus Regulations and surface water quality. Biannual meetings assist in strengthening links and raising awareness with Water Services of their responsibilities in relation to the operation and management of WWTPs.

Kildare County Council reports significant improvement in the quality of the River Liffey downstream of the WWTP at Osberstown since phosphorus removal was installed. The Environment Section has been working in conjunction with the Water Services Department in identifying river stretches that are affected by municipal WWTP discharges. This approach has resulted in funding being approved or sought for improvement works at a number of priority WWTPs. For example, interim improvement works, including phosphorus removal, are almost complete at the Kildare Town WWTP which discharges to the currently polluted Tully Stream.

South Dublin County Council notes improvements in water quality as a result of the removal of WWTPs in Saggart and Newcastle and diversion of wastewater to Ringsend. Ringsend WWTP now provides treatment for all the domestic and industrial wastewater from the entire Dublin region. Donegal County Council notes improvements in water quality in the River Finn as a result of the new Ballybofey / Stranorlar WWTP. Waterford County Council reports improvements in the River Suir as a result of improved municipal wastewater treatment at Clonmel.

WWTP performance can depend to a significant extent on the quality of wastewater received. Particular difficulties have been noted with the discharge of waste food and oils/fats/greases to the public sewer. A number of local authorities (e.g., Kilkenny, Galway, Dun Laoghaire Rathdown County Councils) are taking steps to improve the quality of such discharges (e.g., through discharge licensing and enforcement action). Some local authorities have made efforts to develop documented management systems for their WWTPs (e.g., Offaly County Council). The overall aim is to improve the operating efficiency of the WWTPs and to reduce inputs (including phosphorus) to receiving waters. In addition, sewage plant caretakers in Offaly have completed a sewage plant operation and maintenance course.

Limerick County Council has stated that it is implementing 'The Rural Towns and Villages Initiative', in order to promote development in existing settlements and to reduce pressure on river water quality. Under this initiative the Council will contribute towards the cost of a sewage treatment plant which is provided by a private developer and which meets the needs of the existing town or village, the needs of the proposed development and some additional reserved capacity for future developments. The aim of the Council's contribution will be to ensure that the provision of this facility is viable from the developer's viewpoint. The Council's contribution would be conditional on there being sufficient effluent dilution available in the receiving watercourse; an acceptable

treatment system proposed to the Council; and, upon satisfactory completion and commissioning, transfer of the plant ownership to the Council who will be responsible for its maintenance and operation. The initiative is mainly aimed at towns and villages where the existing scheme may not be otherwise upgraded for some time and where there is significant development pressure. To date the Council has received expressions of interest in respect of twelve towns. In all cases phosphorus reduction will be stipulated, in some cases down to 0.1 mg/l Total Phosphorus.

The OEE is currently focussing on seriously polluted river stations (Q value  $\leq 2$ ), seeking information from the relevant local authorities on causes of pollution and detailed action plans to remedy pollution problems. During 2005, there has been particular focus by the OEE on the twenty-four seriously polluted stations impacted by sewage, seven of which have subsequently improved in quality status. In most cases this improvement has been due to action taken by the local authorities. The OEE is in direct contact with the DEHLG regarding the environmental impacts of WWTPs.

#### ***4.1.9 Drainage Systems***

The main sources of nutrients in urban areas include run-off from paved areas, roadsides, gardens, and parks which may be discharged untreated to surface waters. Atmospheric deposition, domestic animal faecal waste, litter fall, traffic pollutants and chemical fertilizers/pesticides can be present in these discharges. Pollutants may enter surface water drains or combined systems impacting on receiving waters. (A combined system is a collection system in which sanitary sewage and surface water are conveyed in the same pipes). Pollution may reach surface water systems directly from these drains or via Combined Sewer Overflows (CSOs) (also known as storm water overflows). A CSO is a structure or device, on a combined system, introduced for the purpose of relieving the system of flows in excess of a selected rate (e.g., as a result of elevated rainfall levels), the excess flow being discharged to a local receiving water. In addition, pollution may reach receiving waters from misconnections between foul and surface water drainage systems.

Twenty-two local authorities propose to survey and upgrade surface water and foul sewer drainage systems to effectively manage urban runoff and to rectify misconnections. Dublin City Council reports significant progress in the implementation of misconnection surveys (Table 9). The Main Drainage Division has carried out successful surveys of misconnections to and from surface water systems in housing estates in the Camac, Santry and Tolka River catchments. Two three-man crews survey housing estates for misconnections of wastewater to the local surface water systems (e.g., washing machines / dishwashers / sinks). Where misconnections are confirmed the householders are written to and requested to correct the problem. Of 3,798 inspections carried out in the 2002-2004 period, 271 misconnections were found, with 231 of these having been corrected to date. The survey programme is ongoing and was extended to industrial estates in 2003.

Since July 2002, Dun Laoghaire-Rathdown County Council visited 1142 residential properties and gained access to carry out surveys at 829. Misconnections were found at 51 properties, with 36 of these corrected to date. The Council issues warning letters where problems are encountered. Homeowners are encouraged to remedy the situation before prosecution under Section 12 of the Water Pollution Act is considered.

There has been considerable work undertaken by many local authorities in providing collection and treatment systems for villages not currently sewered and in upgrading collection systems (e.g., Cavan, Cork County Councils). Substantial work was completed last year in Swords (Fingal) upgrading sewers and diverting surface water. The timescale for further upgrades has not been decided.

The €10 million Greater Dublin Strategic Drainage Study (GSDSDS), which commenced in 2001, has now been completed for the Dublin Region. This study provides the blueprint to facilitate sustainable development and to facilitate future housing needs in the Region up to 2031 and beyond. The Dublin region drainage system consists of a network of 5,500km of foul and stormwater pipes and eight WWTPs. These collect foul sewage, industrial effluent and rainwater, all of which must be discharged or treated while minimising flood risk or environmental impacts. All regional drainage infrastructure and eight of Dublin's rivers were examined under the study and hydraulic models constructed and verified. The study covered the entire functional areas of Dublin City Council (which was the contracting authority), Fingal, South Dublin and Dun Laoghaire Rathdown County Councils and parts of the functional areas of Meath, Kildare and Wicklow County Councils, taking in a population of 1.2 million. The study has assessed all aspects of the drainage system in order to optimise the capacity of the system to cater for increased development in the region, while avoiding any adverse environmental impact. One benefit of this work should be reduced frequency of discharge from combined sewer overflows to streams, rivers and Dublin Bay. It is estimated that capital expenditure of €2.4 billion will be required in the coming years to maintain and expand the drainage system. The core policy recommendations are now being included in the Development Plans of the seven local authorities in the region. These will immediately require major changes in the way local authorities, builders, developers and industry approach drainage. The implementation of these new policies is necessary to allow the region to develop in a sustainable manner while complying with all relevant EU Directives.

As part of the GSDSDS, local authorities in the Dublin Region have developed guidelines to maximise the use of SuDS (Sustainable Drainage Systems). The new policy seeks to ensure that stormwater runoff is kept to predevelopment levels to minimise the risk of flooding and excess spills from CSOs. SuDS includes infiltration of stormwater via filter drains or porous paving and the use of swales and storage ponds, which can remove pollutants. The increased use of SuDS should improve water quality in the region. In addition, new guidelines on environmental management have been developed. These address all environmental matters, particularly those associated with CSOs, separate systems and treatment plants. Implementation of these guidelines will ensure that the

Dublin Region can continue to develop without adversely affecting the quality of its surface waters. For further information visit the website [www.dublincity.ie](http://www.dublincity.ie).

The DEHLG have issued a Circular Letter (WP 3/95) on 'Procedures and Criteria in relation to Storm Water Overflows', which includes assessment and design criteria for CSOs. The National Urban Waste Water Study identified 5,592km of gravity sewers in 170 catchments and some 450 CSOs. However, it is likely that the number of CSOs is significantly higher than reported. In the interests of meeting the requirements of the Water Framework Directive (and the Phosphorus Regulations) it is important that all CSOs are identified, their performance assessed and measures implemented to prevent pollution, where required.

Under the Waterford Main Drainage Scheme, completion of Interceptor Sewer No. 1 has eliminated foul discharges to the river along the south quays in the city. Phase 2, which was due to start in 2004, will intercept outfalls from the north quays in addition to bringing all other waste water from the city and its environs to a WWTP at Gorteens, to be constructed by 2007 with secondary treatment. The Limerick Main Drainage Treatment Plant was commissioned in October 2003 with the elimination of over 50 effluent outfalls to the Shannon River.

In Kildare, work is ongoing in relation to unauthorised discharges of wastewater to stormwater drainage systems serving urban areas or to surface water drains and streams in rural areas. The problem arises when wastewater, primarily of domestic origin but in more serious cases of industrial origin, is not connected to the local authority sewerage system or to an on-site effluent treatment system. A significant number of premises giving rise to these discharges have been identified and in most cases the responsible party has taken corrective action. Work is also being carried out in relation to the levels of fats, oils and grease entering sewer networks, particularly from premises involved in food preparation.

Wicklow County Council continues to encourage the screening of combined storm overflows and discharges from storm water drainage systems, as well as (or in association with) the use of storage impoundments. The Council continues to include this measure when upgrading drainage systems. Roscommon County Council has carried out a significant amount of work separating storm water and foul sewage, where possible, in Boyle and Ballaghaderreen.

#### ***4.1.10 Septic Tanks/Single House Treatment Systems***

Septic tanks are estimated to contribute approximately 12 per cent of the total annual phosphorus load to Lough Derg (KMM, 2001); 10 per cent to Lough Leane (KMM and Pettit, 2003); and 3 per cent to the Liffey, 7 per cent to the Suir and 8 per cent to the Boyne (MCOS, 2002). Twenty local authorities have proposed controlling septic tanks mainly through the planning process and through survey and assessment. EPA guidance documents on Treatment Systems for Single Houses (EPA, 2000b) and Treatment Systems for Small Communities, Business, Leisure Centre and Hotels (EPA, 1999b),



SR6 (Eolas, 1991) and the relevant Groundwater Protection Wastewater Treatment Responses, are being used extensively by local authorities in the assessment of planning applications and in supervision of the installation, design, operation and maintenance of treatment systems, including septic tanks. FÁS, in conjunction with the EPA and the GSI, is currently running training courses for professionals in this area. A number of local authorities are using qualified persons to carry out site assessments and using planning conditions to ensure that the installation process has been adequately supervised by a competent person (e.g., Clare, Limerick, Kildare County Councils).

Wicklow County Council inserts a maintenance clause for all private small scale treatment systems in planning permissions which requires the annual inspection and servicing of septic tanks. Similarly Carlow County Council inserts a maintenance clause for all small-scale treatment systems in planning permissions, which requires details of final sludge disposal. Carlow County Council supervises groundwater and soil percolation tests for septic tanks in accordance with the aforementioned guidelines. Westmeath County Council requires that if a septic tank is located in a sensitive area, the owner must install a treatment system, have a maintenance contract and ensure minimum effluent quality standards (20 mg/l BOD and 30 mg/l suspended solids).

Cavan County Council has reviewed the planning process in relation to septic tanks and the type and number of septic tanks that can be installed in sensitive areas is now limited. The Council issued bye-laws on the operation and maintenance of single dwelling treatment systems in July 2004. Kerry County Council has widely circulated a brochure on the installation and maintenance of septic tanks and has held an information seminar for local planning agents and consulting engineers in May 2004.

Limerick County Council has carried out surveys of septic tanks in parts of the Deel catchment and has found significant problems. For example in the village of Feenagh, it was found that 17 out of 27 premises surveyed had direct discharges to surface waters. In some cases there was no septic tank and the foul sewage discharged directly to the stream without settlement. The Council is currently working with a local voluntary housing association with a view to part funding the installation of a sewerage system to serve the entire village. Similar problems, but on a smaller scale, were found in the village of Feohanagh.

Wexford County Council has carried out 40 investigations of septic tanks (14 of these in the Our Lady's Island Lake catchment) and has identified malfunctioning of percolation areas as a particular problem. Wexford County Council employs two technicians to assess all applications for septic tanks, wastewater treatment for housing developments, commercial properties and agriculture from an environmental and public health perspective.

All local authorities should carry out random checks of existing single house treatment systems in high risk areas and consider enforcement action where problems are occurring. Local authorities should have particular regard to circular letter SP 05/03 issued by the DEHLG on groundwater protection and the planning system. Local authorities should

continue to assess whether sewage collection and treatment systems are adequate to protect water quality and prioritise upgrades accordingly.

#### ***4.1.11 Abstractions***

The EPA compiled a register in 2004 of waters used for the abstraction of significant public supply, as part of meeting the requirements of the WFD. Under the Local Government (Water Pollution) Acts 1977-90, local authorities are required to maintain registers of abstractions in their functional area. Local authorities need to pay greater attention to water abstraction and its potential environmental impacts such as the reduction in assimilative capacity of a surface water body. For example, Laois County Council report that the River Clodiagh is under extreme pressure. Water abstraction from the river, combined with groundwater usage in the catchment, has severely reduced the flow in the river. Effluent from Clonaslee WWTP, which discharges to the River Clodiagh, now receives very limited dilution. An alternative abstraction source is being installed. Monaghan County Council reports that a number of lakes are under pressure from abstraction pressures. New wells for drinking water are now operational at Clones, Carrickmacross and Monaghan Town. Wicklow County Council has written to approximately 70 companies requesting them to submit abstraction rates. The Council also plans to review the results of the risk assessment carried out by the relevant RBD projects to aid identification of water bodies at risk from abstraction.

#### ***4.1.12 Agricultural Bye-laws***

Five local authorities (Cavan, Cork, Offaly, North Tipperary and Westmeath County Councils) have introduced bye-laws under Section 21 of the Local Government (Water Pollution) (Amendment) Act, 1990, to control agricultural activities. Bye-laws may be adopted for individual catchments/townlands or for the entire county as required. Agricultural bye-laws adopted by the five local authorities to date relate to specific listed townlands. Offaly County Council has also applied the bye-laws to the aquifer protection zones of all public and private groundwater sources within the county. The main provisions contained in the published agricultural bye-laws vary somewhat between local authorities (see Table 10). It is recommended that all local authorities that have implemented agricultural bye-laws should carry out a review of their effectiveness, including an assessment of improvements in water quality in the bye-law areas. This should also include a comparison with water quality trends in non bye-law areas.

Cork County Council is enforcing bye-laws in the Funshion, Gradogue and Lee catchments. Cavan County Council has implemented its bye-laws in the Lough Sheelin catchment. Farm surveys have been undertaken systematically in the Sheelin catchment and all farms have been inspected at least once. To facilitate the proper collation and management of data submitted by the farmers and data collected from the farmyard surveys, a computer database has been created with each farmyard allocated a Farmyard Risk Assessment Number. This number will be used to monitor the operation of individual farms and determine if improvements in farmyard management are taking place.

In Offaly, some 582 farms in 192 townlands are covered by the bye-laws. In December 2002, all 582 farms received letters informing them of their obligations under the bye-laws which must be complied with in 12 months. Farmers have nominated agricultural consultants to prepare their nutrient management plans. Offaly County Council has received 80 farm assessments and 15 nutrient management plans to date. Approximately 280 farm surveys have been completed and enforcement powers under the Water Pollution Acts are used to address incidences of farm pollution. Farm surveying has resulted in 57 Section 12 notices being served on offending farmers since surveying commenced. Westmeath County Council has received 80 nutrient management plans and conducted 196 farm surveys in the bye-law areas, which have been followed up by enforcement action where necessary.

North Tipperary County Council has employed an Environmental Scientist and an Agricultural Scientist to implement and enforce the agricultural bye-laws. The bye-laws regulate approximately 700 farmers, farming 40,000 hectares. All farms in the bye-law area were visited during 2003/04. The local authority has approved seventeen advisors. 200 nutrient management plans have been submitted and are presently being assessed. 156 nutrient management plans are outstanding. There are 204 farmers participating in REPS which is higher than the national average. Identification of all persons farming land in the area covered by the bye-laws has been difficult and time-consuming.

An Agricultural Bye-laws Working Group was constituted in 2001, which includes Cork County, Kerry, North Tipperary, Cavan, Laois, Westmeath and Limerick County Councils. Local authorities that have implemented bye-laws or are considering introducing bye-laws meet to discuss progress, findings and the various issues encountered in the implementation of the bye-laws. Kerry County Council published draft agricultural bye-laws for the Lough Leane Catchment and public consultation was undertaken but it is unlikely that these bye-laws will be adopted in the near future. Mayo County Council has drafted agricultural bye-laws following wide consultation but these await adoption by the Council.

A number of local authorities have been holding back on the introduction of bye-laws until the national picture as regards implementation of the Nitrates Directive was clarified (e.g., Limerick, Fingal, Galway County Councils). This Directive requires measures to be taken to prevent nitrate losses from land, including restrictions on the amount of organic nitrogen that may be applied to land. The Nitrates Action Programme and accompanying legislation, prepared as part of Ireland's commitments under the Directive, include standards for minimum manure storage on farms, closed periods for the application of manures, and requirements on the weather and ground conditions for land applications of animal manures and other fertilisers.

**Table 10 Main provisions of agricultural bye-laws introduced by local authorities.**

Provision	Cavan	Cork	Offaly	Nth Tipperary	Westmeath
Date of issue	1 Jan 2001	15 Oct 1999	16 July 2001	1 Jan 2001	1 March 2001
Livestock manure storage	24 weeks storage within 3 years	Three months storage – with immediate effect	14 weeks storage with 4 years	16 weeks storage within 3 years	20 weeks storage within 3 years
Report on farm effluent storage capacity to LA	Within 6 months		Within 12 months	Within 12 months	Within 6 months (extended to 12 months due to foot and mouth)
Controls on farmyard effluents	Yes	Yes	Yes	Yes	Yes
Landspreading of manure	50% by 31 July All by 30 Sept	All by 31 Oct	50% by 1 July All by 30 Sept	50% by 1 July All by 30 Sept	50% by 1 July All by 30 Sept
Controls on application of fertiliser	Buffer zones specified for use of organic and chemical fertilisers Additional areas / times specified for prohibition of fertiliser use	Buffer zones specified for use of organic fertilisers	Buffer zones specified for use of organic and chemical fertilisers Additional areas / times specified for prohibition of fertiliser use	Buffer zones specified for use of organic and chemical fertilisers Additional areas / times specified for prohibition of fertiliser use	Buffer zones specified for use of organic and chemical fertilisers Additional areas / times specified for prohibition of fertiliser use
Phosphate Sales Register		Retail outlets selling P fertilisers in bags $\geq$ 50kgs			
Nutrient Management Plans	Detailed plan required. Within 9 months	Records to be made of organic and chemical fertiliser use. With immediate effect	Detailed plan required. Within 12 months.	Detailed plan required. Within 12 months	Detailed plan required. Within 6 months (extended to 12 months due to foot and mouth)
Nutrient Management Plan (NMP) requirements	Farmer shall not apply nutrients after one year save in accordance with NMP	Chemical phosphate application prohibited on lands where Morgans P $\geq$ 15mg/l or where Morgans P $\geq$ 30mg/l on peat soils Imported organic fertiliser prohibited on lands where Morgans P $\geq$ 15mg/l	Farmer shall not apply nutrients after one year save in accordance with NMP	Farmer shall not apply nutrients after one year save in accordance with NMP	Farmer shall not apply nutrients after one year save in accordance with NMP
Nutrient Management Plans records	Detailed records required.	Records to be made of organic and chemical fertiliser use.	Detailed records required.	Detailed records required.	Detailed records required.
Soil testing	All farms. Rate to be determined by LA	For all farms >20ha and all IAEs Rate generally $\leq$ 4 ha / sample (or $\leq$ 12 ha / sample if soil uniform)		All farms. Rate to be determined by LA	All farms. Rate to be determined by LA
Intensive Agricultural Enterprises (IAE)	Farmer shall not apply nutrients from IAE after one year save in accordance with NMP	Imported organic fertiliser prohibited on lands where Morgans P $\geq$ 15mg/l	Farmer shall not apply nutrients from IAE after one year save in accordance with NMP	Farmer shall not apply nutrients from IAE after one year save in accordance with NMP	Farmer shall not apply nutrients from IAE after one year save in accordance with NMP
Intensive Agricultural Enterprises (IAE) records	Detailed records required.	Records to be made of organic and chemical fertiliser use.	Detailed records required.	Detailed records required.	Detailed records required.
Controls on importation of organic fertiliser		Yes – must notify LA			
Controls on application of organic and chemical nitrogen		Yes – timing and rate of application specified			
Burial of animals			LA consent required		LA consent required
Applies to:	Specific Townlands	Specific Townlands	Specific Townlands and Aquifer Protection Zones	Specific Townlands	Specific Townlands

#### ***4.1.13 Nutrient Management Planning***

Nutrient management planning is an assessment of the quantities of manure, slurry or inorganic fertiliser that should be applied to a field area, based on nutrient status of the soil, crop to be grown and the nutrient content of the proposed fertiliser, so that target crop yields are achieved and losses to the environment are minimised. Guidelines on the preparation of nutrient management plans have been issued to local authorities (DELG, 1998b). Teagasc through its Farm Advisory Service promotes nutrient management planning. Some local authorities are implementing nutrient management planning through the introduction of agricultural bye-laws (see above) and as part of planning requirements. Nutrient management planning is being applied through REPS and it is obligatory in respect of EPA licensed intensive pig and poultry units. Local authorities also have statutory powers under the Waste Management Acts to require farmers to prepare nutrient management plans where these are considered necessary to protect water quality. However, few local authorities have chosen to use this power to date.

Kildare County Council is planning to carry out an assessment of intensive agricultural enterprises in the county (pig, poultry and mushroom producers). Information on quantities of waste produced, waste storage facilities, spreadlands, etc., will be gathered and recommendations made and implemented where necessary. The need for nutrient management plans will be considered. Clare County Council has required three intensive farming activities (two piggeries and a poultry rearing facility below the EPA IPPC licensing thresholds) to prepare Nutrient Management Plans. All applications for farm developments are examined by the Environment Section to assess the on site storage capacity and land banks for reuse of manures arising in the development.

South Tipperary County Council has identified 48 piggeries in the county. Spreadlands for 28 of these have been submitted and mapped, following a request under Section 23 of the Water Pollution Acts for this information. Each piggery for which information has been submitted has been rated according to its pollution potential. A limited amount of information on spreadlands for IPPC piggeries has also been obtained. There are 27 mushroom developments in the county. 25 of these have nutrient management plans as part of planning permission and the other two have been written to requesting information on spreadlands.

Louth County Council requires a nutrient management plan with all planning applications that involve the spreading of organic / inorganic waste. Limerick County Council has linked very high soils P levels in west Limerick with the landspeading of poultry manure. The Council have held a number of meetings with the poultry producers and a number of options are being explored. These include exporting the litter outside of the county, composting and small scale waste to energy schemes. Limerick County Council also plans to run workshops with farmers on nutrient management, in conjunction with Teagasc. In Carlow, a farm survey is carried out on all agricultural developments that apply for planning permission. In addition, all intensive agricultural enterprises are subject to nutrient management plan requirements as part of the planning process. In

Leitrim a policy on provision of NMPs for new slurry tank developments has been devised and included in the current County Development Plan.

The Agency considers that effective nutrient management planning is a key measure to meet the water quality targets set in the Phosphorus Regulations. This is because many soils in the State are believed to contain phosphorus levels that would be considered excessive and likely to pose a threat to water quality. Despite a decrease in sales of chemical P fertiliser nationally, soil P levels are continuing to increase: approximately 24 per cent of soils analysed by Teagasc contain P levels in excess of that needed to produce suitable crop yields. It has been estimated that there is a surplus of between 48,000 and 60,000 tonnes of P applied to farmland each year (Brogan *et al.*, 2001) with a resulting expenditure of over €30 million a year on unnecessary chemical fertiliser application. It is important to note that for any given level of fertiliser P inputs (organic and chemical), the potential for P losses to water will be higher for soils with high P status than for soils with lower P status. Where high soil phosphorus levels occur and there is connectivity to a water body, there is an increased risk of phosphorus loss to water. It has been recommended that soil phosphorus levels should be maintained at the lower end of Teagasc's 'Soil Index 2' if good water quality is to be achieved (Tunney *et al.*, 2000). Problems also arise through the over application of animal slurries, and their misapplication, e.g., by spreading during wet weather, which poses a direct threat to water quality. Teagasc has issued nutrient advice on appropriate phosphorus application (Teagasc, 2001) and codes of good agricultural practice have been published (DAFF and DoE, 1996; DAFRD, 2001).

Recent research led by Teagasc under the EPA Environmental Research, Technological Development and Innovation (ERTDI) programme indicates that detailed nutrient management planning should take cognisance of soil type (particularly soil drainage class, percentage organic matter and pH), climate/weather and soil phosphorus testing. In order to carry out a risk assessment of phosphorus loss from catchments detailed information on soil type and management practices in a given catchment is required. Where high soil phosphorus levels occur and there is connectivity to a water body, there is an increased risk of phosphorus loss to water. The research indicates that there are catchment hot-spots, usually comprising less than ten per cent of the total catchment area, which contribute much of the phosphorus loading. It is important that these areas be identified and specific control measures applied. There is a need for more monitoring and research into the relationships between management practices and water quality; and into the efficacy and cost effectiveness of measures.

Nutrient management planning takes time to implement and it may be a number of years before measurable improvements in water quality are achieved through this measure. However, ultimately nutrient management planning provides a win-win solution both for the environment and for the farmer.

#### ***4.1.14 Farm Surveys***

Farming still poses one of the most significant threats to water quality in the country (Toner *et al.*, 2005). However, farming practices and funding have recently undergone significant changes, and some of these changes will only show benefits in terms of water quality in future years. Within the sector there are a high percentage of farmers who have built the necessary facilities, understand the implications for the environment of poor practices, and demonstrate a responsible approach. However, in such a large sector, there is inevitably a small number that have not yet adopted the required policies and practices. This necessitates the use of education and awareness programs and farm surveys. Farm surveys to locate potential sources of agricultural pollution are proposed by twenty-seven local authorities. These surveys generally focus on the farm yards and are used to determine high risk farms / activities, to focus appropriate measures in these areas.

Most local authorities are concentrating their farm surveys in catchments where water quality is unsatisfactory or where water quality may be at risk as a result of farming activities. Local authorities generally adopt an incremental approach in relation to enforcement action as a result of farm surveys. The process usually begins with a warning letter, followed by formal notices under the Water Pollution Acts, and finally legal action where necessary. In the vast majority of cases, legal action is not needed to resolve the situation.

Cork County Council reports definite improvements in water quality in some catchments (Owenboy, Awbeg and Argideen) as a result of intensive farm survey programmes carried out by the Council and a high degree of co-operation from the agricultural community, in response to action requested by the Council. The Council has produced a very useful and informative leaflet entitled '*Guide to Farm Inspections to Prevent / Control Water Pollution*'. This leaflet includes a flow chart explaining the farm survey process and the follow-up action that may be taken under the Water Pollution Acts where necessary.

Kildare County Council has commenced farm surveys in sixteen river sub-catchments, where a study of water quality monitoring data and information on potential pressures indicated that agricultural activities were likely to be of significance. Information on each farm holding is being stored in the 'Farms Module' database programme. Kildare County Council reports that notable success has been achieved in the River Graney catchment, a sub-catchment of the Barrow. Monitoring data indicated that most of the phosphorus loading originated in the upper reaches of the catchment and this area was prioritised for inspection. Significant point sources of pollution were identified, however, most of these sources have now been eliminated. There has been a corresponding significant decrease in river phosphorus levels.

Wicklow County Council appointed an agri-consultant to undertake farm surveys in the Potter's River catchment. Surveys were carried out on 78 farms, of which 15 were

deemed high risk and 9 medium risk. Wicklow County Council is currently finalising its farm survey methodology and questionnaire for use in the rest of the county.

Limerick County Council has carried out intensive farm survey work throughout the Deel catchment over the last two years. The Council held a public meeting in each sub-catchment to inform the local community about the Phosphorus Regulations and water quality in general and to make them aware of the survey work that the Council would be undertaking in the area. A Council inspector carries out the initial farm survey with the farmer present. The inspector looks at four main areas on each farm: slurry storage, silage effluent containment, control of dairy washings and control of soiled / clean water. On completion of the survey, a surface water and groundwater risk category is assigned to the farm yard, ranging from low to extreme, based on the location, facilities and management practices. Details of the survey are entered in the Farm Surveys Database and the location and risk category of the farm are mapped on a GIS. Every farmer receives a letter from the Council, thanking him for his co-operation and letting him know whether or not any problems were identified on his farmyard and the nature of these problems. The farmer is also requested to submit maps of his land holdings and soil test results.

Where minor problems are identified on the farm yard, the farmer is asked to undertake the works necessary to remedy these within a specified time period. Once the deadline has expired the farm is re-inspected to ensure compliance. Where more extensive problems are identified, the farmer is asked to submit an Effluent Management Plan, prepared by his agricultural advisor, within six weeks. The six week period was agreed with Teagasc at the outset, based on their ability to process requests. Once the plan has been submitted the Agricultural Scientist reviews the plan in consultation with the farmer and his advisor. Once the plan has been finalised and approved, deadlines for the completion of any works required are agreed with the farmer and he is requested, in writing, to carry out the works within this time frame. Again, once the deadline for any element of the works is reached, a re-inspection is carried out to ensure compliance.

To date there has been a very high degree of co-operation and compliance among the farmers, though there has been recourse to statutory notices under the Water Pollution Acts where serious problems have not been addressed. Where extensive farm improvement works have been undertaken these have often been grant aided under the Farm Waste Management Scheme operated by the DAF. A key factor in the success of the project to date has been the policy of rigorous follow-up where problems are identified. To date over 700 individual farms have been visited, however, the total number of farm visits carried out, including reinspections, is approximately 1350. In every case, once the works are completed, the farmer is informed in writing that he has satisfied the Council's requirements and is thanked for his efforts. The single biggest issue identified on farmyards has been control of soiled water and rainwater. The solution to this can often be as simple as guttering sheds, re-diverting clean uncontaminated rainwater, and limiting the yard area that animals can access. In some cases, however, the farmer has chosen to undertake more extensive works to solve the problem, including the provision of covered housing and storage tanks.



In County Monaghan, catchment surveys have focussed on small rural catchments where water quality was classified as moderately polluted. All agricultural, industrial and commercial operations were surveyed in each catchment. Communal septic tanks and village areas were also surveyed. The aim of the catchment surveys was to identify and eliminate point sources of pollution and identify potential diffuse sources of pollution for further attention. Following an initial site survey, all silage making facilities and medium and high-risk wintering facilities were re-inspected in the summer and winter periods respectively. All discharge sources were followed up with appropriate action.

Wexford County Council has carried out farm surveys, in conjunction with a detailed monitoring programme, of the Our Lady's Island Lake catchment. This followed a significant fish kill in the lake in August 2003. Wexford County Council has taken a co-operative approach in dealing with the various stakeholders in the catchment. The Council has conducted farm surveys and commissioned an intensive monitoring program of the lake and its feeder streams. The Council has also implemented measures to address other pressures in the catchment, such as improvements to WWTP effluent and septic tank surveys.

Clare County Council has carried out a recent farm resurvey (2004/2005) of the moderately polluted Moyarta River catchment. There has been some improvement in water quality and in pollution control in several farms since the initial survey in 2001. The main issues identified in the resurvey primarily relate to inadequate management of effluent collection facilities and the adoption of poor farming practices (at a minority of farms), particularly with respect to the wintering of animals on the land, resulting in excessive poaching around feeding points, and contamination of adjacent watercourses. Follow-up enforcement action is being taken.

Farm surveys are also being undertaken with respect to enforcement of the agricultural bye-laws. Cork, North Tipperary, Offaly and Westmeath County Councils all report progress in the implementation of this measure. Other local authorities reporting significant farm survey work include Galway, Kerry, Laois, Limerick, Monaghan, and South Tipperary County Councils (Table 9). There is evidence that where farm surveys are being carried out there is an increase in demand for Teagasc farmyard renovation plans, making this a very effective strategy (Sean Regan, Teagasc, pers. comm., 2003). The significant developments in farm surveys since the last National Implementation Report are very welcome and will hopefully lead to documented improvements in water quality in the targeted catchments. However, it should be stated that there are large parts of the country where recent farm survey work has not been reported.

In many areas, water quality deterioration has been noted at and downstream of cattle watering sites. Damage to riverbanks can lead to significant siltation of rivers and may act as a conduit for nutrient and sediment release into streams. Direct deposition of faeces may also represent a threat to water quality. Aerial surveys by the Fisheries Boards in the Suir catchment indicate that this problem is common and widespread (Patrick Kilfeather, pers comm., 2005). In some cases negotiations are underway to

provide for fencing and separate water supply for farmers at these sites. There is provision in REPS for protection and maintenance of watercourses, including options to increase watercourse margins and exclude all bovine access to watercourses. Local authorities should seriously consider requiring farmers to undertake necessary stream protection measures, particularly in streams with fauna particularly sensitive to this type of disturbance, such as the freshwater pearl mussel *Margaritifera margaritifera* (see Moorkens *et al.*, 2004). Ring feeders located close to streams also pose a similar threat and should be relocated.

Recent research results from a large-scale ERTDI project which dealt with phosphorus loss from agriculture, have indicated that greater attention must be paid to the need for significantly larger buffer zones near streams and lakes when slurry / manure / fertiliser is spread, particularly on wetter or impermeable soils or in regions of high water table (McGarrigle and Clenaghan, 2004). The research indicates that most phosphorus is lost from particular riparian hot-spots, which usually comprise less than 10 per cent of the total catchment area. One important key to reducing phosphorus losses from agriculture is to control slurry and fertiliser spreading in immediate riparian zones where very large losses of this nature can occur. Researchers are now producing a range of risk-assessment and risk-map tools that can be used by catchment managers and farmers alike to help control eutrophication. Current research indicates that diffuse field sources of phosphorus can be very significant. Therefore farm pollution risk surveys should not only focus on farm yards but also incorporate an assessment of farm nutrient budgets and an assessment of other on-farm risks (e.g., landspreading practice, width of riparian buffer zones, cattle access to river, poaching, ring feeder location etc.).

The EPA has established an enforcement network working group on cross-compliance under EC Community Regulation No. 796/2004 (for direct support schemes for farms under the reform of CAP). This working group includes certain local authorities, DEHLG and the DAF. The focus has been to develop farm inspection procedures to determine compliance with three relevant Directives (Sewage Sludge, Groundwater and Nitrates Directives) in the form of Statutory Management Requirements (SMRs), and Good Agricultural and Environmental Conditions (GAEC). Compliance with these SMRs and GAEC is mandatory under the recently introduced Single Payment Scheme. It is intended that this checklist will be of use to farm inspectors (e.g., staff from DAF, local authorities), allowing a consistent approach to the carrying out of farm inspections for the purposes of environmental protection. The checklist will also allow farmers to know what is required of them under national environmental legislation and the Single Payment Scheme, and will ensure that these requirements are applicable to all farms across the country. A draft checklist with associated guidance was forwarded to the DEHLG in January 2005. The DEHLG and DAF are continuing to work on finalisation of the checklist. In a related development, the Local Government Computer Services Board are continuing to develop a Farms Module to store information collected during local authority farm surveys.

#### **4.1.15 Forestry**

Forestry developments have been of particular concern in the west of Ireland and Wicklow, with the local authorities, fisheries boards and the EPA identifying forestry activities as the likely primary source of pollution in many (frequently upland) catchments (e.g., Clabby *et al.*, 2002, 2003, 2004). Impacts noted in recent surveys primarily relate to siltation/sedimentation and, to a lesser extent, acidification. Significant losses of phosphorus from peat soils as a result of forestry activities have also been reported from some studies in Ireland (e.g., Cummins and Farrell, 2000; Farrell, 2002).

North Tipperary County Council attributes the loss of three of its five Q5 stations as most probably due to silt from forest harvesting and planting operations. There is significant liaison between the local authorities, Forest Service and forestry developers such as Coillte regarding the potential environmental impact of forestry operations, particularly aerial fertilisation programmes, as well as establishment, thinning and clearfelling operations. It is important that local authorities, particularly the Environment Sections, do not overlook potential siltation and acidification impacts on surface waters and liaise with the Forest Service where impacts are detected.

Forestry operations such as planting and clearfelling can and do have significant impacts on rivers unless well managed (McGarrigle and Clenaghan, 2004). The Forest Service has published a National Forest Standard, which includes a Code of Best Forest Practice, embracing Forestry Guidelines (on water quality, landscape, biodiversity, harvesting, aerial fertilisation etc.) and criteria for sustainable forest management (Forest Service, 2000a). Local authorities (and Forest Service inspectorate) should take appropriate enforcement action where proper guidelines are not being adhered to, or where water pollution is detected. The Forest Service, in partnership with the County Councils, is developing Indicative Forest Strategies for each county in Ireland. The strategies will be used for forest planning purposes and will guide the location and character of future afforestation.

In Cork County Council, since 2002, applications for forestry establishment and felling are referred to the Environment Department. These applications are reviewed in the context of potential impacts of operations on watercourses. The Forest Service and Coillte formally consult with the Environment Department on an ongoing basis regarding a wide range of forestry practices annually. Donegal County Council has obtained the annual aerial fertiliser programme for each season from Coillte, as had been agreed, and a number of sites have been chosen to evaluate the effect, if any, on nearby watercourses. A forestry forum has been set up representing all the major forestry interests including the regulatory authorities, Coillte, private growers and the Irish Farmers Association (IFA). The Council have also conducted an investigation into the impact of pesticides used in forestry.

Many local authorities report that Coillte informs them and seeks approval for any proposed aerial fertilisation programmes to be undertaken (e.g., Cavan, Wicklow,

Limerick, Laois, Mayo, North Tipperary, South Tipperary County Councils). It is important that the Environment Section of local authorities (as well as Planning Sections) assess these applications. Monitoring of water quality is frequently undertaken in the immediate vicinity of the forests concerned, generally by Coillte. Leitrim County Council propose to assess all applications for grant aided forestry development, fertilisation and clearfelling in conjunction with the Forest Service. Mayo County Council has drafted bye-laws to control forestry activity and they are awaiting adoption by the Council.

#### ***4.1.16 Peat Extraction***

Two local authorities propose measures to control the impact of the peat extraction industry on water quality. Westmeath County Council is currently working with peat extractors in the River Inny catchment to prevent peat siltation of the river. Notices under the Water Pollution Acts have been served on the main peat extractors requiring them to do works and submit information on their activities. The Council intend to issue discharge licences to the peat extractors as a method of controlling the quality of the discharge to the river. Suspected impacts from peat extraction activities is a significant issue in Offaly and the council propose to consult with Bord na Mona. The EPA also control certain peat extraction activities through the IPPC licensing process.

#### ***4.1.17 Over-Grazing***

Over-grazing remains a significant issue for protection of surface waters, particularly in western counties, despite some destocking of hillsides under programmes such as the Commonage Framework Plans. Over-grazing has led to erosion of hillside peat and riverbanks, causing widening of rivers and increased braiding of channels, making their course highly unstable from one flood event to the next. This has eliminated salmon and trout spawning in many rivers and reduced macroinvertebrate diversity. Aerial surveys by the Central Fisheries Board in 2003 reveal substantial sheep numbers in areas that are severely overgrazed (McGarrigle and Clenaghan, 2004). Very significant damage to the vegetation and soils of considerable areas of the western uplands is continuing with concomitant negative impacts on rivers draining these catchments. It is to be hoped that the CAP reform package and application of cross-compliance measures (see below) will result in greater reductions in sheep numbers and reduce overgrazing pressures further.

#### ***4.1.18 Integrated Constructed Wetlands***

Four local authorities propose wetland/reedbed construction to tackle pollution from point and non-point sources. There is an increase in the number of integrated constructed wetlands (ICWs) being developed to treat wastewater from individual households, small communities and more recently agricultural dirty water. ICWs require planning permission and also a water pollution discharge licence from the local authority. When sited, designed, constructed, operated and maintained in accordance with best practice taking into account risk to groundwater and the effluent quality being discharged to surface water, then ICWs may lead to improved water quality. The conditions of the

water pollution discharge licence should include monitoring to determine the effectiveness of the wetland in relation to phosphorus removal. However, the appropriate use of this technology is still under consideration and a National Technical Working Group is currently reviewing a guidance document for the design and installation of ICWs for the treatment of farmyard dirty water. In addition, the DAF is currently drafting a technical specification, which will be reviewed by the working group. A decision in relation to the possible use of these systems for the treatment of farmyard dirty water is expected in 2006.

Dublin City Council reports that the construction of a wetland in the Tolka Valley Park was completed in 2000 and has resulted in a very noticeable reduction in phosphate inputs to the Tolka from the Finglaswood Stream. Roscommon County Council has constructed four reed beds to reduce phosphorus inputs from small scale urban agglomerations. Replanting of reeds was necessary at one of the locations. The Council will consider the use of reed bed technology for small scale WWTPs based on the success of those already in place. Waterford County Council has collaborated with the National Parks and Wildlife Service, Office of Public Works (OPW) and a consultant hydrogeologist, in trials on constructed wetlands for treating farm soiled water and village sewerage in the Dunhill River catchment (Anne Valley). Twelve wetlands are currently in operation in the catchment and water quality in the river has improved since their installation. Monthly testing of inflows/outflows, receiving waters, and groundwaters for chemical and bacteriological quality is carried out. A constructed wetland has also been constructed at Piltown.

#### ***4.1.19 Drinking Water Treatment Sludges***

The EPA *Water Quality in Ireland 2001-2003* report identifies at least eleven river stations that are polluted by drinking water treatment plant discharges. The EPA recommends that all local authorities should review current methods of handling and disposal of water treatment sludges to ensure that current practice is not in contravention of the Waste Management Act, 1996 (Page *et al.*, 2004). The discharge of water treatment sludge to receiving water, where practised, should cease immediately. The disposal of sludge is a licensable activity under the Waste Management Act, 1996. The Agency has served a Proposed Direction under Section 63 of the Protection of the Environment Act, 2003, on a local authority during 2005 for failure to properly manage sludge from a drinking water treatment plant. The Agency is also pursuing other cases of water pollution caused by drinking water treatment plant discharges.

## 4.2 Monitoring Measures

### 4.2.1 River, lake and facilities monitoring

At present the EPA and the local authorities (including the RBD projects) carry out the bulk of water quality monitoring in Ireland. Many local authorities already have well established monitoring programmes in place. The EPA carries out physico-chemical monitoring of rivers on behalf of certain local authorities. However, most local authorities have developed and/ or reviewed their catchment monitoring programmes, primarily for phosphorus. Many of these local authorities have integrated their monitoring programmes with that of the EPA in order to maximise use of available resources. In many cases, local authorities are now conducting their river chemical monitoring at the EPA biological monitoring stations, providing useful additional information (e.g., Meath, Westmeath). Twenty-four local authorities have increased or propose to increase their monitoring for rivers, fourteen for lakes and two for groundwaters. Many local authorities have taken account of the sampling requirements in the Phosphorus Regulations when revising their monitoring programmes.

Monitoring of MRP has increased substantially at river stations in the country (river MRP is monitored under the Regulations as it is a measure of the most biologically available form of phosphorus). Nationally 25 per cent of stations were monitored for MRP in the 2002-2003 period compared to 10 per cent of stations in the 1998-2000 period. Local authorities that have greatly increased their monitoring for MRP include: Cavan (from 37 per cent to 94 per cent of river stations), Cork County Council (from 0 per cent to 29 per cent), Dun Laoghaire-Rathdown (from 0 per cent to 90 per cent), Kildare (from 6 per cent to 100 per cent), Laois (from 18 per cent to 50 per cent), Longford (from 0 per cent to 54 per cent), Louth (from 31 per cent to 91 per cent), Meath (from 1 per cent to 74 per cent), Roscommon (from 0 per cent to 33 per cent), North Tipperary (from 13 per cent to 40 per cent) and Westmeath (from 3 per cent to 62 per cent). Substantial lake monitoring programmes are also in place for chlorophyll *a* and to a much lesser extent total phosphorus (see Appendix 1.2 and Toner *et al.*, 2005).

Eight local authorities have commenced, or propose to commence, biological monitoring programmes. This is a relatively new and welcome development. Both Monaghan and Clare County Councils have initiated biological monitoring of rivers on an *ad hoc* basis to aid pollution investigations. This allows pollution investigations to focus on shorter river channel sections, rather than surveying every farm in an entire river catchment. Limerick County Council has started carrying out biological monitoring to establish the baseline condition on rivers not monitored by the EPA (including tributaries of the Deel and Loobagh). Dublin City Council and Dun Laoghaire Rathdown County Council propose to carry out biological monitoring in the Dublin area. Cavan and Leitrim County Councils have also initiated biological monitoring. North Tipperary County Council commissioned an environmental consultant to carry out biological monitoring of rivers in the agricultural bye-laws area of the county on an annual basis. Monitoring is generally to aid pollution investigations, extension of EPA monitoring or examining effectiveness of measures.

Seventeen local authorities aim to monitor phosphorus loads from point sources such as WWTPs or industry, with flow proportional composite sampling being the recommended approach. These monitoring programmes should enable the local authorities to assess if discharges from the facilities in question are impacting on river/lake water quality and therefore to decide if phosphorus removal or stricter licensing limits is required. Monitoring of discharges from WWTPs is required under the Urban Waste Water Treatment Regulations, 2001 (S.I. No. 254 of 2001). Laois County Council proposes to monitor the quality of streams and rivers flowing through urban areas in the county, due to concerns about potential municipal impacts.

Six local authorities propose to upgrade their hydrometric monitoring programme. There has been substantial work done by local authorities (e.g., Kildare, Laois County Councils), the EPA and the various WQMMS on upgrading the river hydrometric infrastructure (e.g., on the Barrow and Liffey catchments). An adequate hydrometric monitoring infrastructure is required where local authorities wish to establish phosphorus budgets for specific catchments and subcatchments, and to enable assessment of assimilative capacity of receiving waters when considering applications for a discharge licence. Four local authorities aim to establish phosphorus budgets for catchments in their functional area. Seven local authorities propose upgrading laboratory / monitoring equipment or quality assurance / control procedures. Only four local authorities have proposed the establishment of a database of soil phosphorus levels in their county.

The EPA carries out a National Groundwater Quality Monitoring Programme. The programme commenced in 1995 and samples are taken twice yearly, when the groundwater levels are at their highest and lowest. Groundwater levels are also monitored as part of the programme. The River Basin District Projects are also developing groundwater monitoring programmes to determine the risk to groundwater bodies from anthropogenic pressures.

#### ***4.2.2 Special catchment studies***

Twenty-four local authorities aim to carry out intensive hot-spot catchment studies to investigate the cause of chronic pollution of specific rivers/lakes within their functional area and to monitor and assess the impact of implementing specific measures.

Laois County Council undertook a study of two small catchments, one a grassland area (Donaghmore) and the other a tillage area (Guilie). The study identified farmyards as contributing a significant proportion of total farm exports to watercourses. The Council established two teams (in the River Nore and Barrow catchments) to carry out farm surveys, which were supported by additional water quality monitoring and education and awareness programs. Laois County Council has adopted a programme of monitoring on a catchment, subcatchment and focus point (small area within subcatchment) basis and results are recorded in LabInfo. This monitoring is being carried out to provide increasingly detailed information on water quality in a particular area; and to increase awareness and promote the educational aspect of the programme amongst the farming

sector. The focus points, in particular, provide information to a farmer about water quality in the immediate neighbourhood of the farm and at locations with which the farmer is familiar. Information obtained in the farm surveys include an assessment of slurry storage capacity, polluting matter collection facilities, and of the collection and disposal of roof water. Farm survey data is recorded in a farm database. Laois County Council has identified that staff working in small well-defined areas and developing an effective working relationship with the farming community will make the most progress. Farmers tend to identify much better with river sampling points in their own locality.

Kildare County Council developed a subcatchment monitoring programme in the River Graney to determine reasons for water quality deterioration. This measure proved very beneficial as it highlighted 'hot spot' areas within the subcatchment that were contributing the bulk of the phosphorus loading. Farm surveys commenced in these areas and the findings of these surveys verified that deterioration in the river water quality of the subcatchment was as a result of poor farming practices. Significant point sources of pollution were identified with most of these sources now eliminated. Phosphorus concentrations at three monitoring stations on the main channel of the river have declined by approximately a third as a result.

Kerry County Council has put an intensive monitoring program in place for Lough Currane, due to a perceived drop in angling returns and increased evidence of enrichment. The study, involving monitoring, farm surveys, septic tank audits and review of industries in the area is ongoing. Kerry County Council is continuing to monitor phosphorus budgets within the Lough Leane catchment and plans to implement the recommendations of the WQMMS study, in conjunction with the various stakeholders involved. The Council circulated brochures on the findings of the Lough Leane Project to 10,000 households in the catchment.

Westmeath County Council has adopted the strategy of examining mini-catchments. The catchments are prioritised by local importance and the need to improve water quality. Hence Lough Owel was selected as high priority due to several factors including the fact that it is the primary drinking water source for the County and there has been a recent outbreak of *Cryptosporidium* sp.. The survey of the catchment encompassed: an aquifer vulnerability assessment; surveys of all farms, septic tanks and point discharges within the catchment; intensive water quality monitoring program and compilation of soil phosphorus maps. It is proposed that a catchment management plan will be compiled based on the information gathered. The Council proposes to carry out similar studies on other water bodies within the county in order of priority.

Mayo County Council has employed consultants to carry out a sediment study of Carrowmore Lake in order to determine reasons for the deterioration of the lake. The Council is working with the Fisheries Board and other stakeholders to identify and implement measures to improve the water quality of the lake. Sligo County Council reports that a comprehensive study of sediments from Lough Arrow has been carried out. Limerick County Council employed a hydrogeologist to define the zone of contribution to Lough Gur, which is fed predominantly from groundwater, and identify the potential



pressures within this zone. The results of this investigation will be used as the basis for the measures programme.

Waterford County Council has surveyed twelve farms in the Ballyshonnock Lake catchment and developed Best Farm Management Plans in eight of these (the other four being REPS farms). A monitoring programme is underway to determine the phosphorus budget of the lake. A phosphorus budget has been determined for Knockaderry Lake. The Council has reported difficulties experienced in full implementation of the NMP aspects of the Best Farm Management Plans. This was not a reflection on the level of co-operation given by the farmers, but rather showed the difficulties in the level of detailed planning and record keeping involved in NMP. On the Council's side, it was a very time-consuming exercise to assess the level of implementation of the NMPs.

Wicklow County Council is currently working with the Eastern Regional Fisheries Board (ERFB), EPA, DEHLG and the Department of Communications Marine and Natural Resources to bring about a solution to the problem of pollution in the Avoca river system. The ERFB chose to carry out a catchment study of the Avoca in 2001. A water quality programme (31 sites monthly) was initiated to assess the water quality throughout the system and an electrofishing programme was undertaken to assess fish stocks throughout 2002. Salmon and sea trout continue to ascend the Avoca despite the ongoing pollution caused by acid mine drainage in the lower reaches. As part of the catchment management programme, the ERFB commissioned the University of Newcastle to undertake a scoping study to identify the costs for remediation measures to restore the Avoca to a salmonid river. The study recommends an active WWTP to treat the acid mine drainage.

#### ***4.2.3 Geographical Information Systems and other IT Infrastructure***

Fifteen local authorities propose the establishment and use of GIS for storage and analysis of water quality and other relevant data, to aid water quality management. The Local Government Computer Services Board (LGCSB) introduced the *Catchment Envisage* package to local authorities to store, manage and maintain data for catchment management purposes. However, a number of local authorities reported problems with the Catchment Envisage software. The LGCSB developed new LabInfo and Farm Survey modules, which are more user-friendly and these are being utilised by various local authorities (e.g. Laois, Fingal, Leitrim, Wicklow, North Tipperary County Councils) often in conjunction with a comprehensive GIS system. Laois County Council are using MapInfo GIS to place water quality data, recorded in LabInfo software, on the internet.

The use of LabInfo and regular review meetings has improved communication between Water Services and the Environment section in North Tipperary County Council. Monitoring results for treatment plants, discharge licences and pollution incidents are available on the database and the installation of a new server will make this database available to all relevant personnel in the Council shortly. Kildare County Council also propose to store all water quality data and discharge monitoring data of licensed premises in the LabInfo system.

Many local authorities are using Global Positioning System (GPS) units to enable accurate mapping of discharges, farms etc. Cork County Council is progressing a GPS programme to locate industries, WWTPs, their discharge and storm overflow points, drinking water schemes, river monitoring sites and lakes, to populate the dataset for the Environment Department GIS. Cork County Council also plans to collate and examine in GIS format information on forestry practices since 2000, upstream of each EPA point and designated lake. GPS units are used by a number of local authorities when carrying out farm surveys and recording sampling points (e.g., Laois, North Tipperary County Councils).

In Monaghan, consultants completed a GIS mapping project and sludge management plan for the county in 2002. Data on all enterprises is entered on an access database and mapped using MapInfo. A comprehensive database on all agricultural enterprises, soil phosphorus returns, and a poultry manure waste tracking system has been developed.

Kildare County Council has appointed a GIS co-ordinator to oversee the implementation of a GIS for all sections of the organisation. The main GIS priority so far has been in relation to planning matters. However, there is an internal web-based GIS with raster and vector mapping available to the Environment Section, which has assisted in the identification of farmyards in river catchments. South Tipperary County Council has recruited a GIS technician to maximise the benefits of using GIS for catchment management. Wexford County Council has also appointed a GIS officer.

Special measures are being taken to guide and co-ordinate the establishment of data management systems in the context of river basin management. The EPA, LGCSB and DEHLG have overseen the development of guidelines for GIS through a study carried out by Compass Informatics. The EPA and LGCSB are now co-ordinating the implementation of GIS based on these guidelines and there is a national GIS working group under the WFD.

### **4.3 Consultative and Co-operative Measures**

The EPA considers that the setting up of consultative and co-operative structures that involve all stakeholders is essential to the successful management of a catchment. This is particularly important where diffuse inputs are primarily responsible for deterioration in water quality. A range of actions across all sectors may be necessary to reduce diffuse losses and it is therefore important to include all stakeholders in catchment management initiatives. Stakeholders can be viewed as those who either contribute to the water quality problem, and therefore need to be involved as part of the solution, or those that are beneficiaries of improvements in water quality, as well as statutory bodies with responsibilities for the protection and improvement of water quality.

All local authorities are involved in the RBM Projects established to facilitate implementation of the Water Framework Directive. These projects aim to enable co-operation between local authorities and all relevant stakeholders. The overall

implementation of the Water Framework Directive will involve a high degree of co-ordination and partnership between public authorities in conjunction with extensive public consultation in order to tackle the challenge of water protection. The European Communities (Water Policy) Regulations, 2003 make provisions for a River Basin District Advisory Council within each RBD, to provide for a forum of systematic involvement of interested parties. The WFD makes specific provision that the public must be consulted in the preparation of the RBM Plans. Currently implementation of the RBM projects is overseen by a Steering Committee consisting primarily of representatives of the lead local authority, DEHLG and the EPA. This group is assisted by a management committee, which in addition to the foregoing has representatives from all of the local authorities involved as well as other state agencies and representative bodies.

It is important that local authorities have direct liaison with other local authorities upstream or downstream of their functional area as, for example, industries, treatment works or agricultural activities in one local authority area may be affecting water quality in another. The best practice approach to dealing with water quality issues is at a catchment based level. In a number of areas, County Councils are co-ordinating catchment surveys (e.g., Meath/Fingal; Longford/Leitrim County Councils). It is important that local authorities also work very closely with the Fisheries Boards. In some areas, joint inspections are carried out (e.g., Meath, Kerry) and this is to be recommended. In Cork County Council, Water Services South has set up a formal liaison structure with the Southern Regional Fisheries Board (SRFB) to address, in particular, municipal waste discharges that are of concern to SRFB.

The EPA has established two enforcement networks on the Suir and Erne/Blackwater catchments to encourage co-operation between all the relevant enforcement agencies at a catchment level. These networks include representatives from the EPA, DEHLG, DAF, Fisheries Boards, Local Authorities, RBD projects and Teagasc. The aim of these networks is to facilitate co-operation of the various enforcement agencies in tackling water quality issues, by sharing of expertise, development of common approaches, and pooling of resources.

Almost all local authorities have established liaison with other interested parties such as the EPA, Teagasc, industry, fisheries, farming and forestry organisations, general public, etc., to tackle particular water quality problems. There are a number of multi-sectoral catchment management initiatives underway. For example, Kildare County Council is represented on the Rye River Group, an organisation funded by Intel Ireland Ltd, Leixlip. A number of local authorities are represented on the Barrow Steering Group. The Southern Regional Fisheries Board provides a secretarial and co-ordinating role for the Barrow Steering Group. The Lough Derg / Lough Ree, Three Rivers and Lough Leane WQMMS Projects all facilitated liaison between local authorities and other stakeholders. Following the Three Rivers Project the local authorities set up a River Suir Technical Liaison Group, consisting mainly of the local authorities, which discuss monitoring and management of the Suir catchment.

Prior to the adoption and implementation of the agricultural bye-laws extensive public consultation by the relevant local authorities took place. Also in advance of farm surveys being initiated in river catchments, many local authorities are holding discussions with farmers, Teagasc, and the relevant farming bodies at a local level to explain the objectives of the surveys and the approach to be taken in carrying out this work (e.g., Kildare, Limerick County Councils). This has proven successful and in general the farming community have been very co-operative.

Wexford County Council has taken a co-operative approach in dealing with all the various stakeholders in the Our Lady's Island Lake Project catchment. The Waterford City and County Trout Anglers Association and Waterford County Council co-operate annually in the treatment of certain lakes with barley straw to suppress algal blooms. The (voluntary) manpower provided by this group is essential to the continuation of this work. (Kerry County Council also use barley straw to suppress algal blooms in Lough Gill).

The Irish environmental non-governmental organisations have formed a Sustainable Water Network (SWAN), which is an umbrella network of thirty of Ireland's leading environmental groups working together to protect Ireland's waters by participating in the implementation of the WFD. SWAN comprises both national and local groups, representing a broad range of specialist and local knowledge and expertise in all areas of Ireland's aquatic environment. SWAN partners are engaging with the EPA, local authorities and other interested parties with a view to promoting protection of Ireland's waters. More information is available on [www.swanireland.ie](http://www.swanireland.ie).

#### **4.4 Public Education and Advisory Measures**

Most local authorities are engaging in public education campaigns, which may include activities such as the production of environmental newsletters, leaflets on water pollution, and advice in local newspapers or on local radio. Fifteen local authorities state that they have appointed or propose to appoint an environmental education officer or public awareness officer, though these officers are primarily concerned with waste awareness issues. Laois County Council emphasises that the primary methodology behind its information campaign is simplicity of delivery. This has proved effective especially with its 'Did you know?' and similar series of advertisements. The advertisements also demonstrate the partnership approach to the problem by including the insignia of the various stakeholders. Monaghan County Council has produced leaflets on a number of key water quality issues including *Managing Phosphorus in Farming* and *Preventing Silage Pollution*, which have been circulated to farmers via the Dairy Co-ops. A leaflet on *Septic Tank and Wastewater Treatment System Guidelines* has been produced and is distributed to households with problem or suspect septic tanks. Monaghan County Council has also produced catchment specific leaflets, describing water quality in the catchment, relevant pollution issues and measures which must be taken to address these issues.

Local authorities are also involved in schools education programmes, which include school debating competitions on environmental topics, school visits to Council facilities, and assistance in second and third level student projects. In Cork there is the Green Bus travelling roadshow that travels weekly to schools to give informational talks on waste and water quality issues. There are also many schools around the country involved in the Green Schools Programme, a nationwide initiative promoting environmental awareness in schools. An Taisce award Green Flags to schools of particular merit.

Many local authorities have made presentations to their Strategic Policy Committees (SPC) on the Phosphorus Regulations. The SPCs are made up of elected members and representatives of multi-sectoral organisations. Most local authorities have websites which detail work being undertaken in the water quality protection area.

An important part of the Three Rivers, Lough Derg/Ree and Lough Leane Projects was the undertaking of a programme of public consultation and awareness. This involved public education campaigns, provision of technical advice and assistance, publicity campaigns using television, radio, newspapers and other media and the promotion of these projects through public signs, information leaflets and preliminary, interim and final reports. A number of community and voluntary groups are supported through co-funding partnerships such as the Environment Partnership Fund offered by the DEHLG and local authorities. For example, the Offaly and Kildare Waterways, is a body set up to educate the public on the importance of waterways protection.

Wexford County Council, in partnership with Coastwatch Ireland, and co-sponsored by the DEHLG, National Parks and Wildlife Service and the Heritage Council, ran a six month pilot project on the importance of wetlands. This included information gathering, lectures, public participation events and school visits. Cork County Council regularly facilitate educational tours of Iniscarra Waterworks and the Environment Laboratories for members of the public, school groups and students.

Twelve local authorities propose the establishment of a sectoral education programme, primarily for the agricultural sector. Kildare County Council publishes an annual Environmental Notice aimed at farmers and agricultural contractors in all local newspapers circulating in the Barrow, Boyne and Liffey catchments. This notice appears in these newspapers at the end of April each year advising farmers that due care must be taken with regard to the storage and control of silage effluent. It states that all silage effluent must be collected and prevented from discharging to any watercourse. It also outlines that care must be taken when spraying herbicides, pesticides, fungicides etc., as agrochemicals are harmful to groundwater and surface water and the disposal of empty agrochemical containers should be carried out in an environmentally friendly manner. The local authorities that have introduced bye-laws have produced and distributed booklets and other public education material explaining the legislation (e.g., Cork County Council has circulated over 6,000 information booklets to farmers, farming bodies and other interested parties). There was also significant press coverage in both newspapers and radio at local and national level.

Many local authorities are involved with Teagasc in conducting educational talks to farmers on REPS and on the economic and environmental benefits of nutrient management planning. However, in terms of catchment management, Laois County Council has found that there generally is limited discussion at REPS meetings, as individuals don't know each other and do not want to be identified with areas where there are problems. Also REPS seminars generally only target farmers participating in REPS, who may not necessarily be the farmers a local authority may be most hoping to reach. Laois County Council has found that a greater number of people are reached if lectures are given at one of the farming association meetings (e.g., IFA meetings) rather than meetings initiated by the local authority itself. The most productive meetings are considered to be those at a local level, and in a local hall, where all farmers know each other and readily know water sampling locations. The Council invites a member of one of the farming organisations to chair such meetings. The Fisheries Board and Teagasc also attend and give presentations. The discussion level at these meetings has been extremely high. The groups recognise that the problem and the solution is in their domain. The Council's representation at such meetings is by way of the catchment manager and technician, thus many of the farmers would already know the individuals from the farmyard inspection program. This provides an essential link in the education and awareness program. Council resources devoted to this program are considerable as each presentation has to have a high local content if objectives are to be met. The meetings are generally held in the winter period, at night and in a local hall to facilitate the local farmers. The Council intends to pilot a new method in the near future, letting the local farming sectors take over ownership of their environment. The Council will assume a supporting role in such a format.

North Tipperary County Council was a joint sponsor through the Environmental Partnership Fund during 2003/04 of a project aimed at primary school students highlighting the importance of protecting water quality. This included practical talks and demonstrations on water quality and electrofishing which were given by staff of the Council, Shannon Regional Fisheries Board and Save Our Lough Derg / Ormond Anglers. The Council also promoted International Wetlands Day in February 2004 with a display in the Civic offices and a press release to the local media.

Public seminars were held on the implementation of the Water Framework Directive in 2002, 2004 and 2005 and a relevant website has been constructed ([www.wfdireland.ie](http://www.wfdireland.ie)). Public participation is a major element of the WFD, and should increase the quality of decision making and sense of ownership of the issues involved. The River Basin District Advisory Councils within each RBD will be a major element in facilitating the participation of the public in the formulation and finalisation of the RBD Management Plan and other reports.

## **4.5 Other Agri-environmental and Miscellaneous Measures**

### ***4.5.1 Agri-environmental***

Many local authorities actively promote REPS and/or other pollution control grant schemes in their functional areas. Through the implementation of nutrient management planning requirements, REPS constitutes one of the primary methods for tackling water quality problems arising from agricultural sources. However, the effect of REPS is likely to be limited in intensive farming areas where water quality is generally under greatest pressure, due to the limited uptake of REPS by these farmers. An evaluation of REPS has found that REPS farms continue to support similar stocking rates using significantly less fertilisers compared with their extensive non-REPS counterparts (Carty, 2003). The findings of the Lough Derg and Lough Ree Catchment Monitoring and Management Project suggest a significant relationship between the implementation of REPS measures and river water quality improvement (KMM, 2001). However more extensive monitoring and evaluation of the water quality benefits of REPS is required.

The introduction of the agricultural bye-laws and their implementation has encouraged the participation of farmers in REPS (e.g., in North Tipperary). This is essentially for economic reasons because farmers benefit financially from joining the REPS scheme and will be exempt from the bye-laws and the subsequent expense of adhering to these bye-laws, for as long as they are participating in REPS. However, REPS payments have to be justified to the European Commission on the basis that only actions that go beyond good farming practice are eligible for payment. The definition of good farming practice is continuing to evolve with the introduction of cross-compliance and the Nitrates Directive. For the great majority of farmers the conditions of the Single Payment Scheme will now constitute good farming practice (see below). The increasing take-up of REPS 3 (some 45,000 farmers nationally) should increase planning applications for works to be carried out to improve waste management facilities on participating farms and help to reduce nutrient use on farms. It is expected that REPS participation will continue to increase and the CAP Rural Development Plan 2000-2006 has a target of REPS reaching at least half (70,000) of the farmers in the country.

The Farm Waste Management and the Dairy Hygiene Schemes should enable farmers to avail of grant aid to improve farm infrastructure - deficits in which are widespread throughout the country. Funding under these schemes is often of critical importance to farmers to enable them to put in place the infrastructure that will reduce the likelihood of pollution, and meet environmental requirements, e.g., of agricultural bye-laws. Such investment can potentially make a significant contribution towards reducing animal manure run-off into water bodies, provided that the improvements in infrastructure are complemented by proper management of final disposal. The Nitrates Action Programme includes slurry storage requirements, which vary by region of between 16 and 22 weeks. This will require substantial investment in slurry storage capacity on many farms. Research undertaken on behalf of the IFA estimated that 85% of dairy and specialist beef farms have a slurry storage deficit, with the majority of farms having a 50-75% deficit (O'Sullivan, 2004).

A *Farm Environment Awards* scheme is sponsored by North Tipperary County Council in conjunction with Teagasc, Arrabawn Co-Op and Centenary Co-Op. The objective of the award is to encourage farmers to protect water quality by highlighting good nutrient management practices and identifying areas for farm management improvement. To promote the scheme, approximately 1,500 brochures were distributed to farmers in North Tipperary.

A National Technical Working Group has been established to assess the use of earth lined stores, out-wintering pads, and integrated constructed wetlands (see above) for the storage and/or treatment of farmyard effluents. In relation to earth lined stores, the Working Group has submitted an agreed technical specification and an associated guidance note (developed by Teagasc) jointly to DAF and DEHLG in 2005. In relation to out-wintering pads, the Working Group has carried out an initial review of the research undertaken by Teagasc Grange into their use from an environmental perspective. It was agreed that the Technical Specification and Guidance document cannot be progressed until the results of on-going research into the environmental implications associated with this system becomes available. Progress on this document is expected in 2006.

The decoupling of farm payments from production levels under the CAP reform programme may lead to a reduction in overgrazing pressures and a reduction in discharges to water due to reduced stocking levels. EU Council Regulation No. 1782/2003 establishing common rules for direct support schemes under the CAP places a high priority on environmental protection rather than on production. The Single Payment Scheme commencing in 2005 applies to all farmers. Implementation of cross compliance requires all applicants under the Single Payment Scheme to maintain all their land in 'Good Agricultural and Environmental Condition' (GAEC) (particularly in relation to protection of soils) and comply with 19 Statutory Management Requirements (SMRs). Five of the SMRs relate directly to environmental Directives (specifically Wild Birds, Groundwater, Sewage Sludge, Nitrates and Habitats) and cross-compliance with these Directives became effective on the 1<sup>st</sup> January 2005. The DAF publication *The Single Payment Scheme – A Guide to Cross Compliance* specifies the standards required of farmers for the Single Payment Scheme including GAEC. Farm inspections to ensure cross-compliance have already commenced by, in the main, Dept of Agriculture inspectors. Farmers are not paid to respect environmental and other legislation but if they do not respect cross-compliance requirements they render themselves subject to reduction of direct payments.

The European Court of Justice delivered a judgment in March 2004 that Ireland is non-compliant with the Nitrates Directive mainly by reason of failing to establish and implement an action programme to protect water quality against pollution by farming. The establishment of an action programme requires the preparation of a programme of measures to be taken and the enactment of appropriate legislation to give legal effect to the programme. Ireland's revised Nitrates Action Programme was submitted to the European Commission on 29 July 2005. The Government published the Nitrates Regulations (S.I. No. 788 of 2005) in December 2005 to give legal effect to the



programme. The Nitrates Regulations will provide statutory support for the application of established standards of good agricultural practice across the whole state. This should reduce not only the loss of nitrate but also of phosphate from farm land, thereby reducing in turn the potential for eutrophication in adjacent waters.

The EPA recently published a discussion paper outlining the benefits of centralised anaerobic digestion. The anaerobic process can be used to turn residues from livestock farming, food processing industries, wastewater treatment sludge, water treatment plant sludge among other organic wastes into biogas. The biogas can be used to generate heat and/or electricity. It also produces fibre, which can be used as a soil conditioner and liquor, which can be used as a liquid fertiliser. Anaerobic digestion reduces the pollution potential of organic waste and can assist with nutrient management planning. Government financial support for centralised anaerobic digestion would be required, but could be justified on the basis of its environmental benefits (EPA, 2005a).

The voluntary agreement between the DEHLG and the Irish Detergents and Allied Products Association to effectively provide for the phasing-out of phosphate based domestic laundry detergent products by the end of 2002 appears to be having some effect. Dublin City Council has at least partly attributed substantial reductions in phosphorus levels at their monitoring stations to the implementation of this measure. A comparison of MRP concentrations in Ringsend influent sewage between the 1998-99 and the 2002-04 periods indicates a reduction in the MRP concentration from 4.6 mg/l P to 2.8 mg/l P in the catchment.

#### **4.5.2 Bioengineering**

Local authorities may wish to consider the use of bioengineering solutions for improving the biological status of rivers where phosphorus control proves difficult, for example due to extremely low dilution of effluents. Such solutions may include provision of bank-side shading to prevent algal growths, raking of gravels, installation of aeration weirs or even artificial aeration during critical low-flow periods (Lucey *et al.*, 1999).

On a related note, through use of soft engineering techniques there may be opportunities to allow cattle access to drinking water without allowing them into streams and rivers, thus reducing bankside erosion, sedimentation and direct nutrient inputs. REPS provides an option for exclusion of bovines from watercourses, with the specification that a minimum of two piped drinking troughs per farm must be provided in fields adjoining the watercourse(s) in question. Where bovines do enter the watercourse fencing should be provided to prevent animal movement upstream or downstream and, as far as possible, restrict animals standing in the water.

#### **4.5.3 Research**

Section 29 of the Water Pollution Act 1977, as amended, gives powers to the local authority to contribute to the funds of a person engaged in research, surveys or

investigations in relation to water pollution. Four local authorities are supporting or propose to support research into water quality or agricultural waste management issues.

Kildare County Council has supported the PENrich Study by supplying two autosamplers for the Ballinagee River study area in Co. Wicklow. The study is being carried out by the Forestry Ecosystem Research Group at University College Dublin, and Coillte. The research is co-funded by the EPA and the National Council for Forest Research and Development (COFORD). The overall aim of the study is to determine what impact current forestry operations have on phosphorus in surface waters, to assess the efficacy of the forestry and water quality guidelines (Forest Service, 2000b) and recommend any necessary amendments to them. Donegal County Council reports that funding has been obtained from INTERREG for a project entitled the Forest Ling Project and a co-ordinator has been appointed. This project is looking at all aspects of forestry including environmental issues such as acid sensitive areas. Monaghan County Council are involved in the Blackwater Regional Partnership Project on definition and mitigation of excessive multi-source nutrient loss to water, lead by the University of Ulster and Queens University Belfast.

#### ***4.5.4 Staffing***

Twelve local authorities have appointed or propose to appoint additional staff for implementation of the Phosphorus Regulations. A number of local authorities have set up or propose to set up staff teams dedicated solely or primarily to carrying out measures designed to achieve the targets of the Regulations e.g., in Cork, Leitrim, Limerick, Monaghan, Louth and South Tipperary County Councils. In Limerick County Council this team consists of an agricultural scientist, two field inspectors, a GIS Officer and a Clerical Officer. The team has been engaged in farm and other pollution surveys since November 2002. In Monaghan County Council a phosphorus team of four staff members (3 technical and 1 administration) was established in February 2002. A number of local authorities have stated that restructuring under the Better Local Government initiative has improved their staff resources for tackling water quality issues. Almost all local authorities have stated that additional staff and financial support from central government is required to successfully implement their programme of measures.

#### **4.6 EPA Audits of Local Authorities**

The Agency is required under the EPA Acts, 1992-2003, to assess whether local authorities are performing their statutory environmental protection functions. The Agency carried out audits between 2002 - 2004 on a number of local authorities to assess local authority performance with regard to their statutory duties pertaining to the Phosphorus Regulations. It should be noted that the Agency has also carried out audits relating to the implementation of the Urban Wastewater Treatment Regulations and Drinking Water Regulations (Smith *et al.*, 2004; Page *et al.*, 2004).

The following local authorities have been audited to date: Carlow County Council, Donegal County Council, Dun Laoghaire Rathdown County Council, Fingal County Council, Kildare County Council, Kilkenny County Council, Laois County Council, Limerick County Council, Meath County Council, Monaghan County Council, Offaly County Council, North Tipperary County Council and Wicklow County Council.

The audit criteria were based on: the relevant legislation; the Department of the Environment and Local Government policy against eutrophication (DoE, 1997); EPA Guidance documents on the preparation and submission of local authority measures and implementation reports (EPA, 1999a, 2000a); National Reports on the Regulations (Clenaghan *et al.*, 2000, 2001; Clenaghan, 2003); and the local authority measures and implementation reports.

The audits consisted of a desk-based meeting between the EPA audit team and local authority staff (i.e., senior officers and staff involved in implementation of the Regulations). There was examination of evidence / documentation regarding measures implementation. Audit observations were documented and presented to local authority staff to ensure they were understood. Following the meeting there was the formal issue of a final audit report.

The main findings of the audits included:

- tackling agricultural pollution should receive a higher priority in many local authorities, with dedicated teams employed to address this issue;
- pollution from municipal sources remains widespread, local authorities need to assess whether sewage collection systems and WWTPs are adequate to protect water quality and prioritise upgrades where environmental impacts are greatest;
- there needs to be much greater liaison between environment, planning and sanitary services sections of most local authorities to provide for sustainable development;
- there was evidence of consultation, co-operation and educational measures being implemented with WFD activities providing increased opportunities for liaison.

It is intended that the audit process will identify successes in implementation of the Regulations, useful measures and methods of implementation and problems that local authorities have encountered. The audit process should also provide a method of information exchange between local authorities and the Agency and an additional

mechanism for regular review of progress made towards meeting the targets of the Regulations.

On a related note, Wicklow County Council proposes a new measure to undertake independent audits (self audits or external audits) to assess the Council's implementation of the Phosphorus Regulations. The objectives of the audits are to review the Council's progress regarding measures implementation and in particular to assess the relative success of measures chosen by the Council. The first audit was undertaken by independent consultants in May 2004.

## 5. Issues Raised

The EPA Guidance Note (EPA, 2000a) advised local authorities to identify problems encountered by them in implementation of the Regulations in their Implementation Reports. The main issues identified through implementation of the Regulations include:

- Shortage of staff and finance to implement measures - many of the measures proposed by the local authorities, as necessary to tackle water quality issues in their functional area, are resource intensive, such as farm surveys, septic tank surveys, monitoring, reviewing planning applications, and reviewing and enforcing discharge licences. A substantial cut in mileage allocation affected all monitoring and enforcement programmes across all sectors in Cork County Council.
- Many local authorities have found that dedicated Farm Survey or Water Pollution Unit teams are most effective. However, local authorities report considerable difficulty in recruitment and retention of staff, loss of key staff and extensive internal movement and changes of staff. While, some local authorities stated that the process of Better Local Government has improved the resources available to them to implement the Regulations, many local authorities report that lack of staff resources is hampering their ability to implement measures under the Regulations.
- Staff in the Environment Sections of many local authorities have had to focus their efforts on dealing with waste issues, sometimes to the detriment of resources available to tackle water quality issues. Similarly, the primary focus of Environmental Awareness Officers and Enforcement Teams set up in most local authorities has been waste, not water quality.
- Inadequate staffing levels are available in the environmental laboratory in Roscommon to fully implement Quality Control Procedures. ILAB accreditation for all core parameters has been suspended due to staffing issues.
- Increasing requirements from legislation, such as the WFD, Drinking Water Regulations 2000, Dangerous Substances Regulations 2001, and various pieces of waste legislation, pose an increasing strain on local authority staff resources. In some cases measures proposed under the Phosphorus Regulations have not been implemented due to redirection of local authority staff resources to fulfil other legislative requirements.
- In counties where bye-laws have been introduced it has taken farmers some time to fully understand, appreciate and respond to the bye-laws.
- Enforcement of nutrient management plans has been problematic.
- Some local authorities have raised the point that further work is required nationally to co-ordinate data collection and reporting. Work in this regard is underway due to the requirements of the Water Framework Directive. The LGCSB has redeveloped the

LabInfo and Farms modules of Catchment Envisage following requests to do so by the local authorities. Tools to aid catchment management, such as GIS, are under development in many local authorities. There is a need to develop a reliable risk assessment tool for diffuse source pollution. Computer facilities / tools for the interrogation of environmental data and trend analysis are also considered necessary.

- The delay in introducing the Nitrates Action Programme and the resultant uncertainty regarding storage requirements, closed seasons for landspreading and field storage of manure etc. have made it difficult to agree standards for improvement works with farmers. Local authorities that were considering introducing agricultural bye-laws have decided not to progress this measure until the implications of the Nitrates Directive become clear.
- Increased co-operation is required between EPA and local authorities, particularly in the provision of information on IPPC facilities and location of spreadlands. There is a significant need for both the EPA and the local authorities to put in place an operational database / GIS system incorporating digitized spreadland landbanks for each county. This database should include spreadlands from IPPC facilities, local authority licensed facilities, WWTPs and agricultural holdings. This will assist in evaluating where water quality may be being influenced by these practices. There is also an issue of whether spreadlands from IPPC facilities should be regulated by the EPA or local authorities. There is perceived poor communication and lack of clarity of ownership of responsibility between the EPA and some local authorities in a number of areas where environmental problems have arisen from IPPC facilities or those facilities applying for an IPPC licence. Further consultation and clarification is required.
- The implementation of farm and misconnection surveys can be problematic given that many householders are absent during the day. This requires repeat visits or the introduction of flexible working arrangements for local authority staff.
- Hydrometric data (such as ninety-five percentile flow) is not always available to assess discharge licence applications received by local authorities.
- Sometimes there is a significant time lag (of 2-5 years) between farm visits, issuing of letters, development of farm plan, availability of grants, implementation of works, and follow-up inspections which may have implications for achieving compliance at some stations. Associated water quality monitoring and analysis can be expensive. There may also be a significant time-lag between carrying out intensive survey work and achieving water quality improvements, depending on catchment characteristics.
- There can be delays with the legal process and achieving a successful prosecution under the Water Pollution Acts can take several months. A large amount of time and resources are required to bring successful prosecutions.

- Investigative work is required in many areas to identify those inputs that are having the greatest impact on water quality in order to prioritise measures. There is a need for research to examine the relative effectiveness of various measures, particularly in the agricultural context, and their feasibility. This should include a measure of cost effectiveness.
- Changes in Q values may not always relate to eutrophication as they can occur for a variety of reasons, for example, as a result of hydromorphological pressures, such as drainage and construction; siltation; acidification; toxic pollution; or other physico-chemical factors.
- River biological monitoring on a national scale takes place on a three year cycle. This means that there will just be one more complete biological monitoring period before 2007 (i.e. 2004-2006). Within the timescale of the Regulations, this may limit the biological information available to local authorities in gauging whether or not measures implemented are successful. Many local authorities are also tracking changes in water quality through monitoring of phosphorus. Some local authorities are now conducting their own biological monitoring, to gauge the success of measures, to survey streams that are not covered in the EPA monitoring programme and to aid pollution investigations.
- Specific pollution problems stated by local authorities include:
  - lack of adequate wastewater collection system infrastructure,
  - combined / foul sewer overflows,
  - inefficient phosphate removal at certain WWTPs,
  - lack of nutrient removal at many inland WWTPs,
  - an acute deficit in slurry storage capacity,
  - dealing with manure / litter from intensive agricultural operations,
  - organic and chemical fertiliser being spread on over-enriched land or under unsuitable weather and soil conditions,
  - cattle access to streams,
  - significant impacts from forestry,
  - overgrazing by sheep,
  - inappropriate siting of septic tanks and poor standards of construction and maintenance,
  - low compliance with SR6 / EPA on site treatment system guidelines, and
  - unprecedented development due to economic boom.
- Some local authorities report that programmes to upgrade / build WWTPs can take a significant amount of time, as they are dependant on funding from various sources, which is subject to priority requirements, and include a tendering process, land acquisition, design approval and project delivery.
- Private housing estate developments (not linked to public sewer systems) requiring licences to discharge treated effluent to surface waters are increasing. Rigid

implementation of the Phosphorus Regulations would preclude housing developments in many parts of the country, where dilution factors would not be adequate. In some instances it is may not be achievable to safeguard low levels of phosphorus in rivers and facilitate development, particularly for facilities with smaller WWTPs.

- Farmyard management and minor works in many cases alleviate water pollution. However, if a major capital investment is required some farmers consider the long-term future of the industry is not secure enough to carry out such works and may decide to change farming practices, thus delaying the installation of necessary pollution control measures. In addition, the age profile of farmers in many areas is heavily skewed to the over 50s which may militate against farm development.
- Over the last few years in particular there has been uncertainty amongst farmers and local authority staff regarding future policy and legislative developments (e.g., CAP reform, Nitrates Directive) and new technologies (e.g., earth lined stores, out wintering pads, ICWs). In some cases this has increased reluctance to invest in farm improvements, though many farmers have invested substantially in farm infrastructure.
- Some local authorities have experienced difficulties in identification of persons farming land, for example in agricultural bye-law areas, making this process time consuming.
- Some local authorities report that their information and understanding of the extent of forestry development, its management practices and impacts, particularly in upland areas is limited. Increased liaison between environment and planning sections of local authorities is required as well as liaison between local authorities and the Forest Service.



## 6. Conclusions

- Our understanding of the aquatic environment and the pressures on it has improved greatly since the introduction of the Phosphorus Regulations. Reporting by the EPA, local authorities, WQMMS, ERTDI research projects and under the WFD has served to inform catchment managers of water quality issues and potential solutions. The recent European Court of Justice judgement on the Dangerous Substances Directive against Ireland (Case C-282/02) underlines the importance and urgency of tackling water pollution.
- Monitoring indicates that the majority of Ireland's rivers and lakes are in an unpolluted condition and that there has been a significant reduction in the number of seriously polluted river stations following substantial investment to counter pollution from inadequate management of sewage. There is also evidence of local improvements in water quality due to measures implementation to tackle agricultural pollution sources.
- However, the targets of the Phosphorus Regulations remain a very considerable challenge for the vast majority of local authorities. The current level of resources committed by many local authorities to implementation of measures is insufficient to achieve these targets by 2007. For example, only eleven local authorities reported significant farm survey work and these concentrated mainly on the farmyard. Tackling diffuse pollution in particular requires prioritisation of resources in this area both at a national level and local authority level. Some local authorities are continuing to make progress in tackling agricultural pollution through the use of farm surveys, bye-laws and educational programmes. It is hoped that further developments in this area such as CAP reform, cross-compliance and implementation of the Nitrates Directive will result in improved farm management and significant reduction in the current unsustainable level of nutrient loss.
- Many local authorities have found that focussing resources into high priority mini-catchments has been more beneficial than adopting a whole county approach. The general public, farmers and other sectors may relate better to water quality issues when the cumulative effects of pollution are discussed with reference to a river or lake in their locality. Involving local organisations, such as the IFA, in farm survey programmes has proved beneficial in this regard.
- Significant nutrient loss arises from point sources, particularly from inadequate collection and treatment of sewage. Notable improvements in water quality have been achieved through the installation of phosphorus removal at a number of wastewater treatment plants. However, problems remain in many rivers as a result of municipal pollution and ineffective wastewater treatment. There is evidence to suggest that smaller WWTPs (<15,000 p.e.) may be causing particularly widespread pollution problems.

- The recently formed Office of Environmental Enforcement within the EPA is now using the additional powers conferred on the Agency by the Protection of the Environment Act, 2003, to address deficiencies in local authority performance (e.g., in the operation of WWTPs).
- Current monitoring indicates that 63.4 per cent of river stations nationally are compliant with the Phosphorus Regulations, based on 2001-03 biological and MRP surveys. This represents an increase of 3.4% in compliance from the baseline (generally 1995-1997) period (and an increase of 2.8 per cent in compliance from the 1998-2000 period). However, much of this increase in compliance was due to a significant increase in MRP monitoring.
- Consideration of the number of stations meeting the biological targets of the Phosphorus Regulations presents a better picture of the trend in water quality (as the biological assessment provides a clearer assessment of the overall health of the river system). A total of 56.3 per cent of river stations nationally currently meet the biological targets in the Regulations. This represents a decline of 3.7% in the number of stations meeting the biological targets of the Regulations from the baseline 1995-1997 period (and a decline of 2.2 per cent in the percentage of stations meeting the biological targets of the Regulations from the 1998-2000 period). Despite the decline in the percentage of stations meeting the biological targets of the Regulations, there are still a greater percentage of stations currently of satisfactory status than there were in the baseline 1995-97 survey (61.4 per cent as compared to 60.0 per cent). This disparity is partly explained by the continuing loss of high quality stations which nevertheless remain of satisfactory quality.
- Local authorities with a relatively high level of compliance (>70 per cent of river stations compliant) with the Regulations are Dublin City, Cavan, South Dublin, Roscommon, Cork County, Westmeath, Kildare and Mayo.
- Local authorities with a relatively low level of compliance with the Regulations (< 50 per cent of river stations compliant) are Monaghan, Dun Laoghaire-Rathdown, Offaly and Kilkenny.
- There has been a continuing decline in the number and percentage of river stations of highest water quality, i.e., Q5 and Q4-5 stations. The EPA has noted significant impacts in the upper reaches of many rivers due to, for example, overgrazing, drainage activities and commercial forestry impacts (McGarrigle *et al.*, 2002).
- Marked increases (>30%) in compliance between the baseline and 2001-03 periods are apparent in Dublin City, Kildare, Fingal, Westmeath, South Dublin and Meath. These increases are partly due to increased monitoring for MRP. Some local authorities (most notably Dublin City) report significant reductions in MRP levels. A significant decline (>20%) in compliance with the Regulations was apparent in Donegal and Wicklow.

- Fingal, Kildare, Meath, Wexford and Carlow exhibit a notable increase (>10%) in the percentage of stations meeting the biological targets of the Regulations between the baseline and 2001-2003 periods. Donegal, Wicklow, Leitrim, Dun Laoghaire Rathdown, Cavan, Clare, Kerry, Sligo and Waterford all recorded moderate declines (>10%) in the number of stations meeting the biological targets of the Regulations since the baseline.
- It is clear from EPA and local authority river monitoring results that assessment of compliance at individual stations may vary depending on whether biological or phosphorus data is used. This is not unexpected as even though a high correlation has been demonstrated between the biological Q rating and MRP levels (e.g., Bowman *et al.*, 1996; Lucey *et al.*, 1999), for a variety of reasons this relationship may not be apparent at every individual station. It is important to note that the standards set in the Phosphorus Regulations are interim targets only. The Water Framework Directive requires that good water status must be achieved in rivers and lakes through meeting ecological *and* chemical targets by 2015. The Directive places a strong emphasis on the composition of flora and fauna of surface waters in the assessment of quality status.
- There are now 530 lakes with targets set under the Regulations. Current monitoring information is available on 496 of these lakes. This indicates that 401 of them are compliant with the Regulations. Counties with a relatively large number of non-compliant lakes (>4) include Cavan, Clare, Cork, Leitrim, Longford and Monaghan. Agricultural activities are considered to be the most common source of nutrient enrichment affecting the non-compliant lakes, but point sources are involved in some cases (Toner *et al.*, 2005).
- The cornerstone of European and national policy to tackle eutrophication is the adoption of a catchment based approach to water quality management. The establishment of RBM projects, set up to facilitate implementation of the WFD, should provide an opportunity for more effective and efficient use of resources at an inter-county level, to facilitate co-operation between local authorities, with other statutory bodies and with the relevant sectors and general public.
- It is important to note that, while the RBM projects will be of major benefit to local authorities, local authorities are already responsible for implementing many of the basic and supplementary measures listed under the WFD. Therefore, the success of the WFD, the RBM projects, and indeed the Phosphorus Regulations, will largely depend on implementation of these measures by local authorities.
- In order to assist local authorities and other interested parties (e.g., farmers, industry, forestry, etc.) to meet their requirements under the Phosphorus Regulations and the Water Framework Directive there is a need for more research into the efficacy and cost effectiveness of measures.

## 7. Recommendations

- It is recommended that local authorities identify the causes of decline in high quality waters (i.e., Q5 and Q4-5) and rectify them as a matter of urgency. Where water quality remains high, local authorities must prevent deterioration of high quality waters, for example, through increased control of development in these catchments. This may include increased liaison with, and control over, upland land-users (e.g., cattle and sheep farmers, foresters) where many of the high-quality sites occur.
- Local authorities should also focus on tackling serious and moderate pollution; and on the implementation of measures that are likely to lead to quick benefits in terms of improved water quality. A catchment-based approach to water quality management should be used.
- Local authorities and other relevant agencies should prioritise the construction/upgrade of wastewater treatment plants and collection systems based on the significance of environmental impacts. Local authorities must ensure effluent from WWTPs does not adversely impact on receiving waters. Some WWTPs also require upgrading under the Urban Waste Water Treatment Directive. Adequate provision for urban wastewater treatment and appropriate monitoring and management of plants is required to allow for the full environmental benefit of the large expenditure on wastewater treatment to be realised. Local authorities should carry out chemical and biological assessment of receiving waters above and below each WWTP to assess their impacts on receiving waters. Stormwater overflows should also be assessed. Where problems are found a programme of measures to address these should be developed and undertaken. The Agency recommends that phosphorus removal be considered for all plants discharging to freshwaters.
- Local authorities should increase co-operation between Planning, Environment and Water Services sections and consider water quality issues as a key factor when considering future development. Particular attention should be paid to the potential impact of discharges from new developments on receiving waters, especially on water bodies with limited assimilative capacity. In the context of sustainable development, such discharges should only be facilitated where it can be demonstrated that they will not cause environmental pollution. Local authorities should have regard to Groundwater Protection Schemes developed by the Geological Survey of Ireland in preparation of County Development Plans.
- Greater efforts are required in monitoring and enforcement of local authority discharge licences, and in addressing unlicensed discharges. Local authorities should have regard to the relevant DEHLG circular L8/03 on this matter. In addition, local authorities should have regard to MCEI requirements.
- Local authorities should prioritise catchments for farm survey work and ensure that there are adequate resources to carry out follow-up enforcement work. There needs to be dedicated local authority teams on the ground addressing pollution issues

throughout the country, and enhanced collaboration with other enforcement agencies (e.g., DAF, fisheries, EPA, Forest Service, National Parks and Wildlife Service, other local authorities).

- Local authority farm surveys generally focus on farmyards. However farmyard surveys may not always be enough to yield significant water quality benefits due to high soil phosphorus levels, poor landspreading practice, poaching, cattle access to rivers, lack of riparian buffer zones etc. In these circumstances local authorities need to consider additional measures including more widespread application of soil testing and nutrient management planning, focussing on identifying and controlling 'hot-spot' sources of phosphorus loss, carrying out river walks and aerial surveys, restricting animal access to rivers, and reviewing of waste disposal practices from intensive agricultural enterprises.
- Local authorities should implement national Nitrates Directive requirements and increase collaboration with DAF in relation to cross-compliance checks. Local authorities should co-ordinate inspection activities with inspections carried out by other public authorities.
- Local authorities should survey and upgrade surface water and foul sewer drainage systems to effectively manage urban runoff and to rectify misconnections.
- Local authorities should control septic tanks through the planning process and through survey and assessment. Greater use of EPA Guidelines on the installation and management of single house wastewater treatment systems is recommended. Local authorities should have regard to DEHLG circular SP 05/03 and carry out surveys of septic tanks in high risk areas where pollution problems are suspected. Development Plans should include measures to improve operational capacity of single house wastewater treatment systems.
- Local authorities should control use of sewage sludge in accordance with EPA recommendations.
- Local authorities should exercise greater control over water abstraction activities and ensure significant environmental impacts are avoided.
- Local authority Environment Sections should liaise with the Forest Service and forestry developers such as Coillte regarding the potential environmental impact of forestry operations, particularly aerial fertilisation programmes, establishment, thinning and clearfelling operations.
- Local authorities should review current methods of handling and disposal of water treatment sludges to ensure that current practice is not in contravention of the Waste Management Act, 1996. Direct disposal of sludges to water bodies is not acceptable.

- It is recommended that all local authorities that have implemented agricultural bye-laws should carry out a review of their effectiveness, including an assessment of improvements in water quality in the bye-law areas. This should also include a comparison with water quality trends in non bye-law areas.
- It is essential for successful implementation of the Regulations that adequate resources are available to local authorities and the EPA to implement those measures considered necessary for water quality protection. Measures to address agricultural pollution, in particular, are resource intensive in terms of personnel and consideration should be given at a national and at a local authority level to ensuring adequate resources are devoted to this area.
- The principal emphasis of work carried out under the Phosphorus Regulations should be on implementation of measures to improve/protect water quality, rather than on monitoring. However, investigative biological monitoring can be particularly useful in identifying pollution sources, thereby helping to focus limited resources.
- The Agency has recommended an environmental management systems based approach to implementation of the Phosphorus Regulations. Given that most local authorities are unlikely to meet the targets of the Regulations if current water quality trends continue, there is a pressing need for local authorities to critically review and update their implementation programs on a more regular basis.
- Local authorities must play a lead role in managing the RBM projects set up to facilitate implementation of the WFD and utilise the large amount of information being generated to focus their resources on tackling the most significant pollution issues. The establishment of multi-sectoral river basin district advisory councils and enforcement networks should provide a vehicle for sharing resources and expertise to address water quality problems. Joint approaches are effective and necessary to make most use of limited resources.
- Many dedicated individuals and groups (including some environmental non-governmental organisations) have built up local and national programmes promoting water quality protection on voluntary effort and minimal grants. Local authorities should integrate with and support these projects while promoting a county-wide message. Local authorities should foster a sense of ownership of problems and solutions among the relevant interested parties.

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## **Appendix 1 Additional Water Quality Data**

**Appendix 1.1 Information on number and percentage of stations sampled for MRP in the 2001-03 period, and the change in number of stations monitored for MRP since the 1998-2000 period. (\*Correcting for river stations bordering two local authority areas).**

Local Authority	No. of Q/MRP stations 2001-03	No. of stations sampled for MRP in 2001-03	Percentage of Q/MRP stations sampled for MRP in 2001-03	Difference in percentage of stations monitored for MRP 2001-03 compared to 1998-2000
Carlow	59	12	20	3
Cavan	109	102	94	57
Clare	165	28	17	3
Cork	377	110	29	29
Donegal	231	0	0	0
Dublin City	7	7	100	0
Dublin South	18	14	78	5
Dun Laoghaire Rathdown	10	9	90	90
Fingal	18	18	100	11
Galway	227	1	0	-6
Kerry	206	22	11	-6
Kildare	88	88	100	94
Kilkenny	98	12	12	-5
Laois	100	50	50	32
Leitrim	90	12	13	11
Limerick	132	29	22	18
Longford	37	20	54	54
Louth	44	40	91	60
Mayo	247	13	5	-6
Meath	109	81	74	73
Monaghan	68	20	30	-12
Offaly	98	2	2	-16
Roscommon	123	40	33	33
Sligo	95	1	1	-17
North Tipperary	121	49	40	27
South Tipperary	114	23	20	3
Waterford	79	8	10	-1
Westmeath	71	44	62	59
Wexford	108	3	3	-3
Wicklow	104	4	4	3
Preliminary Total	3353	862		
Revised Total*	<b>3205</b>	<b>797</b>	<b>24.9</b>	<b>14.5</b>

**Appendix 1.2 Current water quality information for lakes reported on by the EPA or local authorities in 2001-2003 period.**

(O = Oligotrophic; M = Mesotrophic; E = Eutrophic; H = Hypertrophic; \* = water quality status needs confirmation)

Lake Name	Local Authority Responsible	Baseline Trophic Status	2001-03 Trophic Status	Standard to be Achieved (Trophic Status)	2001-03 Total Phosphorus (ug/l P)	Standard to be Achieved Total Phosphorus (ug/l P)	Has Either Standard Been Achieved by 2001-03?	Compliance Target Date
Brackley	Cavan	M	M	M		20	Y	2013
Bunerky	Cavan	E	E	M	39.2	20	N	2013
Corglass	Cavan	M	M	M		20	Y	2013
Derrybrick	Cavan	E	E	M		20	N	2013
Dromore	Cavan	E	E	M		20	N	2013
Garty	Cavan	M	M	M		20	Y	2013
Glasshouse	Cavan	E	E	M		20	N	2013
Lavey	Cavan	E	E	M	82.6	20	N	2010
Mullagh	Cavan	E	E	M	56.7	20	N	2007
Nadreegeel (East)	Cavan	M	E	M	71.3	20	N	2007
Nadreegeel (West)	Cavan	M	E	M	41.9	20	N	2007
Oughter	Cavan	H	H	E	89.1	50	N	2007
Ramor	Cavan	H	E	E	101	50	Y	2007
Rockfield	Cavan	E	E	M		20	N	2013
Sillan	Cavan	H	E	E	71.2	50	Y	2007
Skeagh	Cavan	M	M	M		20	Y	2013
Derrycassan	Cavan / Leitrim	M	M	M		20	Y	2013
MacNean	Cavan, Leitrim	M	M	M		20	Y	2013
Gowna	Cavan, Longford	E	E	M	75.3	20	N	2007
Kinale	Cavan, Longford	O	E	O	28.4	10	N	2007
Sheelin	Cavan, Meath, Westmeath	E	E	M	38.7	20	N	2007
Achryane	Clare	O	O	O		10	Y	2013
Acrow East	Clare	M	M	M		20	Y	2010
Acrow West	Clare	M	M	M		20	Y	2010
Aillebrack	Clare	O	O	O		10	Y	2013
Alewnaghta	Clare	M	M	M		20	Y	2013
Atedaun	Clare	M	O	M		20	Y	2010
Atorick	Clare	M	M	M		20	Y	2013
Ballard	Clare	E	E	M	58.3	20	N	2013
Ballyallia	Clare	M		M		20		2010
Ballybeg	Clare	E	E	M		20	N	2007
Ballycar	Clare	M		M		20		2010
Ballycullinan	Clare	E	E	M	34.9	20	N	2007
Ballydoolavan	Clare	H	H	E		50	N	2013
Ballyeighter	Clare	O	O	O		10	Y	2013
Ballylean	Clare	M		M		20		2010
Ballyteigue	Clare	M	M	M		20	Y	2013
Black	Clare	M	M	M		20	Y	2013

Lake Name	Local Authority Responsible	Baseline Trophic Status	2001-03 Trophic Status	Standard to be Achieved (Trophic Status)	2001-03 Total Phosphorus (ug/l P)	Standard to be Achieved Total Phosphorus (ug/l P)	Has Either Standard Been Achieved by 2001-03?	Compliance Target Date
Bridget	Clare	E	E	M		20	N	2013
Bunny	Clare	O	O	O		10	Y	2007
Burke	Clare	E		M		20		2010
Castle	Clare	E	E	M		20	N	2010
Caum	Clare	O	O	O		10	Y	2013
Clonlea	Clare	M	M	M		20	Y	2013
Cloonmackan	Clare	M	M	M		20	Y	2010
Cloonmora	Clare	M	M	M		20	Y	2013
Cloonsnaghta	Clare	M	M	M		20	Y	2010
Cullaun	Clare	O	O	O		10	Y	2007
Cullaunyheeda	Clare	M	O	M	10.6	20	Y	2010
Curtins	Clare	E	E	M		20	N	2013
Doo Lough	Clare	M	M	M		20	Y	2007
Doon	Clare	M	M	M		20	Y	2013
Dromoland	Clare	O	O	O		10	Y	2013
Dromore	Clare	E	M	M		20	Y	2007
Drumcullaun	Clare	O	O	O		10	Y	2010
Druminure	Clare	M	M	M		20	Y	2013
Eanagh	Clare	O	O	O		10	Y	2013
Effernan	Clare	O	O	O		10	Y	2013
Farrihy	Clare	E	E	M		20	N	2013
Finn	Clare	M	M	M		20	Y	2013
Garvillau	Clare	M	M	M		20	Y	2013
Gash	Clare	M	M	M		20	Y	2013
George	Clare	M	M	M		20	Y	2013
Girroga	Clare	O	O	O		10	Y	2013
Goller	Clare	E	E	M		20	N	2013
Gortaganniv	Clare	M	M	M		20	Y	2013
Gorteen	Clare	M	M	M		20	Y	2013
Gortglass	Clare	E	M	M		20	Y	2007
Graney	Clare	M	M	M	20.9	20	Y	2007
Inchicronan	Clare	M	M	M		20	Y	2013
Inchiquin	Clare	M	M	M	16.8	20	Y	2007
Keagh	Clare	M	O	M		20	Y	2010
Kilgory	Clare	O	O	O		10	Y	2013
Killone	Clare	E	E	M		20	N	2013
Knockalough	Clare	M	M	M		20	Y	2013
Knockerry	Clare	M	M	M		20	Y	2010
Lickeen	Clare	E	E	M	32.5	20	N	2007
Lisnahan	Clare	E	E	M		20	N	2013
Luirk	Clare	O	O	O		10	Y	2013
Luogh	Clare	O	O	O		10	Y	2013
Moanmore	Clare	E	E	M		20	N	2013

Lake Name	Local Authority Responsible	Baseline Trophic Status	2001-03 Trophic Status	Standard to be Achieved (Trophic Status)	2001-03 Total Phosphorus (ug/l P)	Standard to be Achieved Total Phosphorus (ug/l P)	Has Either Standard Been Achieved by 2001-03?	Compliance Target Date
Mooghna	Clare	M	M	M		20	Y	2013
Morgans	Clare	M	M	M		20	Y	2013
Muckanagh	Clare	O	O	O		10	Y	2013
Naminna	Clare	O	O	O		10	Y	2010
O'Grady	Clare	M	M	M		20	Y	2013
Rask	Clare	O	O	O		10	Y	2013
Rosconnell	Clare	E	E	M		20	N	2013
Rosroe	Clare	M	M	M		20	Y	2013
Abisdealy	Cork	E	E	M	29.2	20	N	2007
Adery	Cork	E	M	M		20	Y	2010
Allua	Cork	E	E	M		20	N	2013
Atarrif	Cork	M	M	M		20	Y	2010
Avaul	Cork	E	M	M		20	Y	2010
Ballin	Cork	E	E	M	31	20	N	2007
Bofinna	Cork	M	M	M	21	20	Y	2007
Carrigadrohid Reservoir	Cork	M	M	M		20	Y	2010
Castlemehigan	Cork	M	M	M		20	Y	2010
Cluhir*	Cork	E	M	M		20	Y	2010
Coolkelure*	Cork	H	E	E		50	Y	2010
Curralickey	Cork	M	M	M		20	Y	2010
Curramore	Cork	M	M	M		20	Y	2010
Derryvegal	Cork	M	M	M		20	Y	2010
Driminidy	Cork	E	E	M		20	N	2013
Drumbrow*	Cork	M	E	M		20	N	2010
Druminidy	Cork	E		M		20		2010
Fadda	Cork	E	O	M		20	Y	2010
Glen	Cork	M	O	M		20	Y	2010
Glenbeg	Cork	M	O	M		20	Y	2010
Inniscarra Reservoir	Cork	E	E	M	40.5	20	N	2007
Nambrackderg	Cork	O	O	O		10	Y	2010
Shreelane	Cork	E	E	M		20	N	2010
Skeagh*	Cork	E	M	M		20	Y	2010
Tooreen	Cork	E	M	M		20	Y	2010
Lough	Cork City	M		M		20		2007
Acapple	Donegal	O	O	O		10	Y	2013
Adery	Donegal	O	O	O		10	Y	2013
Agannive	Donegal	O	O	O		10	Y	2013
Agher	Donegal	O		O		10		2010
Aghvog	Donegal	O	O	O		10	Y	2013
Altercan	Donegal	O	O	O		10	Y	2013
Ananima	Donegal	O	O	O		10	Y	2013
Anillanowenna-marve	Donegal	O	O	O		10	Y	2010



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Anillaun	Donegal	O	O	O		10	Y	2013
Anna	Donegal	O	O	O		10	Y	2010
Anure (An Iuir)	Donegal	O	O	O		10	Y	2010
Ardpatten	Donegal	O		O		10		2010
Aroshin	Donegal	O	O	O		10	Y	2013
Assaroe	Donegal	O	O	O		10	Y	2013
Auva	Donegal	O	O	O		10	Y	2013
Avehy	Donegal	O	O	O		10	Y	2013
Ballafill	Donegal	O	O	O		10	Y	2013
Bannus	Donegal	M	M	M		20	Y	2013
Birroge	Donegal	O	O	O		10	Y	2013
Columbkille (Ballyshannon)	Donegal	O	O	O		10	Y	2010
Columbkille (Milford)	Donegal	O	M	O		10	N	2010
Crathai (Craghy)	Donegal	O	O	O		10	Y	2010
Croagh	Donegal	O	O	O		10	Y	2010
Cullionbuoy	Donegal	O	O	O		10	Y	2010
Derg	Donegal	O	O	O		10	Y	2010
Derkmore	Donegal	O	O	O		10	Y	2013
Doo	Donegal	O	O	O		10	Y	2010
Drumgun	Donegal	O	O	O		10	Y	2013
Drumlesk	Donegal	O	O	O		10	Y	2013
Dunglow	Donegal	O	O	O		10	Y	2010
Dunragh	Donegal	O	O	O		10	Y	2013
Durnesh	Donegal	M	M	M		20	Y	2013
Ea	Donegal	O	O	O		10	Y	2010
Eske	Donegal	O	O	O		10	Y	2010
Fad (East)	Donegal	O	O	O		10	Y	2010
Fad (West)	Donegal	O	O	O		10	Y	2010
Fern*	Donegal	M	O	M		20	Y	2010
Finn	Donegal	O	O	O		10	Y	2013
Glen (Carrigart)	Donegal	O	O	O		10	Y	2010
Glen (Ballintra)	Donegal	O	O	O		10	Y	2010
Glencoagh	Donegal	O		O		10		2010
Golagh	Donegal	O	O	O		10	Y	2013
Golagh	Donegal	O	O	O		10	Y	2013
Goland	Donegal	O		O		10		2010
Gorman	Donegal	O	O	O		10	Y	2010
Gort	Donegal	O	O	O		10	Y	2013
Greenan	Donegal	O	O	O		10	Y	2013
Inn	Donegal	M	M	M		20	Y	2013
Keel (Kilmacrennan, Goldrum)	Donegal	O	O	O		10	Y	2010
Keel (Crolly, Rosses)	Donegal	O	O	O		10	Y	2010
Keeran	Donegal	O	O	O		10	Y	2013

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Kill	Donegal	O	O	O		10	Y	2013
Kiltooris	Donegal	O	O	O		10	Y	2013
Kindrum	Donegal	O	M	O		10	N	2010
Kinny	Donegal	O	O	O		10	Y	2010
Lagha	Donegal	O	O	O		10	Y	2013
Laghtowen	Donegal	O	O	O		10	Y	2013
Leckenagh	Donegal	O	O	O		10	Y	2013
Loughaderry	Donegal	O		O		10		2010
Meela	Donegal	O	O	O		10	Y	2013
Meenavillier	Donegal	O	O	O		10	Y	2013
Meenlecknalore	Donegal	O	O	O		10	Y	2010
Mintiaghs	Donegal	O	O	O		10	Y	2013
More (Creeslough)	Donegal	O	O	O		10	Y	2013
More (Doochary)	Donegal	O	O	O		10	Y	2013
Mourne	Donegal	O	O	O		10	Y	2010
Mullaghdearg	Donegal	O	O	O		10	Y	2013
Nacally	Donegal	M	M	M		20	Y	2013
Nacreagh	Donegal	O	O	O		10	Y	2013
Nacung	Donegal	O	O	O		10	Y	2007
Nadarragh	Donegal	O	O	O		10	Y	2013
Nageage	Donegal	O	O	O		10	Y	2013
Naglea	Donegal	O	O	O		10	Y	2010
Nagreagh	Donegal	M	M	M		20	Y	2013
Nalughraman	Donegal	O	O	O		10	Y	2013
Namanfin	Donegal	O	O	O		10	Y	2013
Nambradden	Donegal	O	O	O		10	Y	2010
Nameeltoge	Donegal	O	O	O		10	Y	2013
Naminn	Donegal	O	O	O		10	Y	2010
Namnamurrive	Donegal	O	O	O		10	Y	2013
Nawaugh	Donegal	O	O	O		10	Y	2013
New	Donegal	O	M	O		10	N	2010
Polloroy	Donegal	O	O	O		10	Y	2013
Port	Donegal	O	O	O		10	Y	2010
Rath	Donegal	O	O	O		10	Y	2013
Reelan	Donegal	O	O	O		10	Y	2010
Roosky	Donegal	O	O	O		10	Y	2013
St Peter's	Donegal	O	O	O		10	Y	2010
Salt	Donegal	O	O	O		10	Y	2010
Sessiagh*	Donegal	M	O	M		20	Y	2010
Shannagh	Donegal	M	O	M		20	Y	2010
Shivna	Donegal	O	O	O		10	Y	2013
Shore	Donegal	O	O	O		10	Y	2013
Trusk	Donegal	O	O	O		10	Y	2013
Ultan	Donegal	O	O	O		10	Y	2013
Unna	Donegal	O	O	O		10	Y	2013

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Unshin	Donegal	O	O	O		10	Y	2010
Waskel	Donegal	O	O	O		10	Y	2013
Akibbon	Donegal	O	O	O		10	Y	2007
Alek More	Donegal	M	M	M		20	Y	2013
Barra	Donegal	O	O	O		10	Y	2007
Dunlewy	Donegal	O	O	O		10	Y	2007
Gartan	Donegal	O	O	O		10	Y	2007
Veagh	Donegal	O	O	O		10	Y	2007
Achadh Bhuailie (Aughawoolia)	Galway	O	O	O		10	Y	2007
Adoorau	Galway	O		O		10		2010
Adrehid	Galway	O		O		10		2007
Agraffard	Galway	O	O	O		10	Y	2010
Ahalia Nth (Scribe)	Galway	O	O	O		10	Y	2007
Ahalia Sth (Scribe)	Galway	O	O	O		10	Y	2013
Anaserd	Galway	O	O	O		10	Y	2013
an Bhalla (Awallia)	Galway	O	O	O		10	Y	2007
an Bhric Mhoir (Nambrackmore)	Galway	M		M		20		2007
An Chraoibhin (Aunevneen)	Galway	O	O	O		10	Y	2013
an Da Eala (Auneala)	Galway	O		O		10		2010
An Ghadai (Agaddy)	Galway	O		O		10		2010
An ghainimh (Illauntrasna)	Galway	O	O	O		10	Y	2007
an Iarainn (Ierin)	Galway	O	O	O		10	Y	2010
an Iolra Thiar (Aunilra West)	Galway	O		O		10		2007
an Iolra Thoir (Aunilra East)	Galway	O		O		10		2010
An Mhianaigh (Aunweeny)	Galway	O	O	O		10	Y	2007
an Mhuilinn (Aunwillin)	Galway	M	O	M		20	Y	2007
an Oir (Aunore)	Galway	O	O	O		10	Y	2010
Anillaun	Galway	O	O	O		10	Y	2007
Ardderry	Galway	O	O	O		10	Y	2007
Atalia	Galway	O	O	O		10	Y	2013
Atrai (Athry)	Galway	O	O	O		10	Y	2007
Aughrusbeg	Galway	M	M	M		20	Y	2013
Aunfree	Galway	O	O	O		10	Y	2007
Aunierin	Galway	O	O	O		10	Y	2007
Ballinaboy	Galway	M	M	M		20	Y	2013
Ballynahinch	Galway	O	O	O		10	Y	2007
Ballynahowan	Galway	O		O		10		2010
Ballyquirka	Galway	M	M	M		20	Y	2007
Barr an tSruthain (Vauratruffaun)	Galway	O	O	O		10	Y	2007
Beaghcauneen	Galway	O	M	O		10	N	2010

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Bhaile na Cille (Ballynakill)	Galway	O	M	O		10	N	2007
Bhoth Loische (Boliska)	Galway	O	O	O		10	Y	2010
Bofin	Galway	O	O	O		10	Y	2007
Bovroughaun	Galway	O		O		10		2010
Cappahoosh	Galway	O	O	O		10	Y	2007
Carrafinla	Galway	M		M		20		2010
Cheim na Cailli (Keamnacally)	Galway	O	O	O		10	Y	2010
Chnoc an Locha (Knocka)	Galway	O	O	O		10	Y	2010
Chonga Mor (Uggamore)	Galway	O	O	O		10	Y	2010
Cloonadoon	Galway	O	O	O		10	Y	2010
Cloongat	Galway	O	O	O		10	Y	2010
Corrib (Lower)	Galway	M	M	M	15.1	20	Y	2007
Corrib (Upper)	Galway	M	M	M	10.1	20	Y	2007
Cutra	Galway	M	O	M		20	Y	2007
Derryclare	Galway	O	O	O		10	Y	2007
Derrycunlaghmore	Galway	O		O		10		2010
Derrylea	Galway	O	O	O		10	Y	2007
Derryneen	Galway	M		M		20		2010
Dhoire Bhanbh (Knockaunawaddy)	Galway	O	O	O		10	Y	2007
Enask	Galway	O	O	O		10	Y	2010
Fada Ghleannain (Fadda)	Galway	O	O	O		10	Y	2010
Fadda (Ballynahinch)	Galway	O	O	O		10	Y	2013
Fadda (Beaghcauneen)	Galway	O	O	O		10	Y	2010
Fee	Galway	O	O	O		10	Y	2010
Formoyle	Galway	O	O	O		10	Y	2013
Glean da Loch (Glendollagh)	Galway	O	O	O		10	Y	2007
Glenicmurren	Galway	O	O	O		10	Y	2013
Hoirbeaird (Hibbert)	Galway	O	O	O		10	Y	2007
Inagh	Galway	O	O	O		10	Y	2010
Inbhear Beag (Inverbeg)	Galway	O	O	O		10	Y	2010
Invermore	Galway	O	O	O		10	Y	2013
Invernagleragh	Galway	O	O	O		10	Y	2013
Kylemore	Galway	O	O	O		10	Y	2010
Lettercraffroe	Galway	M	M	M		20	Y	2007
Loung	Galway	O	O	O		10	Y	2013
Lurgan	Galway	O		O		10		2007
Maumeen (Ballyconneely)	Galway	O	O	O		10	Y	2010
Maumwee	Galway	O	O	O		10	Y	2007
Muck	Galway	O	O	O		10	Y	2013
Muckanagh	Galway	O	O	O		10	Y	2013

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Na Foirneise (Nafurnace)	Galway	O	O	O		10	Y	2007
na gCaisleach (Carraroe)	Galway	O		O		10		2010
na hArd-doiriu (Ardderrou)	Galway	O		O		10		2010
na mBruaichini (Namroughania)	Galway	O	O	O		10	Y	2007
na Scainimhe (Skannive)	Galway	O	O	O		10	Y	2010
Na Sceiche (Naskeha)	Galway	M	O	M		10	Y	2007
na Tamhnai Moire (Natawnymore)	Galway	O		O		10		2007
Nafeakle	Galway	O		O		10		2010
Nafoeoy	Galway	O	O	O		10	Y	2007
Nagravin	Galway	M	M	M		20	Y	2013
Nahasleam (East)	Galway	O	O	O		10	Y	2007
Nahasleam (West)	Galway	O	O	O		10	Y	2007
Nambrakkeagh	Galway	O	O	O		10	Y	2013
Oiriulach (Aroolagh)	Galway	O	O	O		10	Y	2010
Oorid	Galway	O	O	O		10	Y	2007
Pollacoppul	Galway	O	O	O		10	Y	2010
Rea	Galway	O	O	O		10	Y	2007
Ross	Galway	M	M	M		20	Y	2013
Ros an Mhil (Rossaveel)	Galway	M	O	M		20	Y	2010
Shindilla	Galway	O	O	O		10	Y	2007
Slieveaneena	Galway	O	O	O		10	Y	2010
Thulaigh na Leathair (Tullaghalaher)	Galway	O	O	O		10	Y	2010
Toombeola	Galway	O	O	O		10	Y	2013
Troscan (Truscan)	Galway	M	M	M		20	Y	2010
Tullaghanoon	Galway	O		O		10		2010
Uí Chadhain (Hawnagheekyne)	Galway	O	O	O		10	Y	2007
Barfinnihy	Kerry	O	O	O		10	Y	2013
Clonee	Kerry	O	O	O		10	Y	2013
Cloon	Kerry	O	O	O		10	Y	2013
Currane	Kerry	M	M	M		20	Y	2013
Glanmore	Kerry	M	M	M		20	Y	2013
Inchiquin	Kerry	O	O	O		10	Y	2013
Leane (Killarney)	Kerry	E	M	M	17	20	Y	2007
Leane (Ross Bay)	Kerry	E	E	M	25	20	N	2007
Muckross	Kerry	O	O	O	12	10	Y	2007
Nakirka	Kerry	O	O	O		10	Y	2013
Upper Lake (Killarney)	Kerry	O	O	O	12	10	Y	2010

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Caragh	Kerry	O	O	O		10	Y	2007
Cloonaghlin	Kerry	M	O	M		20	Y	2010
Gill (Kerry)	Kerry	M	M	M		20	Y	2007
Guitane	Kerry	O	O	O	10	10	Y	2007
Adoon	Leitrim	M	M	M		20	Y	2010
Annary*	Leitrim	M	M	M		20	Y	2010
Belhavel	Leitrim	M	M	M		20	Y	2013
Bran	Leitrim	M	E	M		20	N	2010
Calloughs	Leitrim	E	E	M		20	N	2010
Carrigaport	Leitrim	M	M	M		20	Y	2010
Carrigeencor	Leitrim	M	M	M		20	Y	2013
Donagher	Leitrim	M	M	M		20	Y	2010
Drumlaheen	Leitrim	E	E	M		20	N	2013
Fenagh	Leitrim	M	E	M		20	N	2010
Gangin	Leitrim	H	H	E		50	N	2010
Garadice	Leitrim	M	M	M	45	20	Y	2007
Glenade	Leitrim	M	M	M		20	Y	2013
Gulladoo	Leitrim	E	E	M		20	N	2013
Killooman	Leitrim	O	O	O		10	Y	2013
Melvin	Leitrim	O	O	O		10	Y	2007
na Croagh	Leitrim	M	M	M		20	Y	2013
Nacarriga	Leitrim	M	M	M		20	Y	2013
Nambrack	Leitrim	M	M	M		20	Y	2013
Rinn	Leitrim	E	M	M		20	Y	2010
Rowan	Leitrim	O	M	O		10	N	2010
St John's	Leitrim	M	M	M		20	Y	2013
Sallagh	Leitrim	M	M	M		20	Y	2013
Scur	Leitrim	M	M	M		20	Y	2013
Acres	Leitrim	E	E	M		20	N	2007
Allen	Leitrim, Roscommon	O	O	O		10	Y	2007
Glencar	Leitrim, Sligo	O	O	O		10	Y	2010
Bleach	Limerick	O	O	O		10	Y	2013
Gur	Limerick	E	M	M		20	Y	2010
Annagh	Longford	M	E	M		20	N	2010
Corbeagh	Longford	H	H	E		50	N	2010
na Bach	Longford	E	E	M	29.9	20	N	2010
Tully*	Longford, Leitrim	E	E	M		20	N	2010
Forbes	Longford, Roscommon	M	O	M		20	Y	2007
Killaneer	Louth	E	E	M		20	N	2013
Ballymore	Mayo	O	O	O		10	Y	2013
Beltra	Mayo	O	O	O		10	Y	2013
Carra (South)	Mayo	M	O	M	12.6	20	Y	2007
Carrowkeribly	Mayo	O	O	O		10	Y	2013
Carrowmore	Mayo	M	E	M		20	N	2007

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Conn (Lower)	Mayo	M	M	M	12.8	20	Y	2007
Conn (Upper)	Mayo	M	M	M	14.3	20	Y	2007
Cross	Mayo	E	E	M		20	N	2013
Cullin	Mayo	M	M	M		20	Y	2007
Derryhick	Mayo	M	M	M		20	Y	2013
Doo	Mayo	O	O	O		10	Y	2007
Feeagh	Mayo	O	O	O		10	Y	2007
Fin	Mayo	O	O	O		10	Y	2007
Furnace	Mayo	M	M	M		20	Y	2013
Glencullin	Mayo	O	O	O		10	Y	2007
Islandeady	Mayo	M	M	M		20	Y	2013
Keel	Mayo	M	M	M		20	Y	2013
Knappaghbeg	Mayo	M	E	M		20	N	2007
Lannagh	Mayo	M	M	M		20	Y	2013
Levally	Mayo	M	M	M		20	Y	2013
Mask	Mayo	M	M	M	11.4	20	Y	2007
Moher	Mayo	O		O		10		2007
Sruhill	Mayo	M	M	M		20	Y	2013
Urlar	Mayo	M	M	M		20	Y	2013
Carra (North)	Mayo	O	O	O	8.9	10	Y	2007
Ballyhoe	Meath	M	M	M		20	Y	2013
Balrath	Meath	E	E	M		20	N	2013
Bane	Meath	O	O	O		10	Y	2013
Bracken	Meath	E	E	M		20	N	2013
Creeve	Meath	O	O	O		10	Y	2013
White	Meath	O	O	O		10	Y	2013
Whitewood	Meath	E	E	M		20	N	2013
Annamakerrig	Monaghan	E	E	M	50.3	20	N	2007
Antrawer	Monaghan	M	M	M		20	Y	2010
Aphuca*	Monaghan	M		M		20		2010
Aportan	Monaghan	M	O	M		20	Y	2010
Avaghon	Monaghan	M	M	M		20	Y	2010
Ballagh	Monaghan	H	H	E		50	N	2013
Bawn	Monaghan	E	E	M		20	N	2013
Bellatrain	Monaghan	O	O	O		10	Y	2013
Blackraw	Monaghan	M		M		20	Y	2010
Bougagh	Monaghan	M	M	M		20	Y	2010
Carnaroe	Monaghan	M	M	M		20	Y	2010
Corcaghan	Monaghan	E	E	M		20	N	2013
Corconnolly	Monaghan	E	M	M		20	Y	2010
Corkeeran	Monaghan	E	E	M		20	N	2010
Creeve Upper	Monaghan	H	H	E		50	N	2013
Creevy	Monaghan	M	M	M		20	Y	2010
Crinkill	Monaghan	E	E	M		20	N	2013
Derrygooney	Monaghan	M	M	M		20	Y	2010

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Drum	Monaghan	E	E	M		20	N	2013
Drumgole	Monaghan	E	E	M		20	N	2013
Drumlona	Monaghan	E	E	M		20	N	2013
Drumsaul	Monaghan	H	H	E		50	N	2013
Eigish	Monaghan	H	H	E		50	N	2007
Emy	Monaghan	E	M	M		20	Y	2010
Fea	Monaghan	M	M	M		20	Y	2010
Feagh	Monaghan	E	E	M		20	N	2013
Glaslough*	Monaghan	E	E	M		20	N	2013
Greagh	Monaghan	E	E	M		20	N	2013
Greaghlonge	Monaghan	M	M	M		20	Y	2013
Grove*	Monaghan	H	H	E		10	N	2013
Hollywood	Monaghan	O	O	O		10	Y	2013
Inner	Monaghan	E	E	M		20	N	2013
Kilcorran	Monaghan	M	M	M		20	Y	2013
Lambes	Monaghan	E	E	M		20	N	2013
Mahearny*	Monaghan	H	H	E		50	N	2010
Major	Monaghan	E	E	M		20	N	2013
Meenish	Monaghan	E	E	M		20	N	2013
Minor*	Monaghan	E	E	M		20	N	2013
Monalty*	Monaghan	E	E	M		20	N	2013
More	Monaghan	M	M	M		20	Y	2013
Morne	Monaghan	E	E	M		20	N	2013
Muckno	Monaghan	M	E	M		20	N	2007
Muckno Mill	Monaghan	E	E	M		20	N	2013
Mullanary	Monaghan	E	E	M		20	N	2013
Nagarnaman	Monaghan	M	M	M		20	Y	2013
Naglack	Monaghan	O	O	O		10	Y	2010
Namachree*	Monaghan	M	M	M		20	Y	2010
Ony	Monaghan	H	H	E		50	N	2010
Skerrig Reservoir*	Monaghan	E	E	M		20	N	2013
Spring Lake	Monaghan	O	O	O		10	Y	2010
Toghan*	Monaghan	E	E	M		20	N	2010
White	Monaghan	H	E	E	106.3	50	Y	2007
Baraghy	Monaghan, Cavan	E	E	M		20	N	2013
Derg	North Tipperary, Clare, Galway	E	M	M		20	Y	2007
Pallas	Offaly	O	O	O	18	10	Y	2010
Annaghmore	Roscommon	O	O	O		10	Y	2013
Canbo	Roscommon	M	M	M		20	Y	2013
Cavetown	Roscommon	O	O	O		10	Y	2013
Cloonagh	Roscommon	O	O	O		10	Y	2013
Cloonfree	Roscommon	M	M	M		20	Y	2013
Corry	Roscommon	M	M	M		20	Y	2013



Lake Name	Local Authority Responsible	Baseline Trophic Status	2001-03 Trophic Status	Standard to be Achieved (Trophic Status)	2001-03 Total Phosphorus (ug/l P)	Standard to be Achieved Total Phosphorus (ug/l P)	Has Either Standard Been Achieved by 2001-03?	Compliance Target Date
Creevin	Roscommon	O	O	O		10	Y	2013
Derrynasallagh	Roscommon	M	M	M		20	Y	2013
Errit	Roscommon	O	O	O		10	Y	2013
Fergus	Roscommon	M	M	M		20	Y	2013
Fin	Roscommon	O	O	O		10	Y	2013
Funshinagh	Roscommon	M	M	M		20	Y	2013
Gara	Roscommon	M	M	M		20	Y	2007
Glinn	Roscommon	M	M	M		20	Y	2013
Grange/Lisheen	Roscommon	M	M	M		20	Y	2013
Key	Roscommon	M	O	M		20	Y	2007
Kilglass	Roscommon	O	O	O		10	Y	2013
Lisdaly	Roscommon	O	O	O		10	Y	2013
Meelagh	Roscommon	O	O	O		10	Y	2013
Nablahy	Roscommon	M	M	M		20	Y	2013
O'Flynn	Roscommon	O	O	O		10	Y	2013
Shad	Roscommon	O	O	O		10	Y	2013
Skean	Roscommon	M	M	M		20	Y	2013
Tap	Roscommon	M	M	M		20	Y	2013
Treamnamarly	Roscommon	O	O	O		10	Y	2013
Drumharlow	Roscommon	M	O	M		20	Y	2007
Oakport	Roscommon	M	O	M		20	Y	2007
Boderg	Roscommon, Longford	M	O	M		20	Y	2007
Bofin (Shannon)	Roscommon, Longford	M	O	M		20	Y	2007
Achree	Sligo	O	O	O		10	Y	2013
Arrow	Sligo	M	M	M	16.4	20	Y	2007
Ballinascarrow	Sligo	M	M	M		20	Y	2013
Bo	Sligo	M	M	M		20	Y	2013
Bree	Sligo	O	O	O		10	Y	2013
Cloonacleigha	Sligo	M	M	M		20	Y	2013
Dargan	Sligo	M	M	M		20	Y	2013
Easky	Sligo	O	O	O		10	Y	2007
Gill	Sligo	O	M	O		10	N	2007
Rumduff	Sligo	M	M	M		20	Y	2013
Talt	Sligo	O	O	O		10	Y	2007
Templehouse	Sligo	O	O	O		10	Y	2013
Ballyscanlon	Waterford	M	M	M		20	Y	2010
Ballyshunnock	Waterford	E	E	M		20	N	2010
Belle	Waterford	M	M	M		20	Y	2010
Carriganantry	Waterford	E	M	M		20	Y	2010
Coumalocha	Waterford	O	O	O		10	Y	2010
Coumduala	Waterford	O	H	O		10	N	2010
Coumfea	Waterford	O	O	O		10	Y	2010
Coumshingaun	Waterford	O	O	O		10	Y	2010
Crotty's	Waterford	O	O	O		10	Y	2010

Lake Name	Local Authority Responsible	Baseline Trophic Status	2001-03 Trophic Status	Standard to be Achieved (Trophic Status)	2001-03 Total Phosphorus (ug/l P)	Standard to be Achieved Total Phosphorus (ug/l P)	Has Either Standard Been Achieved by 2001-03?	Compliance Target Date
Deelish	Waterford	O	M	O		10	N	2010
Knockaderry	Waterford	H	M	E		50	Y	2010
Mohra	Waterford	O	O	O		10	Y	2010
Sgilloge	Waterford	O	O	O		10	Y	2010
Coosan	Westmeath	M	M	M		20	Y	2007
Ennell	Westmeath	M	M	M		20	Y	2007
Glore	Westmeath	M	M	M	29	20	Y	2010
Mount Dalton	Westmeath	O	E	O	52.3	10	N	2010
Sheever	Westmeath	M		M		20		2010
Sunderlin	Westmeath	O	O	O		10	Y	2013
Ballykeeran	Westmeath	M	O	M		20	Y	2007
Derravaragh	Westmeath	M	M	M	19	20	Y	2007
Killinure	Westmeath	M	O	M		20	Y	2007
Lene	Westmeath	M	O	M	18.5	20	Y	2007
Owel	Westmeath	M	M	M		20	Y	2007
Ree	Westmeath, Longford, Roscommon	E	M	M		20	Y	2007
Bray (Lower)	Wicklow	E	M	M		20	Y	2007
Bray (Upper)	Wicklow	O		O		10		2010
Dan	Wicklow	O	O	O		10	Y	2007
Glendalough Lake Lower	Wicklow	O	O	O		10	Y	2010
Glendalough Lake Upper	Wicklow	O	O	O		10	Y	2007
Golden Falls Reservoir	Wicklow	E	M	M		20	Y	2007
Nahanagan	Wicklow	O		O		10		2010
Poulaphouca Reservoir	Wicklow	M	M	M		20	Y	2007
Tay	Wicklow	O	O	O		10	Y	2013
Vartry Reservoir	Wicklow	O	O	O		10	Y	2007

## **Appendix 2 EPA Implementation**

## **Environmental Protection Agency**

Under the EPA Act, 1992 and the Waste Management Act, 1996 a wide range of functions are allocated to the Agency which relate to the protection of water quality. These functions include the provision of support and advisory services for local authorities; the licensing, regulation and control of activities, primarily relating to industrial and waste management activities; monitoring of water quality and establishment of databases of same; and the promotion and co-ordination of research into water quality issues.

### **Support and Advisory Services**

#### *Phosphorus Regulations*

The Agency hosted a seminar in May 1999 to facilitate preparation of local authority Measures Reports. As a follow up to the seminar, the Agency issued a Guidance Note to local authorities on preparation and submission of the Measures Reports (EPA, 1999a). The Agency hosted a second seminar in June 2000 to facilitate preparation of local authority Implementation Reports. At this seminar, the Agency issued a Guidance Note to Local Authorities on Preparation and Submission of the Implementation Reports (EPA, 2000a). The Agency also published a Synthesis Report of the Measures Reports (Clenaghan *et al.*, 2000). The Agency has subsequently held five more seminars on the Regulations in 2001, 2002, 2003, 2004 and 2005, which included workshops on particular aspects of measures implementation. The Agency published two National Reports on Implementation of the Regulations (Clenaghan *et al.*, 2001; Clenaghan, 2003) and must do so every two years until 2009.

In 2005, the Agency established two enforcement networks on the Suir and Erne/Blackwater catchments to encourage co-operation between all the relevant enforcement agencies at a catchment level. These networks include representatives from the EPA, DEHLG, DAF, Fisheries Boards, Local Authorities, RBD projects and Teagasc. The aim of these networks is to facilitate co-operation of the various enforcement agencies in tackling water quality issues, by sharing of expertise, development of common approaches, and pooling of resources.

The OEE is currently focussing on seriously polluted river stations (Q value  $\leq 2$ ), seeking information from the relevant local authorities on causes of pollution and detailed action plans to remedy pollution problems. During 2005, there has been particular focus by the OEE on the twenty-four seriously polluted stations impacted by sewage, seven of which have subsequently improved in quality status. In most cases this improvement has been due to action taken by the local authorities. The OEE is in direct contact with the DEHLG regarding the environmental impacts of WWTPs.

#### *Other Support and Advisory Services*

The Agency, in conjunction with the DEHLG, County and City Managers Association and the County and City Engineers Association, has developed a local authority management system (LAMS) for identifying and assessing local authority performance of statutory environmental protection functions. This system was

initially piloted in three local authorities, and is now available to all local authorities following a training programme which was delivered in 2004.

The Agency has recently published guidance and reports on a number of issues relevant to water quality protection including publications on the state of the environment (EPA, 2004b); national water quality (Toner *et al.*, 2005); biological survey reports (e.g., Clabby *et al.*, 2004); urban wastewater (Smith *et al.*, 2004); water quality management planning (Fanning *et al.*, 1999); water quality objectives and standards (EPA, 1997); parameters of water quality (EPA, 2001b); a national phosphorus balance for agriculture (Brogan, *et al.*, 2001); groundwater (DELG, EPA & GSI, 1999; EPA, 2003a); landspreading (EPA, 2004a) and drinking water (Page *et al.*, 2004). The Agency has also published a series of BATNEEC notes on integrated pollution control (IPC) licensing of industry; a series of landfill manuals; regular reports on EPA licensing of industrial and waste facilities; and a series of wastewater treatment manuals.

## **Licensing and Control of Waste and Industrial Facilities**

### *Waste Management*

Under the Waste Management Act, 1996, the EPA is responsible for the licensing of all significant waste recovery and disposal facilities operated by local authorities and private enterprises. The EPA licensing process places stringent conditions on the operation of facilities to ensure that the potential environmental impact is strictly controlled. All local authorities and private companies that are engaged in significant waste disposal and recovery activities are required to apply for a licence from the EPA. All waste licenses are issued and reviewed taking account of the phosphorus standards set in the Regulations.

### *Industry*

Under the EPA Act, 1992, the EPA was responsible for regulating large/complex industrial and other processes with significant pollution potential, through IPC licensing. Since July 2004, a new EU Directive on Integrated Pollution Prevention and Control (IPPC) replaced the IPC licensing regime. The EPA licensing system had anticipated and implemented most of the requirements of the EU IPPC Directive, aside from a number of technical and procedural elements. One of the main differences is that IPPC increases the emphasis on 'prevention' with the aim of reducing emissions to air, water and land, reducing waste and using energy efficiently. In addition, more activities were brought into the licensing system, in areas such as intensive agriculture, the treatment and processing of milk, the slaughter of cattle, food production, and the production of paper, pulp and board. In 2004, the EPA carried out an administrative review of the licences it had issued over the past ten years to check for compliance with the new IPPC requirements. A programme of licence review to bring all licences into compliance with the Directive will commence in 2005 (EPA, 2005).

All industrial licenses are issued and reviewed taking account of the phosphorus standards set in the Regulations. The Agency reviews the environmental performance of all its licensees to ensure compliance on an ongoing basis, and takes appropriate enforcement action and/or reviews licences as required. IPC licensing of industry has resulted in significant environmental benefits for waters in terms of

pollution and waste reduction, and rationalisation of water use. For example, substantial improvements have been noted in the Dalgan and Clare Rivers, Co. Galway, through the IPC licensing of a large meat processing plant operating in the Dalgan River catchment (Clabby *et al.*, 2001). Ultimately, all new and existing industrial and manufacturing facilities in the State with a significant pollution generating capacity will be subject to IPC licensing.

## **Monitoring**

At present water quality and quantity data in the State arise mainly from the monitoring programmes undertaken by the EPA, the local authorities and OPW, supplemented by the work of the fishery agencies in specific fishery waters.

### *Hydrometric Network*

Flows in the river system are measured at some 1447 locations using either continuous level recorders (548 locations) or staff gauges (899). Of the 548 continuous recorders, the OPW operate approximately 300, which were originally intended to provide information for flood control and drainage, the ESB operate 36, primarily in relation to the operation of the hydroelectric stations and to dam safety, while the local authorities operate 188, to assist water pollution control measures. The local authorities operate the bulk of the 899 staff gauges. The EPA's eight regional teams of hydrometric technicians undertake the checking and updating of the water level/flow relationships at all of the local authority gauges and also carry out additional checks at the OPW gauges. The EPA carries out processing of water levels data to produce flow statistics for the local authority gauges, while the other bodies process their own data. The EPA maintains a register of all gauges and produces periodic reports on flow statistics. In addition to the foregoing, the Agency also records groundwater levels in some 300 boreholes on an ongoing basis and is incorporating similar data from earlier measurements made by the GSI into the resulting database.

### *River Water Quality*

The EPA national river water quality biological monitoring programme covers 13,200 km of river channel. The EPA carries out the biological surveys at some 3,200 locations over a three year cycle. As part of the national programme on the physico-chemical monitoring of river water quality, the EPA take samples for chemical analysis at approximately 1,600 locations, covering approximately 5,100 km of river channel. Most of the measurements are designed to detect the effects of organic pollution (e.g., from sewage and farm wastes) and there is limited monitoring for potentially toxic substances.

### *Lake Water Quality*

Nationally, 492 lakes were examined in the 2001-03 period with information on these lakes derived mainly from investigations carried out by the EPA, local authorities and the Central and Regional Fisheries Boards. This represents a significant increase over previous reporting periods and is due, largely, to the commencement of the National Lake Monitoring Programme in 2000 (Bowman and Toner, 2001) and to the investigations carried out as part of an EPA ERTDI Fellowship project which commenced in 2001. This survey covers approximately 73 per cent of the total lake

surface area in the state and as such is quite representative of such waters. Many of these are important fishery waters that are monitored by the Central and Regional Fisheries Boards. The Shannon lakes and representative acid-sensitive lakes are monitored by the EPA while several of the local authorities monitor lakes in their functional areas either directly or with the assistance of outside agencies. The measurements made are mainly intended to detect the presence of eutrophication. In addition, over 80 acid-sensitive lakes are monitored by the Agency.

#### *Groundwater Quality*

The EPA initiated a national monitoring programme for groundwaters in 1995, which currently includes some 300 representative locations, sampled twice a year. The measurements made include those that are of interest in assessing the suitability of the groundwaters as sources of domestic and industrial supply, e.g., faecal coliform bacteria and nitrates. Ortho-phosphate concentration is also monitored at most stations.

#### *Tidal Water Quality*

In relation to tidal waters, 25 estuaries are currently monitored annually by the EPA for general water quality conditions and, in particular, for signs of eutrophication. The Marine Institute operates a number of measurement programmes to assess the levels of potentially toxic contaminants in the marine environment, particularly in commercial species of fish and shellfish. Other monitoring programmes in tidal waters deal with the quality of bathing waters, which is undertaken by the local authorities, and the incidence of toxic algal blooms, operated by the Marine Institute. The EPA has published for discussion a review of national monitoring arrangements in respect of tidal waters (EPA, 2003b).

#### *Databases*

Special measures are being taken to guide and co-ordinate the establishment of data management systems in the context of river basin management. The EPA, LGCSB and DEHLG have overseen the development of guidelines for GIS through a study carried out by Compass Informatics. The EPA and LGCSB are now co-ordinating the implementation of GIS nationally based on these guidelines.

### **Research**

The Agency is responsible for developing, supporting, implementing and promoting the national ERTDI Programme. Funding for this programme, which will amount to over €32m over the period 2000-2006, is provided by the DEHLG through the National Development Plan. Several research projects have been supported which apply directly to water quality protection and management. More recent ERTDI publications relate to research on eutrophication from agriculture (Jennings *et al.*, 2003; Daly and Casey, 2003), on the Water Framework Directive (Irvine *et al.*, 2002) and fertiliser taxes (Scott, 2005).

Currently, there are major research projects underway on water quality impacts from agriculture and forestry. The former project is investigating sources and pathways of nutrient losses, seasonal variation of phosphorus losses from soil and field management, and nitrate leaching from soils. This €3.4M project is co-ordinated by Teagasc and involves a consortium of scientists from various Irish universities and

international experts. The forestry projects are focussing on best practice for forestry plantation and management, particularly with regard to fertiliser application and minimising the threat from acidification. In addition to these large-scale projects, there are a number of medium scale projects on topics such as ecological assessment of lakes, endocrine disruption in fish and impacts on groundwater. There are also a number of research projects ongoing in relation to meeting needs arising from implementation of the Water Framework Directive. There is currently work ongoing to establish a national soils database.



## **Appendix 3 Local Authority Implementation**

### **Appendix 3 - Explanatory Note.**

In Appendix 3, a summary is presented of water quality status in each local authority area. The trend in river water quality is discussed using a variety of indicators. A comparison of the number and percentage of satisfactory Q values in the baseline data (Table 4) is made with current data (Table 5). The trend in river quality compliance with the Regulations is discussed based on a comparison of the baseline quality with the most current data available (which consists of 2001-03 biological and phosphorus data) (Table 5). In addition, the loss of high quality Q5 and Q4-5 river stations in many local authority areas is highlighted. Lake water quality is discussed based on information presented in the main report and Appendix 1.2.

A table is presented for each local authority area of county rivers with stations that are either moderately or seriously polluted, according to the EPA biological water quality rating in 2001-03. A small number of these stations are actually compliant with the Regulations based on biological or MRP data. However, given national and EU legislative requirements to protect and improve water quality (e.g., Water Pollution Acts, Water Framework Directive), measures are required to tackle pollution at these stations as a matter of urgency.

## Carlow County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been an improvement in the number of stations of satisfactory water quality with 58.6 per cent of stations currently of satisfactory quality compared to 51.7 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 66.1 per cent comply with the standards set in the Regulations, up 14.4 per cent from the baseline period.
- 63.8 per cent of stations meet the biological targets of the Regulations, up 12.1 per cent from the baseline period.
- There has been an improvement in the number of high quality Q5 stations from 2 in the baseline survey to 3 currently, but a decline in the number of Q4-5 stations, down from 12 in the baseline survey to 9 currently.
- There has been a significant reduction in the number of moderately polluted Q3 and Q2-3 stations from 12 in the baseline survey to 3 currently.

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

<b>River Name</b>	<b>River Code</b>	<b>No. of Stations Seriously Polluted</b>	<b>No. of Stations Moderately Polluted</b>
Barrow	14B01		1
Burren	14B05		1
Lerr	14L01		1

## Cavan County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a decline in the number of stations of satisfactory water quality with 53.5 per cent of stations currently of satisfactory quality compared to 56.4 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 84.4 per cent comply with the standards set in the Regulations, up 28.0 per cent from the baseline period. However, this is largely due to increased MRP monitoring, rather than improvements in water quality.
- 41.6 per cent of stations meet the biological targets of the Regulations, down 14.8 per cent from the baseline period.
- There has been a significant decline in the number of high quality Q5 and Q4-5 stations from 31 in the baseline survey to 21 currently.
- 14 out of 22 lakes currently monitored in the County are non-compliant with the Regulations (Baraghy, Bunerky, Derrybrick, Dromore, Glasshouse, Lavey, Mullagh, Nadreegeel (E&W), Oughter, Rockfield, Gowna, Kinale, Sheelin).

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Blackwater (Kells)	07B01		4
Drumkeery Lough Stream	07D03		1
Moynalty	07M03		1
Inny	26I01		1
Annalee	36A02		2
Bunnoe	36B05		1
Cavan	36C02		3
Cullies	36C03		3
Dromore	36D02		1
Erne	36E01	1	2
Madabawn Stream	36M02		1
Templeport Lake Stream	36T01		1

## Clare County Council

### SUMMARY OF WATER QUALITY STATUS

- Currently 69.9 per cent of stations are of satisfactory water quality, which is the same as that pertaining during the 1995-97 baseline survey.
- Of stations monitored in 2001-2003, 55.8 per cent comply with the standards set in the Regulations, down 14.1 per cent from the baseline period.
- 55.8 per cent of stations meet the biological targets of the Regulations, down 14.1 per cent from the baseline period.
- There has been a significant decline in the number of high quality Q5 stations from 15 in the baseline survey to 5 currently.
- 14 out of 65 lakes currently monitored in the County are non-compliant with the Regulations (Ballard, Ballybeg, Ballycullinan, Ballydoolavan, Bridget, Castle, Curtins, Farihy, Goller, Killone, Lickeen, Lisnahan, Moanmore, Rosconnell).

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Graney (Shannon)	25G04	1	
Scarriff Stream	25S08		1
Broadford	27B02	1	
Castlelodge	27C01		1
Clooneen (Clare)	27C03		1
Cragaunboy	27C04		1
Crompaun West	27C05		2
Clareen (Fergus)	27C06		1
Carrownanelly	27C07		1
Cloverhill Stream	27C10		1
Cloondanagh Lough Stream	27C13		1
Doonaha	27D01		3
Fergus	27F01		2
Liskenny	27L01		3
Moyarta	27M01		2
Owenogarney	27O01		1
Wood	27W01		3
Annageeragh	28A02		1
Ballymacravan	28B02		1
Freagh	28F01		1

## Cork County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been an improvement in the number of stations of satisfactory water quality with 81.1 per cent of stations currently of satisfactory quality compared to 77.4 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 73.7 per cent comply with the standards set in the Regulations, down 3.7 per cent from the baseline period.
- 68.6 per cent of stations meet the biological targets of the Regulations, down 8.8 per cent from the baseline period.
- There has been a significant decline in the number of high quality Q5 and Q4-5 stations from 123 in the baseline survey to 93 currently.
- There has been an increase in the number of seriously polluted stations from 1 in the baseline survey to 3 currently.
- 7 out of 24 lakes currently monitored in the County are non-compliant with the Regulations (Abisdealy, Allua, Ballin, Druminidy, Drumbrow, Iniscarra, Shreelane).

#### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Awbeg (Buttevant)	18A05		3
Blackwater (Munster)	18B02	1	
Blackwater (Munster)	18B02		1
Bride (Waterford)	18B05		1
Brogeen	18B06	1	1
Ballyclogh stream	18B08		1
Dalua	18D01		2
Douglas (Bride)	18D02		1
Finnow (Blackwater)	18F03		1
Flesk (Bride)	18F04		2
Funshion	18F05		1
Bride (Lee)	19B04	1	
Butlerstown	19B06		1
Dungourney	19D07		1
Lee (Cork)	19L03		1
Martin	19M01		1
Womanagh	19W01		1
Bandon	20B02		1
Minane	20M01		1
Charleville stream	24C02		2
Maigue	24M01		1

## **Cork City Council**

### **SUMMARY OF WATER QUALITY STATUS**

- The EPA has no biological monitoring stations in the functional area of Cork City.
- One lake, known as The Lough, must be maintained at mesotrophic status under the Regulations. Most recent monitoring indicates that it is currently of status and is therefore with the Regulations.

## Donegal County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a slight improvement in the number of stations of satisfactory water quality with 78.8 per cent of stations currently of satisfactory quality compared to 77.9 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 52.4 per cent comply with the standards set in the Regulations, down 25.5 per cent from the baseline period.
- 52.4 per cent of stations meet the biological targets of the Regulations, down 25.5 per cent from the baseline period. This reflects the overall decline in quality of many stations since the Regulations were introduced.
- There has been a significant decline in the number of high quality Q5 stations from 29 in the baseline survey to 11 currently.
- There has been an increase in the number of seriously polluted stations from 11 in the baseline survey to 13 currently. Donegal has by far the highest number of seriously polluted river stations in the country, comprising 27 per cent of the national total.
- 3 out of 99 lakes currently monitored in the County are non-compliant with the Regulations (Columbkille (Milford), Kindrum, New).

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Bunadaowen	01B01		1
Burn Daurnett	01B02		2
Carrigans	01C01		2
Deele (Donegal)	01D01		1
Finn (Donegal)	01F01		1
Rough burn	01R02		1
St Johnston	01S01	1	
Swilly Burn	01S03		1
Bradoge	35B07		1
Crow	37C03		1
Stragar	37S02		1
Tullinteane	37T01	1	
Aighe	38A03	1	
Dungloe	38D02		1
Faymore	38F01		1
Keel Lough stream	38K01	1	
Murlin	38M03	2	
Owentocker	38O06		1
Stracashel	38S01		1
Tullaghobegly	38T01	1	
Aghaweel	39A01		1
Glashagh (Crana)	39G06		1
Lurgy	39L02		1
Maggy's Burn	39M01	1	
Bredagh	40B02	1	
Donagh	40D01	2	
Malin Stream	40M01		2
Roosky	40R01	2	



## Dublin City Council

### SUMMARY OF WATER QUALITY STATUS

- Currently no stations are of satisfactory water quality in the Dublin City area, which is the same situation as that pertaining during the 1995-97 baseline survey.
- Of stations monitored in 2001-2003, 85.7 per cent comply with the standards set in the Regulations, up 85.7 per cent from the baseline period.
- Increased compliance with the Regulations has been due to significant phosphorus reductions at most stations.
- No station complies with the biological targets of the Regulations, which is the same situation as that pertaining during the 1995-97 baseline survey.
- All river stations in the Dublin City Council area are either seriously or moderately polluted.

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

<b>River Name</b>	<b>River Code</b>	<b>No. of Stations Seriously Polluted</b>	<b>No. of Stations Moderately Polluted</b>
Camac	09C02	1	
Dodder	09D01		2
Santry	09S01	1	
Tolka	09T01		1

## Dun Laoghaire Rathdown County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a decline in the number of stations of satisfactory water quality with 16.7 per cent of stations currently of satisfactory quality compared to 33.3 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 40.0 per cent comply with the standards set in the Regulations, up 6.7 per cent from the baseline period. However, this is largely due to increased MRP monitoring, rather than improvements in water quality.
- 16.7 per cent of stations meet the biological targets of the Regulations, down 16.6 per cent from the baseline period.
- There is still a relatively high proportion of stations with moderately polluted waters (4 out of 6) with only one station of satisfactory quality.

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

<b>River Name</b>	<b>River Code</b>	<b>No. of Stations Seriously Polluted</b>	<b>No. of Stations Moderately Polluted</b>
Kill Of The Grange Stream	10K02		2
Shanganagh	10S01		2

## Fingal County Council

### SUMMARY OF WATER QUALITY STATUS

- There is currently one station of satisfactory water quality compared to none in the baseline 1995-97 survey.
- Of stations monitored in 2001-2003, 50 per cent comply with the standards set in the Regulations, up 50 per cent from the baseline period.
- 44.4 per cent of stations meet the biological targets of the Regulations, up 44.4 per cent from the baseline period.
- There has been a reduction in the number of seriously polluted stations from 2 in the baseline survey to none currently.

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Ballyboghil	08B01		1
Broadmeadow	08B02		3
Delvin	08D01		2
Hurley	08H01		1
Ward	08W01		3
Mayne	09M03		1
Pinkeen	09P02		1
Tolka	09T01		2

## South Dublin County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a decline in the number of stations of satisfactory water quality with 37.5 per cent of stations currently of satisfactory quality compared to 50.0 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 83.3 per cent comply with the standards set in the Regulations, up 33.3 per cent from the baseline period. This is largely due to increased MRP monitoring.
- 43.8 per cent of stations meet the biological targets of the Regulations, down 6.3 per cent from the baseline period.
- There has been a general reduction in MRP levels recorded since 1998-2000.

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

<b>River Name</b>	<b>River Code</b>	<b>No. of Stations Seriously Polluted</b>	<b>No. of Stations Moderately Polluted</b>
Camac	09C02		2
Dodder	09D01		2
Liffey	09L01		2

## Galway County Council & Galway City Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been an improvement in the number of stations of satisfactory water quality with 64.8 per cent of stations currently of satisfactory quality compared to 59.5 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 63.9 per cent comply with the standards set in the Regulations, up 4.4 per cent from the baseline period.
- 63.9 per cent of stations meet the biological targets of the Regulations, up 4.4 per cent from the baseline period.
- There has been a serious decline in the number of high quality Q5 stations from 13 in the baseline survey to 4 currently.
- However, there has also been a significant reduction in the number of seriously and moderately polluted stations from 58 in the baseline survey to 39 currently.
- 2 out of 81 lakes currently monitored in the County are non-compliant with the Regulations (Beaghcauneen, Bhaile na Cille).

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Barnacullia Stream	25B14	1	
Coos	25C08		1
Eyrecourt Stream	25E01		3
Kilcrow	25K01		2
Lisduff (Kilcrow)	25L06		2
Lisduff Stream (Shannon)	25L07		2
Ahascragh	26A01		1
Ballinure	26B01		2
Castlegar	26C03		2
Laurencetown Stream	26L07		2
Shiven (South)	26S03		2
Suck	26S07		1
Castlelodge	27C01		2
Clarinbridge	29C02		4
Carra Stream	29C03		1
Kilcolgan	29K01		1
Owendalulleagh	29O01	1	
Toberdoney	29T01		1
Abbert	30A01		1
Bealanabrack	30B01		1
Ballycuirke	30B14		1
Grange (Galway)	30G02		1
Gortgarrow Stream	30G05		1
Terryland	30T01		1
Yellow (Sinking)	30Y01		1
Ballinaboy	32B07		1

## Kerry County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a slight decline in the number of stations of satisfactory water quality with 76.0 per cent of stations currently of satisfactory quality compared to 77.0 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 66.5 per cent comply with the standards set in the Regulations, down 10.5 per cent from the baseline period.
- 64.2 per cent of stations meet the biological targets of the Regulations, down 12.8 per cent from the baseline period.
- There has been a significant decline in the number of high quality Q4-5 stations from 70 in the baseline survey to 55 currently.
- However, there has also been a reduction in the number of seriously polluted stations from 3 in the baseline survey to 1 currently.
- 1 out of 15 lakes currently monitored in the County is non-compliant with the Regulations (Leane (Ross Bay)).

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Deenagh	22D01		1
Ferta	22F01		1
Flesk (Kerry)	22F02		1
Gweestin	22G06		1
Milltown (Kerry)	22M03		2
Owenalondrig	22O01		1
Shanowen (Kerry)	22S01		1
Brick	23B03		1
Clydagh (Feale)	23C03		1
Feale	23F01		1
Galey	23G01		1
Lee (Tralee)	23L01	1	1
Milltown House Stream	23M04		1
Tyshe	23T02		1
Tarmon Stream	23T03		1
Ballylongford	24B03		1
Tarbert	24T01		1

## Kildare County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a significant improvement in the number of stations of satisfactory water quality with 34.1 per cent of stations currently of satisfactory quality compared to 20.0 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 70.5 per cent comply with the standards set in the Regulations, up 50.5 per cent from the baseline period. This increase in compliance is partly due to increased MRP monitoring.
- 45.9 per cent of stations meet the biological targets of the Regulations, up 25.9 per cent from the baseline period. This indicates an improvement in water quality at a significant number of stations.
- There has been a significant increase in the number of high quality Q4-5 stations from 1 in the baseline survey to 5 currently.

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Blackwater (Longwood)	07B02		2
Boyne	07B04		4
Glash	07G02		2
Clonshanbo	09C03		2
Lyreen	09L02		2
Morell	09M01		2
Painstown	09P01	1	
Rye Water	09R01		3
Athy Stream	14A06		1
Figile	14F01	1	1
Greese	14G04		4
Graney (Lerr)	14G07		1
Lerr	14L01		3
Palatine Stream	14P04		1
Slate	14S01	1	2
Tully Stream	14T02	2	2

## Kilkenny County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a slight decline in the number of stations of satisfactory water quality with 37.9 per cent of stations currently of satisfactory quality compared to 40.0 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 46.9 per cent comply with the standards set in the Regulations, up 6.9 per cent from the baseline period.
- 45.3 per cent of stations meet the biological targets of the Regulations, up 5.3 per cent from the baseline period.
- There has been a significant reduction in the number of moderately polluted stations from 24 in the baseline survey to 13 currently.

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Duiske	14D04		1
Gowran	14G03	1	3
Bregagh (Kilkenny)	15B02		2
Caherlesk Stream	15C12		1
Desart Stream	15D04		2
Glory	15G01	1	
King's (Kilkenny)	15K02		1
Nore	15N01	1	1
Nuenna	15N02		1
Blackwater (Kilmacow)	16B02		1



## Laois County Council

### SUMMARY OF WATER QUALITY STATUS

- Currently 48.5 per cent of stations are of satisfactory water quality, which is the same as that pertaining during the 1995-97 baseline survey.
- Of stations monitored in 2001-2003, 66.0 per cent comply with the standards set in the Regulations, up 17.5 per cent from the baseline period. However, this increase in compliance is largely due to increased MRP monitoring, rather than improvements in water quality.
- 51.5 per cent of stations meet the biological targets of the Regulations, up 3.0 per cent from the baseline period.
- There has been a reduction in the number of high quality Q5 stations from 3 in the baseline survey to 1 currently.

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

<b>River Name</b>	<b>River Code</b>	<b>No. of Stations Seriously Polluted</b>	<b>No. of Stations Moderately Polluted</b>
Barrow	14B01		1
Crooked (Stradbally)	14C02		1
Dunrally Stream	14D05		1
Stradbally (Laois)	14S02		2
Triogue	14T01		4
Ballyroan	15B01		2
Cappanacloghy	15C06	2	1
Erkina	15E01		1
Gully	15G03		2
Rathdowney Stream	15R03		2

## Leitrim County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a slight decline in the number of stations of satisfactory water quality with 78.4 per cent of stations currently of satisfactory quality compared to 79.5 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 64.4 per cent comply with the standards set in the Regulations, down 15.1 per cent from the baseline period.
- 60.2 per cent of stations meet the biological targets of the Regulations, down 19.3 per cent from the baseline period. This reflects the overall decline in quality of many stations since the Regulations were introduced.
- There has been a significant reduction in the number of high quality Q5 stations from 10 in the baseline survey to 4 currently.
- 9 out of 30 lakes currently monitored in the County are non-compliant with the Regulations (Bran, Calloughs, Drumlahen, Fenagh, Gangin, Gulladoo, Rowan, Acres, Tully).

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Rinn	26R02		2
Shannon (Upper)	26S02		1
Annadale Stream	36A05		1
Cullies	36C03		1
Laheen Stream	36L02		3
Legga Stream	36L03		1

## Limerick County Council

### SUMMARY OF WATER QUALITY STATUS

- Currently 45.5 per cent of stations are of satisfactory water quality, which is the same as that pertaining during the 1995-97 baseline survey.
- Of stations monitored in 2001-2003, 51.5 per cent comply with the standards set in the Regulations, up 6.0 per cent from the baseline period.
- 50.8 per cent of stations meet the biological targets of the Regulations, up 5.3 per cent from the baseline period.
- There has been a significant reduction in the number of high quality Q5 and Q4-5 stations from 18 in the baseline survey to 11 currently.
- However, there has been a reduction in the number of seriously polluted stations, down from 4 in the baseline survey to 2 currently.
- Both lakes currently monitored in Limerick are compliant with the Regulations.

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Aherlow	16A01		1
Feale	23F01		1
Ahacronane	24A01		2
Ahavarraga Stream	24A02	1	1
Barnakyle	24B05		2
Bunoke	24B06		3
Broadford Stream	24B07		1
Charleville Stream	24C02		2
Clonshire	24C03		5
Deel (Newcastlewest)	24D02		6
Greanagh	24G05		1
Loobagh	24L01	1	2
Lismakeery Stream	24L03		1
Maigne	24M01		2
Mahore	24M04		1
Shanagolden Stream	24S02		2
Groody	25G05		2

## Longford County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a significant improvement in the number of stations of satisfactory water quality with 48.6 per cent of stations currently of satisfactory quality compared to 37.8 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 62.2 per cent comply with the standards set in the Regulations, up 24.4 per cent from the baseline period. This increase in compliance is partly due to increased MRP monitoring.
- 45.9 per cent of stations meet the biological targets of the Regulations, up 8.1 per cent from the baseline period.
- 6 out of 10 lakes currently monitored in the County are non-compliant with the Regulations (Annagh, Corbeagh, na Bach, Gowna, Kinale, Tully).

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Black (Westmeath)	26B05		1
Camlin	26C01		3
Rhine	26R04	1	1
Shannon (Upper)	26S02		1
Cullies	36C03		1
Legga Stream	36L03		1

## Louth County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a slight improvement in the number of stations of satisfactory water quality with 43.6 per cent of stations currently of satisfactory quality compared to 41.0 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 59.1 per cent comply with the standards set in the Regulations, up 18.1 per cent from the 1998-2000 period. However, this increase in compliance is largely due to increased MRP monitoring, rather than improvements in water quality.
- 41.0 per cent of stations meet the biological targets of the Regulations, which is the same as that in the baseline period.
- There has been a reduction in the number of high quality Q4-5 stations, from 7 in the baseline survey to 4 currently.
- The only lake monitored in the county (Killaneer Lake) is non-compliant with the Regulations.

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Ballymascanlan	06B02	1	
Ballykelly	06B03		1
Castletown	06C01		1
Dee	06D01		3
Flurry	06F02		3
Proules	06P01		1
Raskeagh	06R02		1
Termonfeckin	06T01		1

## Mayo County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been an improvement in the number of stations of satisfactory water quality with 76.4 per cent of stations currently of satisfactory quality compared to 73.6 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 70.4 per cent comply with the standards set in the Regulations, down 3.2 per cent from the baseline period.
- 70.7 per cent of stations meet the biological targets of the Regulations, down 2.9 per cent from the baseline period.
- There has been a reduction in the number of high quality Q5 stations, from 14 in the baseline survey to 10 currently.
- However, there has been a reduction in the number of moderately polluted stations, from 33 in the baseline survey to 21 currently
- There has also been a reduction in the number of seriously polluted stations, from 4 in the baseline survey to 1 currently.
- 3 out of 24 lakes currently monitored in the County are non-compliant with the Regulations (Carrowmore, Cross, Knappaghbeg).

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Ballindine	30B03		2
Cloondaver Stream (North)	30C09		1
Claureen (Mayo)	30C12		1
Dalgan	30D01		1
Owenbrin	30O01		1
Robe	30R01		1
Goulaun	32G06		1
Owenwee (Mayo)	32O06		1
Ballinglen	33B01		1
Bellagarvaun	33B04		1
Cartron	33C02		1
Clooneen (Mayo)	33C03		1
Gweedaney	33G06		1
Castlebar	34C01		2
Glore (Mayo)	34G02		1
Loughnaminoe Stream	34L04	1	
Meander	34M05		1
Swinford	34S05		1
Slieveclaur	34S06		1
Yellow (Knock)	34Y02		1

## Meath County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been an improvement in the number of stations of satisfactory water quality with 24.8 per cent of stations currently of satisfactory quality compared to 21.9 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 54.1 per cent comply with the standards set in the Regulations, up 32.2 per cent from the baseline period. This increase in compliance is partly due to increased MRP monitoring.
- 41.9 per cent of stations meet the biological targets of the Regulations, up 20.0 per cent from the baseline period. This indicates an improvement in water quality at a significant number of stations since the Regulations were introduced.
- There has also been a reduction in the number of seriously polluted stations, from 6 in the baseline survey to 1 currently.
- 4 out of 8 lakes currently monitored in the County are non-compliant with the Regulations (Balrath, Bracken, Sheelin, Whitewood).

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Dee	06D01		1
Athboy	07A01		2
Blackwater (Kells)	07B01		1
Blackwater (Longwood)	07B02		1
Boycetown	07B03		2
Boyne	07B04		1
Castlejordan	07C04		2
Kinnegad	07K01		1
Knightsbrook	07K02		1
Moynalty	07M03		1
Skane	07S01		2
Yellow (Blackwater)	07Y01		1
Broadmeadow	08B02		4
Delvin	08D01		2
Fairycastle Stream	08F01		1
Hurley	08H01		1
Mosney	08M02		1
Nanny (Meath)	08N01	1	3
Rye Water	09R01		2
Tolka	09T01		2
Inny	26I01		3

## Monaghan County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a decline in the number of stations of satisfactory water quality with 25.0 per cent of stations currently of satisfactory quality compared to 30.9 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 38.2 per cent comply with the standards set in the Regulations, up 7.5 per cent from the baseline period. This increase in compliance is largely due to increased MRP monitoring.
- 25.4 per cent of stations meet the biological targets of the Regulations, down 5.9 per cent from the baseline period.
- There has been a reduction in the number of high quality Q5 and Q4-5 stations, from 12 in the baseline survey to 6 currently.
- 31 out of 52 lakes currently monitored in the County are non-compliant with the Regulations (Annamakerrig, Ballagh, Baraghy, Bawn, Corcaghan, Corkeeran, Creeve Upr, Crinkill, Drum, Drumgole, Drumlona, Drumsaul, Eigish, Feagh, Glaslough, Greagh, Grove, Inner, Lambes, Maherarney, Major, Meenish, Minor, Moynalty, Morne, Muckno, Muckno Mill, Mullanary, Oony, Skerrig Res., Toghan).

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Blackwater (Monaghan)	03B01		4
Clontibret Stream	03C01		3
Conawary (Lower)	03C02		2
Mountain Water	03M01		2
County Water	06C03		3
Fane	06F01		6
Proules	06P01		2
Avaghon Lake Stream	36A07		2
Bunnoe	36B05		3
Conawary (Upper)	36C11		2
Dromore	36D02		5
Finn (Monaghan)	36F01		4
Knappagh	36K01		1
Magherarney	36M01	1	1
Maghery (Magherarney)	36M03		3



## Offaly County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a significant decline in the number of stations of satisfactory water quality with 34.7 per cent of stations currently of satisfactory quality compared to 43.9 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 42.9 per cent comply with the standards set in the Regulations, down 1.0 per cent from the baseline period.
- 42.9 per cent of stations meet the biological targets of the Regulations, down 1.0 per cent from the baseline period.
- There has been a reduction in the number of high quality Q5 and Q4-5 stations, from 13 in the baseline survey to 9 currently.
- However, there has been a reduction in the number of seriously polluted stations, from 4 in the baseline survey to 1 currently.
- There is only one lake currently monitored in the county (Pallas Lake) and it is compliant with the Regulations.

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Boyne	07B04		2
Castlejordan	07C04		1
Yellow (Castlejordan)	07Y02		1
Cushina	14C04		1
Daingean	14D06		4
Figile	14F01		1
Brosna	25B09		2
Ballynagrenia Stream	25B16		1
Durrow Abbey Stream	25D12		1
Derrycooly Stream	25D13		1
Golden Grove Stream	25G06		2
Little Brosna	25L02		3
Moate Stream	25M05		1
Rock (Birr)	25R02		1
Silver (Kilcormac)	25S02		1
Silver (Tullamore)	25S03		2
Tullamore	25T03	1	2

## Roscommon County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been an improvement in the number of stations of satisfactory water quality with 61.7 per cent of stations currently of satisfactory quality compared to 54.2 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 78.9 per cent comply with the standards set in the Regulations, up 24.7 per cent from the baseline period. This increase in compliance is partly due to increased MRP monitoring.
- 63.3 per cent of stations meet the biological targets of the Regulations, up 9.1 per cent from the baseline period.
- There has been a significant increase in the number of high quality Q4-5 stations, from 13 in the baseline survey to 26 currently.
- There has been a reduction in the number of moderately and seriously polluted stations, from 39 in the baseline survey to 25 currently.
- All 32 lakes currently monitored in the county are compliant with the Regulations.

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Carricknabraher	26C02		1
Cross (Roscommon)	26C10		1
Curraghroe Stream	26C15		2
Clogher (Roscommon)	26C18		1
Derryhippoo	26D01		1
Feorish (Tarmonbarry)	26F03		2
Hind	26H01		3
Jiggy (Hind)	26J01	1	1
Killukin	26K02		2
Lissaphobble	26L04		1
Mihanboy	26M04		1
Mantua Stream	26M13		1
Owenur	26O06		1
Shannon (Upper)	26S02		2
Smaghraan	26S04		1
Suck	26S07		1
Strokestown	26S08		2

## Sligo County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been an improvement in the number of stations of satisfactory water quality with 82.1 per cent of stations currently of satisfactory quality compared to 78.9 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 68.4 per cent comply with the standards set in the Regulations, down 10.5 per cent from the baseline period.
- 67.4 per cent of stations meet the biological targets of the Regulations, down 11.5 per cent from the baseline period. This decline can be largely accounted for by the significant number of baseline Q4-5 stations that have declined in quality since the Regulations were introduced.
- There has been an increase in the number of high quality Q5 stations, from 2 in the baseline survey to 5 currently.
- There has been a reduction in the number of moderately polluted stations, from 9 in the baseline survey to 5 currently.
- 1 out of the 13 lakes currently monitored in the County is non-compliant with the Regulations (Gill).

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

<b>River Name</b>	<b>River Code</b>	<b>No. of Stations Seriously Polluted</b>	<b>No. of Stations Moderately Polluted</b>
Moy	34M02		2
Tubbercurry	34T02	1	1
Bunnanaddan Stream	35B08		1
Gurteen Stream	35G05		1

## North Tipperary County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a significant improvement in the number of stations of satisfactory water quality with 42.1 per cent of stations currently of satisfactory quality compared to 36.4 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 65.3 per cent comply with the standards set in the Regulations, up 28.9 per cent from the baseline period. This increase in compliance is partly due to increased MRP monitoring.
- 46.3 per cent of stations meet the biological targets of the Regulations, up 9.9 per cent from the baseline period.
- There has been a significant decrease in the number of high quality Q5 stations, from 5 in the baseline survey to none currently.
- There is only one lake currently monitored in the county (Lough Derg) and it is compliant with the Regulations.

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Nore	15N01		1
Black (Twomileborris)	16B01		2
Borrisoleigh Stream	16B06		1
Clover	16C04		1
Drish	16D02		2
Farneybridge	16F02		2
Rossestown	16R01		3
Suir	16S02		2
Ardgregane Stream	25A04		1
Ballintotty	25B01		1
Ballyfinboy	25B02		1
Bunow	25B25		2
Carrigahorig Stream	25C16		2
Golden Grove Stream	25G06		1
Kilmastulla	25K04		3
Lorrha Stream	25L05		2
Ollatrim	25O01		1
Pallas	25P01		2
Yellow (Kilmastulla)	25Y01	1	2

## South Tipperary County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a decline in the number of stations of satisfactory water quality with 58.8 per cent of stations currently of satisfactory quality compared to 62.3 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 66.7 per cent comply with the standards set in the Regulations, up 4.4 per cent from the baseline period.
- 62.3 per cent of stations meet the biological targets of the Regulations, the same as that in the baseline period.

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Aherlow	16A01		1
Anner	16A02		3
Ara	16A03		2
Black Stream (Cashel)	16B05		1
Clashawley	16C01		3
Moyle	16M01		3
Outeragh Stream	16O01		2
Rossadrehid Stream	16R06		1
Suir	16S02		2
Cappawhite Stream	25C10		2

## Waterford County Council

### SUMMARY OF WATER QUALITY STATUS

- Currently 74.7 per cent of stations are of satisfactory water quality, which is the same as that pertaining during the 1995-97 baseline survey.
- Of stations monitored in 2001-2003, 67.1 per cent comply with the standards set in the Regulations, down 7.6 per cent from the baseline period.
- 64.6 per cent of stations meet the biological targets of the Regulations, down 10.1 per cent from the baseline period. This decline can be largely accounted for by the significant number of baseline Q4-5 stations that have declined in quality since the Regulations were introduced.
- 3 out of 65 lakes currently monitored in the County are non-compliant with the Regulations (Ballyshunnock, Coumduala, Deelish).

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Clodiagh (Portlaw)	16C03		1
Halfway House Stream	16H02	1	
Suir	16S02		2
Brickey	17B01		1
Leperstown Stream	17L01		1
Owbeg (Waterford)	18O02		1

## **Waterford City Council**

### **SUMMARY OF WATER QUALITY STATUS**

- There are no EPA monitored river stations or lakes within the functional area of Waterford City Council that currently come under the Regulations.
- However, Waterford City Council provides data from stations on the St John's River and the River Suir.

## Westmeath County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a significant decline in the number of stations of satisfactory water quality with 20.6 per cent of stations currently of satisfactory quality compared to 27.9 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 71.8 per cent comply with the standards set in the Regulations, up 43.9 per cent from the baseline period. However, this increase in compliance is largely due to increased MRP monitoring, rather than improvements in water quality.
- 25.0 per cent of stations meet the biological targets of the Regulations, down 2.9 per cent from the baseline period.
- There has been a decrease in the number of high quality Q4-5 stations, from 5 in the baseline survey to 2 currently.
- There has been an increase in the number of moderately polluted stations, from 10 in the baseline survey to 24 currently.
- However, there has been a decrease in the number of seriously polluted stations, from 4 in the baseline survey to 1 currently.
- 2 out of the 12 lakes currently monitored in the County are non-compliant with the Regulations (Mount Dalton, Sheelin).

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Deel (Raharney)	07D01		1
Kinnegad	07K01		1
Milltownpass	07M04		1
Riverstown	07R01		3
Rochfortbridge Stream	07R04		1
Brosna	25B09	1	5
Ballynagrenia Stream	25B16		1
Dysart Stream (Lough Ennell)	25D05		1
Moate Stream	25M05		2
Syonan Castle Stream	25S04		1
Black (Westmeath)	26B05		2
Dungolman	26D06		1
Gaine	26G01		3
Yellow (Castlepollard)	26Y02		1



## Wexford County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a significant improvement in the number of stations of satisfactory water quality with 54.2 per cent of stations currently of satisfactory quality compared to 40.2 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 60.2 per cent comply with the standards set in the Regulations, up 20.0 per cent from the baseline period.
- 57.9 per cent of stations meet the biological targets of the Regulations, up 17.7 per cent from the baseline period. This indicates an improvement in water quality at a significant number of stations since the Regulations were introduced.
- There has been an increase in the number of high quality Q5 stations, from none in the baseline survey to 2 currently.
- There has been a decrease in the number of moderately and seriously polluted stations, from 34 in the baseline survey to 24 currently.

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

River Name	River Code	No. of Stations Seriously Polluted	No. of Stations Moderately Polluted
Aughboy (Wexford)	11A02	1	
Ballyedmond	11B01		1
Banoge	11B02		2
Blackwater (Wexford)	11B03		3
Clonough	11C01		4
Inch (Wexford)	11I01		1
Owenvorragh	11O01		3
Tinnock	11T01		1
Bann	12B01		1
Blackwater Stream (Bann)	12B08		1
Corbally Stream	12C04		2
Glasha (Slaney)	12G01		2
Duncormick	13D01		1
Aughnacrew	14A07		1

## Wicklow County Council

### SUMMARY OF WATER QUALITY STATUS

- Since 1995-1997 there has been a significant decline in the number of stations of satisfactory water quality with 69.9 per cent of stations currently of satisfactory quality compared to 76.7 per cent in the baseline survey.
- Of stations monitored in 2001-2003, 54.8 per cent comply with the standards set in the Regulations, down 21.9 per cent from the baseline period.
- 54.4 per cent of stations meet the biological targets of the Regulations, down 22.3 per cent from the baseline period.
- There has been a significant decrease in the number of high quality Q4-5 stations, from 33 in the baseline survey to 22 currently.
- However, there has been a decrease in the number of seriously polluted stations, from 2 in the baseline survey to 0 currently.
- All 8 lakes currently monitored in the county are compliant with the Regulations.

### COUNTY RIVERS WITH SERIOUSLY OR MODERATELY POLLUTED STATIONS IN 2001-03

<b>River Name</b>	<b>River Code</b>	<b>No. of Stations Seriously Polluted</b>	<b>No. of Stations Moderately Polluted</b>
Glashaboy Brook	09G02		1
Aughrim (Wicklow)	10A02		1
Avonbeg	10A04		2
Glenealo	10G05		1
Newcastle (Wicklow)	10N01		2
Newtownmountkennedy	10N02		2
Templerrainy Stream	10T04		2
Shillelagh	12S01		1
Greese	14G04		2