

A RIVER WATER QUALITY MONITORING STRATEGY FOR NORTHERN IRELAND

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RIVER WATER QUALITY MONITORING STATEMENT

Environment and Heritage Service (EHS) is committed to chemical and biological monitoring of all significant waterways in Northern Ireland (NI) in line with national and international classification schemes and agreements.

Since 2000, those rivers in the main arterial network having a mean width of more than 3.0 m have been monitored both biologically and chemically for General Quality Assessment (GQA) parameters. This programme is augmented by limited macrophyte surveys at approximately 430 sites at nationally defined intervals. Together this classifies approximately 4,200 km of waterway. The main arterial network is also monitored chemically as required by local, national and international legislation.

In addition since 2000, the quality of minor waterways (1.5-3.0 m wide) has been assessed biologically based on annual samples from approximately 180 sites. This has resulted in a further 1,000 km being classified biologically. EHS may also undertake proactive and impact assessment surveys as required.

1. INTRODUCTION

Some 15,445 km of waterways appear on the 1:50,000 Ordnance Survey (OS) Map of NI. Rivers are important natural resources particularly for agriculture, fisheries, recreational use, amenity value and as sources of drinking water. Approximately 13% of drinking water in NI is abstracted from rivers, and many waterways also support ecological habitats and species of national and international importance.

Some of these uses can threaten the water quality of the rivers on which they depend,

and there may be pollution from other activities in the surrounding catchment. Pollution can be from point sources such as industrial or sewage effluent discharges, or can be diffuse such as road or agricultural run-off. Ultimately the pollution entering rivers can make its way to the marine environment to adversely affect estuarine and coastal water quality.

It is important that rivers are protected from pollution and managed as a sustainable resource for all of the activities that depend on their water quality. Historically river water quality classification has focused on chemical quality. For a number of reasons there is a growing emphasis on the use of biological indicators as a measure of the ecological quality or health of surface waters including rivers.

This document sets out the history of the development of the monitoring programme for rivers in NI since 1972. It looks at the reasons why EHS carries out the monitoring currently undertaken and outlines the results of a review of the network undertaken in 1999 and implemented in 2000.

2. LEGISLATIVE FRAMEWORK

Environmental Policy in NI has evolved over a long period through a series of legislative, institutional and programme developments.

Recent specialised environmental legislation arises from European Community (EC) Directives. There are several types of EC legislation known as Regulations, Directives, Decisions and Recommendations. However, the primary instruments are the Directives, and those that are driving the requirement to monitor river water quality are outlined below.

2.1 EC Legislation

Council Directive concerning the quality required of surface water intended for the abstraction of drinking water in the Member States – EC Surface Water Directive (75/440/EEC)

This Directive has two purposes:

- ◆ to ensure that surface water abstracted for use as drinking water reaches certain standards and is given adequate treatment before being put into public supply; and
- ◆ to improve rivers or other surface waters used as sources of drinking water.

Sources of surface water for the abstraction of drinking water (referred to as ‘surface water’) are to be classified by their existing quality (physical, chemical and microbiological characteristics) into three categories corresponding to the three standard methods of treatment required to transform the ‘surface water’ into drinking water. Forty-six ‘parameters’ are listed along with an imperative (I) value and a guide (G) value for each.

The Member States are required to lay down I and G values for sampling points where water is abstracted for drinking. Where no I value is given the G value provides guidance. Once values are set, Member States must monitor to ensure that 95 per cent of the samples of surface water meet the I values laid down and that 90 per cent of the samples do so for the G values.

In Northern Ireland the requirements of this Directive have been transposed into local legislation through:

- ◆ The Surface Waters (Abstraction for Drinking Water) (Classification) Regulations (NI) 1996 (SR 1996 No 603).

The Department for Regional Development’s Water Service, as the supply agency, carries out the monitoring required under these Regulations. The results are audited by EHS through a transfer of data.

Council Directive on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community - EC Dangerous Substances Directive (76/464/EEC)

This Directive sets a framework for the elimination or reduction of pollution of inland, coastal and territorial waters by certain dangerous substances. Subsequent daughter Directives set standards for particular substances. The Directive is also intended to ensure consistency in implementing various international conventions and equality in conditions of competition affecting industry in the various Member States.

An Annex to the Directive has a List I and a List II of ‘families’ and groups of dangerous substances. List I, sometimes referred to as the ‘Black List’, includes substances selected on the basis of their toxicity, persistence and bioaccumulation, eg, organohalogen and organophosphorus compounds, carcinogenic substances, and mercury and cadmium compounds. List II, sometimes called the ‘Grey List’, includes possibly less dangerous substances, such as zinc, copper and lead compounds, cyanide and ammonia.

Member States are to take appropriate steps to eliminate pollution by List I substances and to reduce pollution by List II substances. ‘Elimination’ of pollution does not necessarily mean a zero-emission, since pollution is defined

not by reference to the presence of a substance but to its effects. Discharges of both List I and List II substances are to be subject to prior authorisation by a competent authority.

Control of discharges is through the setting of uniform emission standards or quality objectives. The latter system of quality objectives is used in the UK and must be in accordance with existing Directives. This approach is conditional on the Member State proving to the European Commission that the quality objectives are being met in accordance with a monitoring procedure set up by the Council.

In Northern Ireland the requirements of this Directive have been transposed into local legislation through:

- ◆ The Surface Waters (Dangerous Substances) (Classification) Regulations (NI) 1998 (SR 1998 No 397)

Eleven river sites located at the freshwater limit of the discharge of major rivers to estuarine or coastal waters are currently monitored for List I and II substances under this legislation.

Council Directive concerning the quality of bathing water - EC Bathing Water Directive (76/160/EEC).

The purpose of this Directive is to ensure that the quality of bathing water is improved over time, and maintained, not just to protect public health but also for reasons of amenity. Bathing water is defined as fresh or seawater in which bathing is explicitly authorised, or is not prohibited and is traditionally practised by a large number of bathers.

An Annex lists 19 physical, chemical and microbiological parameters, against 13 of which are indicated I and/or G values. The most important of these values are the total and faecal coliform counts. The Member States must set values which bathing water must meet, the values being no less stringent than the I values, with the G values being observed as guidelines.

The Directive lays down minimum sampling frequencies and specifies where and how samples are to be taken. Some parameters, such as *streptococci*, *Salmonellae* and enteroviruses, have to be checked when there is reason to suppose that they are present. However, it is now recognised

that faecal streptococci are a reliable indicator of faecal contamination and they are now monitored regularly by most Member States. A review of the Bathing Water Directive is currently taking place based on an *in situ* assessment approach.

In Northern Ireland the requirements of this Directive have been transposed into local legislation through:

- ◆ The Quality of Bathing Waters Regulations (NI) 1993 (SR 1993 No 205).

To date no inland bathing waters have been identified in Northern Ireland and there is therefore no requirement at present to monitor rivers under this legislation.

Council Directive on the quality of freshwaters needing protection or improvement in order to support fish life- EC Freshwater Fish Directive (78/659/EEC)

This Directive sets standards of water quality for the protection of coarse and game fisheries, together with monitoring requirements. The Member States are to designate freshwaters needing protection or improvement in order to support fish life. Two categories of water are to be designated: suitable for salmonids (salmon, trout) and suitable for cyprinids (coarse fish). An Annex sets out 14 physical and chemical parameters against which are listed separate I and G values for salmonid and cyprinid waters. Member States are to set values no less stringent than the I values and 'shall endeavour to respect' the G values.

Member States are to establish pollution reduction programmes and are to ensure that within five years of designation the waters conform to the values set. Minimum sampling frequencies are given but where the water quality is good, sampling frequency may be reduced. If sampling shows that a set value is not being met, appropriate measures are to be taken.

In Northern Ireland the requirements of this Directive have been transposed into local legislation through:

- ◆ The Surface Waters (Fishlife) (Classification) Regulations (NI) 1997 (SR 1997 No 488).

There are currently 1062 km of waterway designated as salmonid and a further 129 km designated as cyprinid under this legislation.

These are monitored on a monthly basis for the parameters in Appendix 1 to assess compliance with the Directive.

Council Directive concerning the protection of waters against pollution caused by nitrates from agricultural sources - EC Nitrate Directive (91/676/EEC)

This Directive seeks to reduce or prevent the pollution of water caused by the application and storage of inorganic fertiliser and manure on farmland. It is intended both to safeguard drinking water supplies and to prevent wider ecological damage in the form of the eutrophication of freshwater and marine waters generally.

Member States are to identify waters actually or potentially affected by pollution from nitrates. These are to include:

- ◆ surface freshwaters, in particular (though not exclusively) those for the abstraction of drinking water, where nitrate concentrations do or may exceed limits in the EC Surface Water Directive (75/440/EEC); and
- ◆ freshwater lakes, other freshwater bodies, estuaries, coastal waters and marine waters that are or may become eutrophic.

All known areas of land which drain into waters identified in this way and contributing to pollution must be designated by Member States as 'nitrate vulnerable zones' (NVZs). The identification is to be reviewed and if necessary revised at least every four years.

Action Programmes relating to NVZs must be established within two years of designation and revised at least every four years. For the purpose of designating and reviewing NVZs, Member States had to undertake before December 1993 a one-year programme to monitor surface waters and groundwaters, which is to be repeated every four to eight years, depending on the level of nitrate pollution. Every four years the eutrophic state of freshwaters, estuaries and coastal waters must also be reviewed.

In Northern Ireland the requirements of this Directive have been transposed into local legislation through:

- ◆ The Protection of Water against Agricultural Nitrate Pollution Regulations (NI) 1996. (SR 1996 No 217)

- ◆ The Protection of Water against Agricultural Nitrate Pollution (Amendment) Regulations (NI) 1997 and 1999. (SR 1997 No 256 and 1999 No 3)
- ◆ The Action Programme for Nitrate Vulnerable Zones Regulations (NI) 1999. (SR 1999 No 156)

Three NVZs have been designated in Northern Ireland under this legislation based on nitrate levels in groundwaters.

To date no surface water NVZs have been designated in NI under this legislation. Nitrate levels are monitored at approximately 250 river sites on a monthly basis.

Council Directive concerning urban waste water treatment – EC Urban Waste Water Directive (91/271/EEC)

This Directive seeks to reduce the pollution of freshwater, estuarial and coastal waters by domestic sewage, industrial waste water and rainwater run-off (collectively, 'urban waste water'). It sets minimum standards, and timetables for their achievement, for the collection, treatment and discharge of urban waste water.

All towns and villages ('agglomerations') with a population equivalent (pe) greater than 2000 are required to have collecting (sewerage) systems by the end of either the year 2000 or 2005, depending on their size. Urban waste water entering these collecting systems is to be subject to treatment requirements which generally become more stringent the larger the agglomeration. Waste water is normally to be subject to a minimum of secondary treatment, a process generally involving biological treatment with a secondary settlement. Deadlines for the installation of secondary treatment systems vary with the size of the population served.

Higher, or tertiary, standards of treatment are required for discharges to sensitive areas. They include waters subject to eutrophication (in which case significant reductions of nitrates and/or phosphates are required); surface waters with high nitrate levels intended for the abstraction of drinking water; and other waters where higher treatment standards are necessary to fulfil the requirements of other Community Directives.

In Northern Ireland the requirements of this Directive have been transposed into local legislation through:

◆ The Urban Waste Water Treatment Regulations (NI) 1995 (SR 1995 No 12).

Lough Neagh and Lower and Upper Lough Erne have been identified as Sensitive Areas under this legislation and all of the larger waste water treatment works discharging within these catchments are subject to nutrient removal. Consideration is being given to further identifications of Sensitive Areas.

Directive establishing a framework for Community action in the field of Water Policy – EC Water Framework Directive (2000/60/EC)

This Directive will promote an integrated approach to groundwater and surface water protection within river basins. River Basin Management Plans (RBMPs) will be established and reviewed every six years. Member States will have to achieve the objectives of ‘good surface water’ status, preventing the deterioration and pollution of surface waters and restoring surface waters at the latest 15 years after the Directive is published. Dates are also given for the repeal of a number of other Directives. ‘Good surface water’ is defined as the status achieved by the surface water body when both its ecological status and chemical status are at least good.

The Directive will require Member States to establish a register of areas designated as requiring special protection under specific Community legislation or for the conservation of habitats or species directly depending on water. In this way, this Directive will integrate the requirements of some of the repealed water quality Directives along with requirements under the EC Birds (79/409/EEC) and the EC Habitats (92/43/EEC) Directives. Member States must also achieve compliance with any standards and objectives relating to these protected areas 15 years after adoption unless otherwise specified in other Community legislation. Some of the Special Protection Areas (SPAs) and candidate Special Areas of Conservation (SACs) created under these Directives and which will form the Natura 2000 sites in NI, will have a river water dependent element in their designation.

The requirements of the EC Habitats Directive have been transposed into local legislation through:

◆ The Conservation (Natural Habitats, etc)

Regulations (Northern Ireland) 1995 (SR1995 No 380)

Member States will have to establish monitoring programmes in order to produce coherent and comprehensive overviews of water status in each river basin. Surface water monitoring programmes will have to cover monitoring of ecological and chemical status and will have to be supplemented by further specifications for special protection areas. These programmes must be in place, at the latest, six years following adoption.

Surface water bodies including rivers will be characterised into types, and reference conditions specific to each river type must then be established representing the elements expected at high ecological status. Information must then be collected about the pressures on river water quality and an assessment of impact carried out. The ecological quality of rivers will then be expressed as ecological quality ratios. These ratios will represent the relationship between the values observed for a given river or river reach and that expected for these values in the reference conditions for high ecological status. Each Member State will divide its ecological quality ratio scale into five classes ranging from high to bad ecological status. An intercalibration exercise will be conducted to define boundaries between classes throughout each ecoregion defined in the Directive.

The Directive lists the hydromorphological, physicochemical and biological elements to be monitored in rivers (Appendix 2). Member States will have to establish three types of monitoring programme. Surveillance monitoring is the first of these and is required to provide information for:

- ◆ supplementing and validating the impact assessment procedure;
- ◆ the efficient and effective design of future monitoring programmes;
- ◆ the assessment of long term change in natural conditions; and
- ◆ the assessment of long term changes resulting from widespread anthropogenic activity.

Surveillance monitoring must be carried out at sufficient surface water bodies to provide an

assessment of the overall surface water status, and the Directive describes criteria for selection of appropriate bodies. For rivers these include:

- ◆ the rate of water flow is significant within the river basin district, including points on large rivers where the catchment area is greater than 2,500 km²;
- ◆ significant bodies of water crossing Member State boundaries;
- ◆ sites identified under the Information Exchange Decision 77/795; and
- ◆ such other sites as are required to estimate the pollutant load which is transferred across Member State Boundaries, and which is transferred into the marine environment.

Surveillance monitoring must be carried out for each monitoring site for a period of one year during the six year period of the RBMP for all the parameters outlined in Appendix 2. Parameters indicative of physicochemical quality elements should be monitored at the frequency shown in Appendix 3, whilst hydromorphological and biological elements should be monitored at least once during the period. This monitoring can be reduced if the previous surveillance monitoring determined the body to be in good status and if a review of impact of human activity reveals no changes.

The second type of programme is operational monitoring and must be undertaken to:

- ◆ establish the status of those bodies identified as being at risk of failing to meet their environmental objectives; and
- ◆ assess any changes in the status of such bodies resulting from the programmes of measures.

Frequencies of operational monitoring should ensure sufficient data for a reliable assessment of the status of the relevant quality element and as a guideline should take place at intervals not exceeding those in Appendix 3.

The third type of programme is investigative monitoring which must be undertaken:

- ◆ where the reason for exceedences is unknown;
- ◆ where the surveillance monitoring indicates that the objectives for a body of water are not

likely to be achieved and operational monitoring has not already been established, in order to ascertain the causes of a water body failing to achieve environmental objectives; or

- ◆ to ascertain the magnitude and impacts of accidental pollution.

Additional monitoring may be carried out for protected areas, in particular:

- ◆ bodies of water designated under the EC Surface Water Directive providing more than 100 m³ /day as an average; and
- ◆ habitat and species protection sites.

Standard methodologies for sampling and monitoring are specified for macroinvertebrates, physicochemical and hydromorphological parameters. Similar methodologies have to be developed for other biological compartments, such as macrophytes and fish. Where possible, international (ISO) or European (CEN) standards for methodologies should be used.

It should be noted in addition that artificial or heavily modified water bodies such as canals should achieve good ecological potential and that they should be monitored for quality elements of whichever of the four natural water categories most closely resembles the water body concerned.

2.2 Local Legislation

Regulations

As already mentioned, the requirements of the various EC Directives in force have been in most cases transposed into local legislation through regulations and are detailed in the relevant sections above.

Water Act (NI) 1972

Under the Water Act (NI) 1972 direct discharges to surface waters are regulated by the Department of the Environment (“the Department”). This legislation makes it unlawful, *inter alia*, for the Department to grant a consent that would permit a discharge in breach of any EC Directive. The new Water (NI) Order 1999, repeals and re-enacts with amendments the Water Act (NI) 1972. The amendments have been made to take account of changes in Departmental policies, the increase in

public environmental awareness, scientific advances and EC Directive requirements. The water quality provisions of the Order should come into operation in 2000/01. The Order enables provisions for the control of water abstraction to be made. EHS is also responsible for the implementation of this legislation.

Nature Conservation Commitments

EHS launched a 'River Conservation Strategy' in January 2001. The overall aim of this strategy is to protect, conserve and enhance the natural and built heritage values of rivers in Northern Ireland and facilitate their sustainable use. The document details the conservation value and interest of rivers in Northern Ireland along with the factors impacting upon their conservation value. The roles and responsibilities of EHS in river conservation are set out along with how these will be delivered.

In order to design a rational river monitoring programme which will satisfy the needs of EHS general water quality assessment and conservation, it will be necessary to define the relationship between water quality and habitat/species protection. To this end, EHS is committed to reviewing the possibility of using water quality monitoring data to assess compliance with conservation objectives for designated rivers.

3. REVIEW OF THE EHS RIVER WATER QUALITY MONITORING NETWORK 1972-1999

3.1 River Water Quality Monitoring 1972-1998

Chemical monitoring of rivers in NI was carried out prior to 1970 but it was only in the early 1970s that a co-ordinated programme of routine chemical monitoring evolved. From 1990, chemical monitoring of rivers has been complemented by biological monitoring.

In 1976 a working group of officials from the then Department of the Environment for NI and the then Department of Industrial and Forensic Science (DIFS) reviewed the monitoring network. At that time rivers were being monitored at 103 stations. According to the working group, the sampling stations were “located on all the main rivers, at the mouths of the rivers, on the major tributaries of the rivers and in relation to particularly significant discharges and abstractions”. The main objectives of this network appeared to be to collect background data on river water quality and to measure the impact of specific discharges. The review recommended that changes be made to both the sampling frequency and the determinands monitored.

Following the implementation of these recommendations, the monitoring network remained largely unchanged until 1983 when, in preparation for the EC Freshwater Fish Directive (78/659/EEC), 14 new stations were established on designated rivers. This Directive introduced some new determinands and reintroduced some that had been abandoned in the 1976 review. From 1983 to 1998, approximately 190 stations were further added to the network for a number of reasons.

In 1998 the main purposes of EHS river water quality monitoring activities in NI could be divided as follows:

1. quality classification;
2. to assess compliance with EC Directives and international agreements;
3. to monitor the impacts of eutrophication;
4. to monitor the effects of specific discharges;
5. to provide data for the Environmental Change Network (ECN);
6. to provide data for the UK Acid Waters Monitoring Network (UK AWMN); and
7. specific studies.

It may be appropriate at this point to briefly describe the rationale and requirements for collecting the data for each of the above purposes.

3.1.1 Quality Classification

In order to carry out its statutory duty as a manager of the aquatic environment, EHS must have reliable information on the general quality of water throughout Northern Ireland. Chemical and biological water quality classifications allow the data collected to be assessed for any geographical or temporal trends whilst the results also contribute to a UK national classification programme. Management decisions can therefore be based on sound scientific evidence.

From the late 1970s chemical water quality in NI rivers was assessed using the National Water Council (NWC) Classification system, and from 1990 biological quality was assessed using the Rivers InVertebrate Prediction and Classification System (RIVPACS). However, it was noted that the procedures used to support decisions on assigning river reaches to classes in the NWC system varied across the UK. In 1995, the General Quality Assessment (GQA) chemical classification system was adopted and the methodology was applied retrospectively to previous data sets. A GQA biological classification system was also adopted. Rivers in NI are therefore currently classified under separate GQA classification systems for chemistry and macroinvertebrate biology.

3.1.1.A Chemical GQA Classification

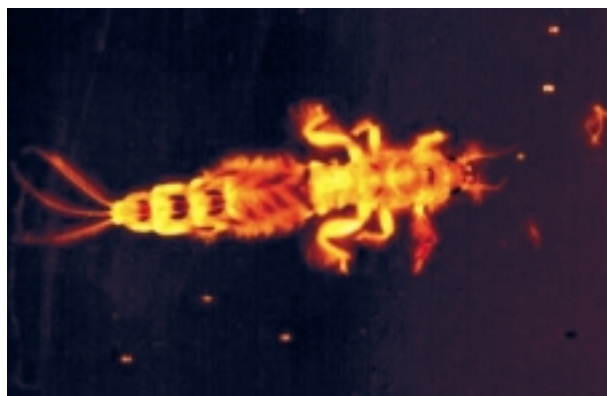
The Chemical GQA system has six classes ranging from Very Good to Bad quality, using nationally accepted criteria (Appendix 4). These classifications are based on the concentrations of biochemical oxygen demand (BOD), ammonia and dissolved oxygen (DO). BOD, ammonia and DO are indicators of organic pollution, although DO may also indicate other pollution or the influences of natural plant or algal growth. It was suggested that the Chemical GQA system would reduce the risk of chemical misclassification for a number of reasons. Firstly, the system uses the data from three years of chemical monitoring to calculate percentiles. Secondly, the water quality standards were re-defined from 95-percentiles to 90-percentiles which can be estimated with greater precision, making it easier to detect changes in quality, and are more likely to be reflective of pollution than of random environmental variability. Finally, data from previous surveys can be used to establish a baseline against which future changes that are statistically significant can be distinguished.

In 1998 there were approximately 290 river sampling stations (including a small number of lake sites) monitored either fortnightly or monthly for classification under the Chemical GQA system. The results of this monitoring were used to classify some 2,467 km of rivers providing a sampling density of approximately 8 km per station.

3.1.1.B Biological GQA Classification

Chemical classification in isolation can be misleading as it may only reveal a “snapshot” of water quality at the time of sampling therefore not detecting intermittent pollution events, or it may fail to detect pollution by specific chemicals which are not being isolated by the test procedure. Biological monitoring techniques can provide a more general picture of longer term water quality and are therefore useful in conjunction with chemical monitoring. Like the Chemical GQA system, the Biological GQA classification system is divided into six classes ranging from Very Good to Bad quality and defined in accordance with standard procedures (Appendix 5). The Chemical and Biological classes are not directly comparable due to the different parameters measured, and a river reach can therefore have different classifications under the two systems.

The Biological GQA classification system is based on information provided by the River InVertebrate Prediction And Classification System (RIVPACS) which is an assessment of the representativeness of the benthic macroinvertebrate community. Various macroinvertebrates are sensitive to pollution and some in particular are sensitive to specific types of pollution. These organisms act as indicators and their relatively slow recolonisation rates can allow damage to be detected for a period of weeks or months after the pollution event itself. The RIVPACS computer software uses physical, geographical and chemical characteristics of the sampling site to predict the macroinvertebrate community that should be present in the absence of pollution. This system makes biological assessment quantifiable, fast, objective, statistically robust and obtainable from one, two or three season sampling.



Mayfly (pollution sensitive)

Biological classification of rivers in NI began in 1990. In 1998 there were 282 biological sampling stations monitored on a three-season basis. The results of this monitoring were used to classify some 2,354 km of rivers under the Biological GQA system.

3.1.2 EC Directives and OSPAR RID

There is a close link between EC Dangerous Substances monitoring required by Directive 76/464/EEC and OSPAR RID. Under the Convention for the Protection of the Marine Environment of the North East Atlantic (the ‘OSPAR’ Convention), the UK has agreed to carry out each year a comprehensive survey of selected substances discharged to Convention waters. The survey covers discharges which reach Convention waters via rivers or estuaries as well as direct discharges, and is referred to as OSPAR RID (OSPAR Riverine Inputs and Direct Discharges). Since 1990 the 10 major rivers in NI which

discharge to Convention waters (Appendix 6) have been monitored at their downstream end for OSPAR RID parameters. For completeness, one major river which flows via the Republic of Ireland to non-Convention waters has also been monitored since 1993.

As some of the determinands (Appendix 7) are common to OSPAR RID and Dangerous Substances, the sampling programmes are combined where possible. The frequency of monitoring has been reduced in recent years as these substances are rarely detected.

The EC Freshwater Fish Directive (78/659/EEC) sets out the requirements for the “quality of fresh waters needing protection or improvement in order to support fish life”. In NI, 1062 km and 129 km of waterway were designated as salmonid and cyprinid respectively. In 1998 all rivers in the network, whether designated or not, were monitored for all of the parameters required by this Directive.

All rivers were monitored for nitrate levels under the EEC Nitrates Directive (91/676/EEC).

3.1.3 Monitoring of the Impacts of Eutrophication

All chemical monitoring sites have been monitored for soluble reactive phosphorus since the mid-1980s. From the early 1990s, 16 sites on rivers in the Erne Catchment were also monitored for the parameters total phosphate and total soluble phosphate. It was intended that the data from this work would be used to determine a phosphorus budget for the catchment. There were, however, difficulties with the analytical detection limit for some parameters, and the results were therefore not suitable for trophic classification.

In 1994 the Biological GQA river monitoring programme was augmented for the first time by the assessment of aquatic macrophytes under a development project supported jointly with Industrial Research and Technology Unit (IRTU) of the Department of Enterprise, Trade and Investment. The work was continued by EHS in subsequent years to highlight any rivers or catchments showing evidence of enrichment. Also, as changes in trophic status are generally the result of slow processes, the investigation formed a base-line survey against which future monitoring could be compared. The analysis of the data indicated that rivers in NI are for the most part enriched. It also indicated that the level of enrichment in rivers such as the Lagan, Foyle and

Blackwater is such that there is scope for plant induced water quality variations detectable as a deterioration in chemical water quality with DO levels being an indicator of this activity.



Bogbean
(pollution sensitive, favours less enriched conditions)

3.1.4 Specific Discharges

An attempt has been made since the start of monitoring to assess the effects of a number of significant effluent discharges. To monitor the effects of a discharge on the receiving water, a sampling point should be outside the mixing zone. A suitable upstream sample should also be taken. In some cases where a monitoring station had been located downstream of a discharge and could be used to provide information about its effects, there was no corresponding upstream monitoring station to enable any decline in quality to be attributed exclusively to the discharge. This raises a question mark over the usefulness of these downstream stations. In addition, if such monitoring sites provide information on specific discharges and not the general water quality, by definition they should not form part of a quality classification network.

3.1.5 Environmental Change Network (ECN)

The ECN Programme is a research initiative, launched in January 1992, concerned with long term monitoring, analysis and prediction of environmental change. It is co-ordinated by the Natural Environmental Research Council (NERC) on behalf of a consortium of sponsoring organisations which jointly operates a network of sites representative of terrestrial and freshwater ecosystems in the UK. There are two river sites (one on the River Faughan in the Foyle catchment

and the other on the Garvary River in the Erne catchment) sponsored by EHS and monitored for the parameters in Appendix 8. Physical, chemical and biological data are being collected from each site according to rigorous protocols, to provide comparable data over a long time span in order to detect environmental change. (The Department of Agriculture and Rural Development (DARD), as sponsors, also monitor secondary sites on the River Bush and Lough Neagh.)

3.1.6 UK Acid Waters Monitoring Network

In 1986 the Interim Report of the UK Acid Waters Review Group (UK AWRG) drew attention to the urgent need for more detailed guidelines for future monitoring of acidity in freshwaters. In light of its findings, recommendations were made for a national network of surface water monitoring sites with a view to providing a comprehensive baseline for the assessment of future trends in acidity. The UK Acid Waters Monitoring Network (UKAWMN) was established in April 1988 with the objective of providing long term, high quality chemical and biological data in conjunction with the UK Precipitation Monitoring Network to assess trends in surface water acidity. The network originally consisted of 10 stream sites and 10 lakes, situated in parts of the UK most susceptible to acidification. Two of these stream sites were located in NI at Beaghs Burn (County Antrim) and the Bencrom River (County Down). In 1990, the Blue Lough (County Down) and Coneyglan Burn (County Tyrone) in NI were added to the network with support from EHS. Monthly water samples are taken from the river sites for chemical analysis, and epilithic diatoms and benthic invertebrates are monitored once a year. Data for the UK is stored in a database managed by the Centre for Environment and Hydrology (CEH) and ENSIS Ltd. Interpretation of data is carried out at periods of 5-6 years by an advisory group of experts, and the data is also used for calibration of critical load mapping for the UK Critical Load Advisory Group.

3.1.7 Specific Studies

In addition to these monitoring programmes, specific studies are carried out to gather data in relation to particular areas of interest, for example, the assessment of water quality in urban streams in Belfast or Londonderry in connection with Urban Pollution Manual studies. These specific studies would be too numerous to mention

in this summary statement but further details may be requested from the Water Management Unit, EHS.

3.2 Development of the River Quality Monitoring Network in 1999

River water quality monitoring in NI is carried out by EHS in order to manage the aquatic environment in a sustainable manner while having regard to the needs of industry and agriculture, the protection of fisheries, the protection of public health, the preservation of amenity and the conservation of flora and fauna. Any evaluation of water quality monitoring programmes should begin with the questions “Why do we monitor?” and “What do we seek to achieve?” The objective of monitoring should determine how monitoring activities are carried out and should be reflected in the key components of the monitoring programme such as parameters monitored, sampling site location, number of sampling sites and frequency of sampling.

The conclusions of the review of river monitoring from 1972 to 1998 defined the objectives of the routine river monitoring network to be:

- ◆ to classify general river water quality;
- ◆ to assess compliance with specific Directives and international agreements; and
- ◆ to provide the river quality information required for the setting of discharge consent standards.

It was highlighted that this network could not assess impacts of specific discharges or activities which would require separate monitoring exercises.

Sampling points must be representative of the river reach in question. Reaches are defined according to their upstream and downstream limits. Physical features such as tributaries, weirs or significant discharges often mark the ends of river reaches owing to their potentially significant effects on water quality. To be representative, sampling points should avoid mixing zones immediately downstream of tributaries or discharges. In addition, they should be accessible throughout the year, with particular regard to aspects of Health and Safety for those carrying out the sampling.

EHS assessed the rationale behind other river monitoring networks in the UK and the Republic of Ireland and made recommendations for a

procedure to determine the rivers for potential inclusion in the new monitoring network. This led to the use of Geographical Information System (GIS) software to determine the rivers that appear on the Ordnance Survey 1:50,000 map with a mean flow greater than 5,000 m³/day. This desktop exercise produced a potential network of approximately 5,500 km of base rivers to be assessed for monitoring.

The 1998 biological monitoring programme was reviewed against three key criteria to identify possible redundancies in sites as follows:

1. proximity of point discharges causing the site to reflect an impact rather than general background quality;
2. no additional information gained from the site than is provided by neighbouring sites and therefore surplus to requirements; and
3. the site supports a poor habitat for invertebrates and is unlikely to yield any useful information.

Statistical computer packages called Improved Environmental Monitoring (IEM) Tools were used to assist in the assessment of criterion 2 above. This review produced an approximate 15% reduction of the monitoring sites from the 282 sites monitored in 1998 to 241 sites for 1999. These sites were monitored biologically on a single season basis in 1999. Any sites, however, that showed a significant change in class from the

previous year's results were revisited on a second season. Biologists in the field assessed the new river reaches that appeared on the map produced from the GIS/flow analysis. New sites were assessed on the following criteria:

1. the waterway must have a mean width exceeding 1.5 m and be likely to sustain a flow for most of the year;
2. the waterway must have a substrate amenable to colonisation by benthic invertebrates;
3. the sampling site must be accessible; and
4. the sampling site must not pose any problems with regard to health and safety.

The chemical monitoring network was also reviewed and site redundancy on the old network was identified using the same criteria applied to the biological network (except for the requirement for a suitable substrate for biological colonisation). This review also employed IEM Tools. The requirement to monitor each site under other legislation, such as the EC Freshwater Fish Directive (78/659/EEC), the EC Nitrates Directive (91/676/EEC) and the international agreement OSPAR RID, was also considered.

This assessment in 1999 led to an extended river water quality monitoring network and laid the foundations for the year 2000 monitoring network.

4. RIVER WATER QUALITY MONITORING BY OTHER AGENCIES IN NI

Since 1990, DARD (formerly DANI) has been conducting water quality monitoring on the minor tributaries of two river catchments (Upper Bann and Colebrooke) to determine the impact of agricultural activities on water quality. This programme examines 24 tributaries (4 of which are also monitored by EHS). DARD considers these smaller streams to be important from a fisheries point of view as they provide spawning areas for trout and salmon. In general, DARD also monitors water quality in terms of fishery protection or for a range of other research topics.

In addition to EHS monitoring of river quality, the Department for Regional Development (DRD) Water Service (WS) monitors the quality of water abstracted for drinking water under the EC Surface Water Directive (75/440/EEC).

The local district councils may on occasion also monitor river water for bacteriological quality in regard to environmental health risk.

Research studies or Environmental Impact Assessments may lead to river quality data being collected by EHS, DARD, other government bodies, academic institutions or consultants. It is important that this data is quality assured and shared amongst interested parties. Sharing of information provides a better view of the overall state of NI rivers thus allowing more effective decision making.

5. RIVER WATER QUALITY MONITORING FROM 2000

5.1 Year 2000 Network

The new network for 2000 identified by the review allows EHS to classify approximately 5200 km of rivers under the Biological GQA Classification scheme. In addition, approximately 4,200 km of rivers are being monitored under the Chemical GQA Classification system. It will however be after 2002 before chemical classification can be produced for those rivers first monitored in 2000 as three years' data is required under this system.

The number of stations being monitored biologically increased from approximately 280 in 1998 to approximately 600 in 2000. This increased monitoring requirement is being met through a hierarchical approach to sampling frequency. The sites remaining after the 1998 network review have become the primary network monitored biologically on a three-season basis in 2000. Waterways on the extended network with a mean width greater than 3 m have become secondary sites and are being monitored biologically on a two season basis. Finally, waterways on the extended network with a mean width less than 3 m have become minor sites and are being monitored biologically on a one-season basis. This means that where 840 biological site visits were made in 1998, approximately 1250 were required in 2000 reflecting a 48% increase in sampling effort to double the length of rivers monitored. This assessment also showed that approximately 500 km of the network was not suitable for biological monitoring. These sites have been collated into a pictorial inventory.

The primary and secondary networks are being monitored chemically under the Chemical GQA classification system, and classifications for the secondary network will be available in early 2003 as explained above. Minor sites are also monitored chemically in support of RIVPACS for alkalinity. The primary network will continue to be monitored in accordance with EC Directives and International agreements. Chemical monitoring

for additional parameters which would be required under the EC Freshwater Fish Directive have been discontinued at undesignated sites and effort redirected elsewhere.

The year 2000 network is set out in Appendix 9.

5.2 Proposed Future Monitoring

- ◆ EHS will maintain in 2001 the biological and chemical GQA monitoring programme for rivers established in 2000.
- ◆ It is proposed that monitoring in subsequent years will be reviewed in the light of the EC Water Framework Directive and the available resource. EHS will also have to consider commitments to monitoring under national programmes.
- ◆ Under the EC Water Framework Directive it will also be necessary at a local, national and EC level to develop new classification methodologies for other biological compartments, such as macrophytes and fish. In late 1999, EHS awarded a studentship to the University of Ulster at Coleraine to develop an objective classification methodology based on the macrophyte data collected to date. Further resource will be sought to support similar research into methodologies for fish assessment. Once developed, these new monitoring methodologies will have to become part of routine network strategy requiring increased resources.
- ◆ EHS will continue to monitor designated river sites under the EC Freshwater Fish Directive.
- ◆ EHS will continue to monitor river sites under the EC Nitrates Directive.
- ◆ Any possible overlap between DARD and EHS monitoring will be reviewed through the joint DARD/DOE Freshwater Sciences Subcommittee (FSSC).

- ◆ EHS will continue its commitment to the UK Acid Waters monitoring.
- ◆ EHS will review its requirements for monitoring rivers in relation to eutrophication under the “Proposals for a Strategy to Control Nutrient Enrichment: Eutrophication in Northern Ireland’s Waters”.
- ◆ The Water Management Unit of EHS will review the possibility of meeting the needs of colleagues in Natural Heritage within the future river monitoring programme.
- ◆ EHS will review its monitoring of dangerous substances in line with national and EC policy including priority substances listed under the EC Water Framework Directive.
- ◆ EHS will continue to review its approach to monitoring in view of new developments in technology.
- ◆ EHS will carry out impact and/or investigative monitoring where this is needed for regulation purposes and, where necessary, following pollution incidents or where routine monitoring highlights problems.
- ◆ EHS will identify future resource implications of these additional monitoring burdens.

CHEMICAL PARAMETERS MONITORED BY EHS ON RIVER WATERS UNDER THE EC FRESHWATER FISH DIRECTIVE

Temperature
pH Value
Dissolved Oxygen
Biochemical Oxygen Demand
Ammoniacal Nitrogen
Non-ionised Ammonia
Suspended Solids
Nitrite
Total Hardness
Zinc (total)
Copper (dissolved)
Petroleum Hydrocarbons (visual check)

PARAMETERS TO BE MONITORED IN RIVERS UNDER THE EC WATER FRAMEWORK DIRECTIVE

Biological elements

- Composition and abundance of aquatic flora
- Composition and abundance of benthic invertebrate fauna
- Composition, abundance and age structure of fish fauna

Hydromorphological elements supporting the biological elements

- Hydrological regime
 - quantity and dynamics of water flow
 - connection to the ground water bodies
- River continuity
- Morphological conditions
 - river depth and width variation
 - structure and substrate of river bed
 - structure of the riparian zone

Chemical and physicochemical elements supporting the biological elements

General

- Thermal conditions
- Oxygenation conditions
- Salinity
- Acidification status
- Nutrient conditions

Specific pollutants

- Pollution by all priority substances identified as being discharged into the body of water
- Pollution by other substances identified as being discharged in significant quantities into the body of water

MONITORING FREQUENCIES FOR RIVERS UNDER THE EC WATER FRAMEWORK DIRECTIVE**Biological**

Phytoplankton	6 months
Other aquatic flora	3 years
Macro-invertebrates	3 years
Fish	3 years

Hydromorphological

Hydrology	1 month
Morphology	6 years

Physico-chemical

Thermal conditions	3 months
Oxygenation	3 months
Salinity	3 months
Nutrient status	3 months
Acidification status	3 months
Other pollutants	3 months
Priority substances	1 month

DESCRIPTION OF CHEMICAL GQA CLASSIFICATION SYSTEM (NI)

Chemical Grade	DO (% saturation) (10%ile)	BOD (mg/l) (90 %ile)	Ammonia (mgN/l) (90%ile)	Likely River Uses and Characteristics ¹
A (Very good)	80	2.5	0.25	<ul style="list-style-type: none"> ◆ All abstractions ◆ Very good salmonid fisheries ◆ Cyprinid fisheries ◆ Natural ecosystem
B (Good)	70	4	0.6	<ul style="list-style-type: none"> ◆ All abstractions ◆ Salmonid fisheries ◆ Cyprinid fisheries ◆ Ecosystem at or close to natural
C (Fairly good)	60	6	1.3	<ul style="list-style-type: none"> ◆ Potable supply after advanced treatment ◆ Other abstractions ◆ Good cyprinid fisheries ◆ A natural ecosystem, or one corresponding to a good cyprinid fishery
D (Fair)	50	8	2.5	<ul style="list-style-type: none"> ◆ Potable supply after advanced treatment ◆ Other abstractions ◆ Fair cyprinid fisheries ◆ Impacted ecosystem
E (Poor)	20	15	9.0	<ul style="list-style-type: none"> ◆ Low grade abstraction for industry ◆ Fish absent, sporadically present, vulnerable to pollution² ◆ Impoverished ecosystem²
F (Bad)	<20	-	-	<ul style="list-style-type: none"> ◆ Very polluted rivers which may cause nuisance ◆ Severely restricted ecosystem

¹Provided other standards are also met²Where the Class is caused by discharges of organic pollution

BIOLOGICAL GQA CLASSIFICATION BANDINGS (NI)

Biological GQA Class	*EQI for ASPT	*EQI for Taxa
A (Very good)	1 or above	0.85 or above
B (Good)	0.90-0.99	0.70-0.84
C (Fairly good)	0.77-0.89	0.55-0.69
D (Fair)	0.65-0.76	0.45-0.54
E (Poor)	0.50-0.64	0.30-0.44
F (Bad)	<0.50	<0.30

*EQI = Ecological Quality Indices

ASPT = Average Score per Taxon

RIVERS MONITORED FOR DANGEROUS SUBSTANCES AND OSPAR RID PARAMETERS

Burn Dennet

Finn (Foyle catchment)

Mourne

Faughan

Roe

Lower Bann

Bush

Lagan

Quoile

Newry/Clanrye

Erne (although not discharging to Convention waters, this large river is monitored close to the point where it crosses the border between Northern Ireland and the Republic of Ireland)

PARAMETERS MONITORED UNDER THE EC DANGEROUS SUBSTANCES DIRECTIVE AND OSPAR RID

Group A Dangerous Substances - Monitored Quarterly

Atrazine	Azinphos-ethyl	Azinphos-methyl
Simazine	Dichlorvos	Diazinon
Fenitrothion	Chlofenvinfos	Fenthion
Malathion	Propetamphos	Organotin
Parathion	Parathion-methyl	

Group B Dangerous Substances - Monitored Annually

a-HCH	1,2,4-Trichlorobenzene
b-HCH	1,3,5-Trichlorobenzene
HCBD	1,2,3-Trichlorobenzene
o'p-DDT	Trifluralin
p'p-DDT	Endosulfan
p'p-DDE	PCP
p'p-TDE(DDD)	Chloroform
Aldrin	Carbon tetrachloride
Dieldrin	1,1,1-Trichloroethane
Endrin	Trichloroethene
Isodrin	Tetrachloroethene
HCB	1,2-Dichloroethane
Lead (dissolved)	Arsenic (dissolved)
Boron (total)	Vanadium
Chromium (dissolved)	Nickel (dissolved)
Iron (dissolved)	

OSPAR RID Parameters

Total N	Copper (total)
Zinc (total)	Nitrate as N
Ammonia as N	Ortho-phosphate
Total phosphorus	Suspended solids
Cadmium (total)	Mercury (total)
Lead (total)	G-HCH
	PCB 28, 52, 101, 118, 138, 153, 180

PARAMETERS MONITORED AND FREQUENCY UNDER ECN

pH	Monthly
Suspended solids	Monthly
Temperature	Monthly
Conductivity	Monthly
Dissolved oxygen	Monthly
NH ₄ -N ammonia	Monthly
N Total	Monthly
NO ₃ -N	Monthly
NO ₂ -N	Monthly
Alkalinity	Monthly
Chloride	Monthly
BOD	Monthly
Phosphorus-total	Monthly
SRP	Monthly
Silicate (SiO ₂)	Monthly
Sulphate (SO ₄ S)	Monthly
Sodium (dissolved)	Monthly
Potassium (dissolved)	Monthly
Calcium (dissolved)	Monthly
Magnesium (dissolved)	Monthly
Copper (dissolved)	Monthly
Zinc (dissolved)	Monthly
Cadmium (dissolved)	Monthly
Aluminium (total)	Monthly
Tin (total)	Monthly
Vanadium (total)	Monthly
Manganese (total)	Monthly
Iron (total)	Monthly
Nickel (total)	Monthly
Mercury (total)	Monthly
Chlorophyll-a	Monthly
Arsenic (total)	Monthly
Lead (total)	Monthly
Invertebrates	RIVPACS frequency
Macrophytes	3-5 years
Periphyton	Annually (Summer)

YEAR 2000 RIVER MONITORING NETWORK

Station Number	Station Name	Irish Grid Reference	Type of Station*
F10014	Glenmornan R at Catherines Br	C384005	Primary
F10001	Owenreagh Burn at Gordons Br	H400984	Minor
F10022	Burndennet R at Burndennet Br	C374048	Primary
F10023	Altinaghree Burn at Bunowen Br	C449043	Primary
F10024	Burndennet R at Dunnamanagh	C439030	Primary
F10020	Dunnyboe Burn at Dunnyboe Br	H459993	Secondary
F10019	Burndennet R at Essbeg Br	H510978	Secondary
F10018	Lowertown Tributary at Lowertown	C463058	Minor
F10017	Castlemellan Tributary at Castlemellan	C436051	Minor
F10016	Inver Burn (Burn Dennet) at Balix Br	H493981	Minor
F10015	Sandville Burn at Mount Pleasant	C392049	Minor
F10025	Finn (Foyle) R at Clady Br	H293940	Primary
F10028	Mourne R at Strabane Br	H345975	Primary
F10029	Mourne R at Victoria Br	H353907	Primary
F10030	Douglas Burn (Foyle) at Douglas Br	H373900	Primary
F10026	Cavanalee R at Milltown Br	H352964	Secondary
F10027	Grevenue Burn at Grevenue Br	H348928	Minor
F10045	Derg R at Crew Br	H315845	Primary
F10046	Killen Burn at Glashagh Br	H231827	Primary
F10047	Derg R at Aghyaran Br	H191806	Primary
F10048	Mourne Beg R at Mourne Br	H207838	Primary
F10049	Glendergan R at Straghcumber	H145796	Primary
F10042	Lough Catherine Stream at Millbrook	H364875	Secondary
F10041	Garvagh Burn at Garvagh Br	H196842	Secondary
F10040	Back Burn (Derg) at Castlederg	H257847	Secondary
F10039	Tullydoortans Burn at Crew House	H312857	Secondary
F10043	Shanaghy Burn at Glashagh Br	H171796	Secondary
F10035	Croagh Burn at Croagh	H124857	Secondary
F10038	Dreenan Burn at Dreenan Br	H212843	Minor
F10037	Dunrevan Burn at Dunrevan Br	H284852	Minor
F10032	Listymore Steam at Crew Upper	H298859	Minor
F10031	Greenville Stream at Greenville Br	H326860	Minor
F10036	Crigh Burn at Crigh Br	H154785	Minor
F10034	Altamullan Burn at Aghyaran	H177811	Minor
F10033	Essan Burn at Straghcumber	H135791	Minor
F10072	Ownekillow R at Killymore Br	H438873	Primary
F10073	Glenmacoffer Burn at Glenmacoffer Br	H527856	Primary
F10074	Ownekillow R at Drumlea	H532871	Primary
F10075	Glenlark R at Glenlark Br	H576875	Primary
F10076	Coneyglen Burn at Coneyglen Br	H603871	Primary
F10077	Ownekillow R at Monanameal Br	H614848	Primary
F10078	Glenelly R at Corick Br	H450886	Primary
F10079	Glenelly R at Clogherny Br	H563914	Primary
F10080	Glenelly R at Sperrin	H634941	Primary
F10081	Owenreagh (East) R at Drumlea Br	H535859	Primary
F10083	Glensawisk Burn at Campbells Br	H565825	Primary
F10067	Glashyngolgan Burn at Fort Br	H459902	Secondary

Station Number	Station Name	Irish Grid Reference	Type of Station*
F10054	Goles R at Goles Br	H672948	Secondary
F10053	Glenerin Burn at Glenerin Br	H646945	Secondary
F10052	Oughtnamwella Burn at Sperrin	H633942	Secondary
F10068	Letterbrat Burn at Letterbrat Br	H477913	Secondary
F10055	Eden R at Eden	H502916	Secondary
F10051	Oughtdoorish Burn at Oughtdoorish Br	H583927	Secondary
F10057	OughtBoy Burn at Oughtboy Br	H592930	Secondary
F10058	Broughderg Water at Broughderg Br	H684853	Secondary
F10059	Crockglass Tributary at Crockglass	H668858	Secondary
F10060	Rylands Burn at Rylands Br	H475868	Secondary
F10061	Glenknock Burn at Glenknock Cottages	H411866	Secondary
F10062	Glenass Burn at Henry's Br	H515916	Minor
F10063	Glenroan Burn at Glenroan Br	H539912	Minor
F10064	Tullynadall Burn at Tullynadall	H447906	Minor
F10065	Ederlin Burn at Ederlin Br	H554913	Minor
F10066	Oughtmame Burn at Oughtmame Br	H625937	Minor
F10071	Altavakan Burn at Glenmacoffer	H523842	Minor
F10070	Creggan Burn at Creggan	H632786	Minor
F10069	Glashagh Burn at Cashel Wood	H615803	Minor
F10056	Cashel Burn (Owenreagh East) at Cashel	H584816	Minor
F10864	Gortin Burn (Owenkillew) at Gortin Br	H494858	Minor
F10865	Corickmore Tributary at Corickmore	H446884	Minor
F10086	Strule R at Moyle Br	H411861	Primary
F10087	Strule R at Stone Br	H437776	Primary
F10088	Strule R at Abbey Br, Omagh	H449729	Primary
F10089	Cappagh Burn at Tattynure Br	H436794	Primary
F10085	Ashgrove Tributary at Ballykeel	H434837	Secondary
F10084	Carnony Burn at Knockmoyle Br	H444776	Secondary
F10100	Gillygooly Burn at Mill House	H412746	Primary
F10101	Fairwater R at Mullanatoomog	H392766	Primary
F10102	Fairywater R at Monaghans Br	H345776	Primary
F10103	Drumquin R at Drumquin	H330743	Primary
F10091	Glenrone R at McCrea Park	H327725	Secondary
F10097	Black Water (Drumquin) at Carrickaness Br	H297743	Secondary
F10092	Drumquin R at Crooked Br	H332732	Secondary
F10090	Fairwater R at B50 Road Br	H292802	Secondary
F10093	Fairywater R at Aghakinmart	H258785	Secondary
F10094	Beherny Drain at Camberry	H327763	Minor
F10095	Drumgallan Burn at Drumgallan Br	H302792	Minor
F10096	Kilmore Burn at Ramseys Br	H403753	Minor
F10111	Camowen R at Donnelly's Br	H464730	Primary
F10113	Killiclogher Burn at Killiclogher	H472737	Primary
F10114	Camowen R at Ramackan Br	H565701	Primary
F10115	Cloghfin R at Lisboy Br	H512706	Primary
F10109	Ballynamullan Burn at Omagh	H480728	Secondary
F10108	Drumnakilly Burn at Drumnakilly	H538731	Secondary
F10104	Granagh Burn at Carrickmore	H604721	Secondary
F10107	Camowen R at Carrickmore	H621712	Secondary
F10110	Altanagh Burn at Pound Br	H613698	Secondary
F10106	Cloghfin R at Ballykeel Br	H572671	Secondary
F10105	Arvalee Burn at Omagh	H484712	Minor
F10128	Drumragh R at Campsie Br	H455727	Primary
F10129	Owenreagh (South) R at Ballynahatty	H437673	Primary
F10131	Creevan Burn at McKinley Bungalows	H419699	Primary

Station Number	Station Name	Irish Grid Reference	Type of Station*
F10133	Quiggery Water at Edergoole Br	H449678	Primary
F10134	Quiggery Water at Sessiagh Br	H451647	Primary
F10135	Quiggery Water at Ecclesville	H441601	Primary
F10136	Eskragh Water at Seskinore Mill Br	H472635	Primary
F10137	Routing Burn at Browns Br	H507617	Primary
F10118	Raveagh Burn at Raveagh	H503607	Secondary
F10119	Letfern Burn at Letfern	H498628	Secondary
F10120	Magheragart Burn at Polfore	H371625	Secondary
F10121	Cranny Burn at Cranny	H387637	Secondary
F10125	Owenreagh (South) R at B84 Road Br	H330658	Secondary
F10126	Garvaghy Burn at Kilnaheery	H541618	Minor
F10127	Eskragh Water at Eskragh	H513597	Minor
F10122	Syonee Burn at Fintona	H434604	Minor
F10124	Dungoran Burn at Dungoran	H438587	Minor
F10123	Mullaghbane Burn at Shannaragh	H376653	Minor
F10116	Dromore Burn at Mullanboy	H360643	Minor
F10117	Stroancarbadagh Burn at Ballynahatty	H434670	Minor
F10147	Faughan R at Carrakeel Br	C493206	Primary
F10148	Faughan R at Mobuoy Br	C477193	Primary
F10151	Faughan R at Ardmore	H474135	Primary
F10152	Faughan R at Legahory	C501107	Primary
F10153	Bonds Glen R at Ardground	C516077	Primary
F10155	Foreglen R at Dungorkin Br	C552074	Primary
F10156	Faughan R at Tamnagh Br	C596013	Primary
F10157	Burntollet R at Burntollet Br	C503107	Primary
F10158	Glenrandal R at Claudy	C539066	Primary
F10141	Crunkin Burn at Crunkin Br	C522121	Secondary
F10140	Loughermore R at Loughermore Br	C584126	Secondary
F10139	Sluggada Burn at Tamnagh Lodge	C606006	Secondary
F10145	Burngibbagh at Drumahoe	C459147	Minor
F10142	Berry Burn at Berry Burn Br	C479124	Minor
F10143	Meenarnet Burn at Slaghtmanus	C551128	Minor
F10144	Foreglen R at Ballymoney	C615096	Minor
F10138	Park Tributary at Park	C589025	Minor
F10146	Inver R (Faughan) at Inver Br	C535010	Minor
F10170	Roe R at Roe Br	C670296	Primary
F10171	Roe R at Limavady	C668229	Primary
F10172	Roe R at Dog Leap	C679203	Primary
F10174	Roe R at Dungiven	C685095	Primary
F10175	Roe R at Corick Br	C751063	Primary
F10176	Castle R at Drummond Br	C688232	Primary
F10177	Curly R at Artikelly Br	C684246	Primary
F10178	Owenbeg R at Dungiven	C683098	Primary
F10179	Owenrigh R at Carnanbane	C669067	Primary
F10163	Wood Burn at Killibleught Br	C677124	Secondary
F10160	Gelvin R at Lower Gelvin Br	C692139	Secondary
F10161	Bovevagh R at Burnfoot Br	C681136	Secondary
F10169	Owenalena R at Owenalena Br	C743060	Secondary
F10162	Hass Tributary at Browns Br	C693102	Secondary
F10159	Clogherna Burn at Tullygowan	C644043	Secondary
F10164	Owenbeg R at Aughlish Br	C653037	Secondary
F10165	Castle R Tributary at Drenagh	C691232	Minor
F10166	Curly R at Gallows Knowe	C735268	Minor
F10167	Roe R Tributary at Aghanloo	C675269	Minor
F10168	Owenbeg R Tributary at Derrychriar	C660087	Minor

Station Number	Station Name	Irish Grid Reference	Type of Station*
F10181	Muff R At Mill Br	C524188	Primary
F10182	Faughanvale R at Faughanvale Br	C578214	Primary
F10183	Burnfoot R at Rush Hall	C646241	Primary
F10180	Ballykelly R at Ballykelly Br	C627224	Secondary
F10184	Big Drain at Magilligan Br	C680339	Minor
F10185	Umbra Stream at Umbra Br	C726356	Minor
F10212	Main R at Dunmore Br	J087896	Primary
F10213	Main R at Gracehill Br	D077023	Primary
F10214	Main R at Dundermot Br	D057130	Primary
F10215	Kellswater R at Currys Br	J105971	Primary
F10216	Kellswater R at Rock Br	J160983	Primary
F10218	Braid R at Harryville Br	D105030	Primary
F10220	Clogh R at Glarryford Br	D062131	Primary
F10209	Ahoghill Burn at Killybegs Br	D074004	Secondary
F10210	Deerfin Burn at Harryville	D107022	Secondary
F10197	Devenagh Burn at Devenagh Br	D133044	Secondary
F10187	Artoges R at Green Br	D156078	Secondary
F10188	Priests Burn at Breckagh Br	D203093	Secondary
F10189	Braid R at Aghacully Br	D212084	Secondary
F10190	Glen Burn at Buckna	D211075	Secondary
F10202	Killagan R at Killagan Br	D046213	Secondary
F10191	Cloghmills Water at Clogh Mills	D069177	Secondary
F10211	Tullykittagh Water at Tullykittagh Br	D126164	Secondary
F10192	Skerry Water at Craigdunloof	D146164	Secondary
F10193	Glenravel R at Carrowcowan Br	D147154	Secondary
F10194	Connor Burn at Connor Enclosure	J152969	Secondary
F10195	Douglas Burn (Glenwhirry) at Lynns Br	J227998	Secondary
F10208	Glenwhirry R at Pigtail Br	J263987	Secondary
F10196	Creevamoy Burn at Creevamoy Br	D170069	Minor
F10200	Cashel Burn (Braid) at Downstream Br	D173069	Minor
F10199	Damstown Burn at Damstown Br	D028178	Minor
F10186	Legnagooly Burn at Legnagooly Br	D132128	Minor
F10198	Dunnstown Burn at Dunnstown	D048095	Minor
F10207	Aghill Burn at Craigs Br	D046082	Minor
F10206	Parish Burn at Clarkestown	J074985	Minor
F10205	Ashfield Burn at Bunkers Hill	J103979	Minor
F10204	Sharvogues Burn at Sharvogues	J104948	Minor
F10203	Ross Burn at Rossburn	J159973	Minor
F10201	Clatteryknowes Burn at Shank Br	J206997	Minor
F10233	Six Mile Water at Castle Farm Br, Antrim	J144868	Primary
F10234	Rathmore Burn at Rathmore Br	J197854	Primary
F10235	Six Mile Water at Ballycushan	J229867	Primary
F10237	Four Mile Burn at Newmill	J230897	Primary
F10238	Six Mile Water below Ballyclare	J285903	Primary
F10239	Clady Water at Dunadry Road Br	J194847	Primary
F10240	Ballymartin Water at Ballymartin Water Br	J230866	Primary
F10241	Doagh R at Doagh	J258896	Primary
F10242	Doagh R at Dunamoy	J260935	Primary
F10229	Rathmore Burn Tributary at Burnside	J192874	Secondary
F10222	Castle Water at Hillis Br	J312937	Secondary
F10223	Green Burn at Millvale	J295909	Secondary
F10230	Lisnalinchy Burn at Ballywalter Br	J263883	Secondary
F10224	Plaskets Feeder at Kilbegs	J134888	Minor
F10232	Holywell Burn at Dunsilly	J140888	Minor
F10225	Ballymartin Water Feeder at Craigarogan	J276838	Minor

Station Number	Station Name	Irish Grid Reference	Type of Station*
F10226	Ballymartin Water at Mallusk	J285832	Minor
F10227	DoaghR Tributary at Dixons Corner	J258937	Minor
F10231	Six Mile Water at Ballyboley Br	J315950	Minor
F10228	Castle Water at Castletown	J331938	Minor
F10221	Ballylinny Burn at Milltown Br	J284900	Minor
F10244	Crumlin R at Cidercourt Br	J135766	Primary
F10245	Crumlin R at Airport Road Br	J192767	Primary
F10440	Crumlin R at Thompsons Br	J225765	Secondary
F10441	Dundesert R at Dundesert Gospel Hall	J169775	Minor
F10439	Coopers Water at Boomers Br	J216757	Minor
F10248	Glenavy R at Leap Br	J139725	Primary
F10249	Glenavy R at Ballydonaghy Br	J180744	Primary
F10246	Rushyhill R at Leathemstown	J218729	Secondary
F10247	Stonyford R at the Y Br	J203722	Secondary
F10270	Upper Bann at Shillington Br	J013543	Primary
F10271	Upper Bann at Dynes Br	J042511	Primary
F10273	Upper Bann at Lawrencetown	J100491	Primary
F10277	Upper Bann at Ballydown	J138450	Primary
F10278	Tullyorior Trib at Tullyorior Rd Br	J168442	Minor
F10279	Upper Bann at Polands Br (New Chem Site)	J188429	Primary
F10280	Upper Bann at Katesbridge	J209408	Primary
F10282	Upper Bann at Bannfield Br	J228345	Primary
F10283	Muddock R at Muddock Br	J235341	Primary
F10286	Upper Bann at McCombs Br	J232331	Primary
F10287	Upper Bann at Hilltown	J218291	Primary
F10292	Ballybay R at Obins Street, Portadown	J001546	Primary
F10295	Cusher R at Knock Br	J039508	Primary
F10297	Cusher R at Clare Br	J012430	Primary
F10300	Cusher R at Captains Br	H998296	Secondary
F10250	Rocky R at Rocky R Br	J233277	Secondary
F10265	Leitrim R at Leitrim Br	J218285	Secondary
F10264	Hilltown Tributary at Hilltown	J210294	Secondary
F10262	Drumadonnell R at Ballyrone Road	J227388	Secondary
F10261	EEl Burn (Upper Bann) U/S of Polands Br	J192429	Secondary
F10260	Mowhan R at Derrycughan	H987368	Secondary
F10256	Cusher R at McCreedys Br	J002337	Secondary
F10251	Whitecross Stream at Whitecross	H987318	Secondary
F10252	Kinnahalla R U/S of New Br	J239289	Minor
F10254	Shankys R at Tornamrock Park	J225255	Minor
F10255	Upper Bann Tributary D/S of McCombs Br	J235332	Minor
F10253	Muddock R Tributary at St Johns Terrace	J255335	Minor
F10257	Upper Bann Tributary at Katesbridge	J211409	Minor
F10258	Ballydown Feeder at Ballydown	J136446	Minor
F10267	Annagh R at Maghon	J004517	Minor
F10259	Cusher R Tributary at Maymount	J012424	Minor
F10263	Cusher R Tributary at Mountnorris	H992363	Minor
F10266	Loughgilly R at Ballygorman	J011354	Minor
F10328	Blackwater R at Bonds Br	H873586	Primary
F10330	Blackwater R at Benburb	H819520	Primary
F10331	Blackwater R at Caledon Br	H759446	Primary
F10332	Blackwater R at Burns Br	H712474	Primary
F10333	Blackwater R at Derrymeen Br	H625530	Primary
F10335	Torrent R at New Br, Annaghbeg	H883629	Primary

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F10336	Torrent R at Newmills Br	H816677	Primary
F10339	Tall R at Redmonds Br	H938554	Primary
F10341	Tall R at Darbys Br	H946462	Primary
F10342	Rhone R at Clonteevy Br	H864585	Primary
F10343	Callan R at Derryscollop	H867558	Primary
F10345	Callan R at Paper Mill Br	H857392	Primary
F10346	Oona Water at Oona Br	H782531	Primary
F10347	Tynan R at A28 Road Br	H764446	Primary
F10348	Ballygawley Water at Lismore Br	H630538	Primary
F10349	Fury R at Belalastera Br	H552517	Primary
F10316	Callan R at Dundrum	H868344	Secondary
F10309	Blackwater R Tributary at Killyfaddy	H525536	Secondary
F10312	Blackwater R Feeder at Ballygreenan	H586550	Secondary
F10313	Blackwater R Feeder at Favour Royal	H610524	Secondary
F10314	Ballymacane R at Callan Confluence	H869372	Secondary
F10315	Torrent R at Castlecaulfield	H756627	Secondary
F10320	Oona Water at Clontyplevin	H719589	Secondary
F10321	Oona Water at Pluck Br	H778569	Secondary
F10311	Tamnamore Stream at Tamnamore	H867607	Secondary
F10319	Balteagh Stream at Balteagh Br	H794405	Secondary
F10323	Cor R at Lemnagore Wood	H754429	Secondary
F10317	Butter Water at Ballynahone Br	H863429	Minor
F10318	Killeen Water at B77 Road	H875472	Minor
F10324	Castle Dillon Lake Trib at Ballygassy Road Br	H897514	Minor
F10322	Fury R Feeder Stream at Knockroe	H562495	Minor
F10308	Fury R at Carnagat	H575472	Minor
F10307	Blackwater R Feeder at Lisboy	H530521	Minor
F10303	Blackwater R Feeder at Roy	H557546	Minor
F10301	Blackwater R Feeder at Aughnacloy	H665517	Minor
F10302	Lissenderry Feeder at Ravellea Road Br	H659522	Minor
F10306	Blackwater R Feeder at Branter	H569532	Minor
F10305	Donaghmore Feeder at Backford Br	H766658	Minor
F10325	Rhone R U/S of Moygashel Feeder	H816584	Minor
F10326	Rhone R Tributary at Moyroe Corner	H842602	Minor
F10310	Blackwater R Trib U/S of Middletown STW	H750387	Minor
F10304	Crilly Feeder at Dunmacmay	H711482	Minor
F10361	Ballinderry R at Ballinderry Br	H927798	Primary
F10362	Ballinderry R at Doorless New Br	H835764	Primary
F10363	Ballinderry R at Kings Br	H812765	Primary
F10364	Ballinderry R at Corkill Br	H734793	Primary
F10366	Lissan Water at Drumgrass Br	H806816	Primary
F10367	Ballymully R at Ballygonny Br	H871786	Primary
F10368	Killymoon R at Prince of Wales Br	H824757	Primary
F10369	Rock R at Ballynakilly Br	H773724	Primary
F10360	Coolmaghry Tributary at Tulnagall Br	H764682	Secondary
F10356	Claggan R at Lisnanane Br	H785711	Secondary
F10351	Drumard Stream at A505 Road Br	H783773	Secondary
F10352	Kildress Stream at A505 Road Br	H736783	Secondary
F10358	Tulnacross Tributary at Beech Grove	H729799	Secondary
F10350	Kingsmill Stream at Kingsmill Br	H868763	Secondary
F10357	Ballymully R at A29 Road Br	H856833	Secondary
F10359	Gortin Water (Ballinderry) at Gortin Br	H782792	Secondary
F10355	Tullyaran Tributary at Tulnagall Br	H763682	Minor
F10354	Rough Hill Stream at Ballynakilly	H772724	Minor
F10353	Ballymully R Tributary at the Nook	H854832	Minor

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F10380	Moyola R at Moyola New Br	H956905	Primary
F10381	Moyola R at Fortwilliam Br	H837977	Primary
F10382	Magherafelt Burn at Granias Br	H931911	Primary
F10383	Grange Water at Curran	H888952	Primary
F10384	Back Burn (Moyola) at Widow Steeles Br	H875971	Primary
F10373	Altaoan R at Banty Br	H796966	Secondary
F10377	Douglas R at Boheradaile Br	H774967	Secondary
F10376	Moyola R at Moykeeran	H774953	Secondary
F10375	Whitewater (Moyola) at Whitewater Br	H766933	Secondary
F10374	Moyola R at Labby Ford	H752928	Secondary
F10378	Glengomna Water at Glengomna Br	H727935	Secondary
F10372	Burnburnley at B18 Road Br	H952898	Minor
F10371	Luney Water at Luney Br	H865933	Minor
F10379	Keenaght Water at Desertmartin	H853919	Minor
F10370	Milltown Burn (Moyola) at A29 Road Br	H848997	Minor
F10396	Dunore R at Upper Br	J146829	Primary
F10397	Black Burn at Mount Cottage	J121806	Primary
F10386	Salterstown R at Salterstown	H944831	Secondary
F10387	Ballinderry (Antrim) R at Drumart Br	J132682	Secondary
F10391	Mill Burn (Antrim) at Milltown	J123886	Minor
F10389	Ballyronan Stream at Ballyronan	H947854	Minor
F10388	Cluntoe Stream at Stanierds Point	H963777	Minor
F10385	Mourneview Stream at Downstream Br	H928712	Minor
F10394	Ducking Stool R at Ballybeg	H898679	Minor
F10390	Aghalee Burn at Usshers Br	J114657	Minor
F10392	Rooghan R at B12 Road Br	J133702	Minor
F10393	Crew Burn at Carrols Br	J134707	Minor
F10427	Lower Bann at the Cuts	C855303	Primary
F10429	Lower Bann at Kilrea Br	C936133	Primary
F10430	Lower Bann at Portglenone	C975038	Primary
F10431	Lower Bann at Toome Br	H989908	Primary
F10432	Ballymoney R at Glenstall Br	C914238	Primary
F10433	Ballymoney R at Ballymena Road Br	C955258	Primary
F10434	Macosquin R at Ree Br	C898237	Primary
F10436	Agivey R at Moneycarrie Br	C867195	Primary
F10437	Aghadowey R at White Bridges	C878228	Primary
F10438	Clady R at Glenone Br	C963038	Primary
F10419	Mayoghill R at Caheny Br	C889191	Secondary
F10418	Aghadowey R at Gorran Br	C834203	Secondary
F10411	Agivey R at Glen Ullin	C792124	Secondary
F10417	Culmore R at Gortclanny	C942137	Secondary
F10425	Ballydonnelly Tributary at Gortereghy Br	C952119	Secondary
F10416	Articlave R at Ardina Br	C789349	Secondary
F10415	Artigoran Tributary at Artigoran	C903258	Secondary
F10414	Drumawhiskey R at Bendooragh	C924238	Secondary
F10413	Ballymoney Tributary at Greenville Br	C970262	Secondary
F10409	Breckagh Burn at Breckagh Br	C988276	Secondary
F10404	Grillagh R at Curdian Br	C901031	Secondary
F10405	Knockoneill R at Beagh Picnic Area	C855063	Secondary
F10406	Inverroe Water at the Meen (A54 Road Br)	C953067	Secondary
F10410	Scab Island Stream at Annagh	H965948	Minor
F10424	Ivy Burn at Rock Cottage	H999916	Minor
F10420	Doorish Point Stream at Drumraymond	J001934	Minor
F10421	Mullaghardry Point Stream at Mullaghardry	H994973	Minor
F10422	Neelys Hill Feeder at Culnafay House	H999980	Minor
F10423	Cam Burn at Ballynacally Beg	C843212	Minor

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F10412	Dundooan Feeder at Marina	C846339	Minor
F10407	Shinny Water at Crossgare Br	C841269	Minor
F10403	Dunglady R at Dunglady Fort	C892044	Minor
F10408	Bracknamuckley Burn at Milltown	C972057	Minor
F10449	Bush R at Bushmills	C939409	Primary
F10451	Burn Gushet R at Burn Gushet Br	C949311	Primary
F10452	Bush R at Conogher Br	C962306	Primary
F10454	Bush R at Ballyhoe Br	D077291	Primary
F10455	Dervock R at Dervock Br	C977317	Primary
F10456	Derbock R at Iderown Br	D021334	Primary
F10442	Moss-side Water at Gortanuey Br	D017334	Secondary
F10448	Well Water at Turnarobert	D079332	Secondary
F10443	Flesk Water at Flesk Br	D028302	Secondary
F10447	Burn Gushet R at Ballybogy	C923325	Minor
F10446	Bush R Tributary at Walk Mill	C931392	Minor
F10445	Dervock R Tributary at Dervock	C977324	Minor
F10444	Liscolman Feeder at Ballymacfin	C992331	Minor
F10472	Tow R Near Old Gasworks	D114406	Primary
F10473	Glenshesk R at B15 Road Br	D126406	Primary
F10474	Carey R at Carey Mill Br	D141406	Primary
F10475	Glendun R at Knocknacarry Br	D240326	Primary
F10476	Glemaan R at Cushendall Br	D237276	Primary
F10477	Glenariff R at Callisnagh Br	D224214	Primary
F10478	Glencloy R at Carnlough	D288168	Primary
F10479	Glenarm R at Glenarm	D310151	Primary
F10470	Owencloghy Water at Mill Br	D289091	Secondary
F10468	Owencam R at Slaght	D144344	Secondary
F10467	Glenmakeeran R at Drumnakeel Br	D161398	Secondary
F10466	Carey R at Torteige	D174398	Secondary
F10471	Clady Burn at Knocknacrow Br	D221329	Secondary
F10457	Owennaglush R at Owennaglush Br	D168283	Secondary
F10464	Glendun R at Crockan	D165275	Secondary
F10458	Ballyemon R at Cloghs Upper	D224277	Secondary
F10463	Carnlough R at Drumnahoe	D278183	Secondary
F10469	Essathoham Burn at Parkmore	D197208	Minor
F10462	Killyglen Burn at Drains Bay	D392052	Minor
F10461	Milltown Burn (Cushendun) at Milltown	D247333	Minor
F10460	Glencorp Feeder at Dunouragan	D233315	Minor
F10459	Clyttaghan Burn at Drumadion	D195313	Minor
F10465	Beaghs Burn at Beaghs Br	D179298	Minor
F10511	Lagan R at Stranmillis	J341709	Primary
F10512	Lagan R At Shaws Br	J325690	Primary
F10519	Lagan R at Wolfendens Br	J284668	Primary
F10522	Lagan R at Moores Br	J262629	Primary
F10523	Lagan R at Youngs Br	J233630	Primary
F10526	Lagan R at Forge Br, Magheralin	J129581	Primary
F10527	Lagan R at Banoge	J123538	Primary
F10529	Lagan R at Dromore	J194533	Primary
F10530	Lagan R at Bulls Brook	J252516	Primary
F10532	Ravernet R at Legacurry Br	J297601	Primary
F10486	Upper Lagan at Dromara	J287497	Secondary
F10488	Upper Lagan at Larch Hill	J255511	Secondary
F10487	Eel Burn R (Lagan) at Glenlagan	J239505	Secondary
F10484	Edenordinary Stream at Drumskee House	J149522	Secondary

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F10480	Knockmore Burn at Knockmore	J236637	Minor
F10481	Ballylintagh Burn at B178 Road Br	J286603	Minor
F10482	Drumbeg Stream at Drumbeg	J305668	Minor
F10483	Begny Hill Feeder at Woodford Br	J289502	Minor
F10485	Scallion Hill Feeder at Beech Hall	J249482	Minor
F10541	Quoile at Quoile Br	J488465	Primary
F10542	Annacloy R at Annacloy Br	J449484	Primary
F10545	Ballynahinch River at Caseys Br	J343540	Primary
F10546	Glasswater R at Kilmore	J450511	Primary
F10533	Drumaness Tributary U/S of Drumaness	J398497	Secondary
F10534	Ballynahinch Feeder at Listooder	J422528	Minor
F10535	Annacloy R Feeder Stream at Rosssconor	J442478	Minor
F10536	Upper McAuley's Lake Feeder at Hillside	J364488	Minor
F10537	Lower McAuley's Lake Feeder West of Lake	J358484	Minor
F10538	Ballykine Feeder Steam at Laurel Lodge	J342529	Minor
F10539	Ballycrune Feeder U/S of Ballycrune Lough	J308548	Minor
F10540	Annahilt Feeder at Annahilt	J302559	Minor
F10548	Blackwater (Ards) R at Ballymartin Road Br	J503624	Primary
F10547	Ballinree Burn at Balloo Crossroads	J494606	Minor
F10550	Enler R at Kennel Br	J456699	Primary
F10549	Ballystockart R at A22 Road Br	J442712	Secondary
F10554	Larne R at Rock Filling Station	D390023	Primary
F10555	Larne R at Owens Br	D378009	Primary
F10556	Glynn R at Glynn	J408999	Primary
F10557	Kilroot R at Kilroot	J444898	Primary
F10559	Woodburn R at Courtaulds Factory	J403872	Primary
F10560	Three Mile Water at Glenavna Hotel	J358828	Primary
F10551	Larne R at Ballyrickard Br	J367996	Secondary
F10552	Glenoe Water at Glenoe	J396968	Secondary
F10553	Dunisland Water at Rungill	J402971	Secondary
F10576	Crawfordsburn R at C'Burn Country Park	J467820	Secondary
F10577	Cunning Burn at Ballyewry	J535713	Secondary
F10575	Blackstaff (Ards) R at Blackstaff Br	J606596	Secondary
F10578	Smelt Mill Bay Stream at Linear Park	J490819	Minor
F10574	Ballyholme Bay Stream U/S of Confluence	J523823	Minor
F10573	Cotton R at Cotton Br	J536785	Minor
F10572	Mill Burn (Ards) at Millisle (B172 Road Br)	J596762	Minor
F10570	Mill Pond Feeder Stream at Shrigley	J525542	Minor
F10571	Comber Tributary at Camp Hill	J454688	Minor
F10606	Blackstaff (South Down) R at Tullymurry Br	J429411	Primary
F10607	Ardilea R at A2 Road Br	J407391	Primary
F10608	Moneycarragh R at Moneylane	J399369	Primary
F10609	Carrigs R at Maghera Br	J368343	Primary
F10602	Moneycarragh Feeder at B175 Road Br	J364405	Secondary
F10605	Rathmullan Burn at Minerstown	J481364	Minor
F10603	Ballyviggis Stream at Brimstone Brae	J526391	Minor
F10604	Ballyarent Burn at Mill Quarter Bay	J599442	Minor
F10619	Newry R at Newry	J087267	Primary
F10620	Newry R at Carnmeen	J075303	Primary
F10622	Clanrye R at Crown Br	J108275	Primary

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F10623	Clanrye R at Barnmeen	J164326	Primary
F10625	Bessbrook R at Millvale Br	J061285	Primary
F10626	Jerrettspass R at Jerrettspass	J064333	Primary
F10612	Lissize R at Red Br	J181336	Minor
F10611	Tullyquilly Feeder at Barnmeen	J171329	Minor
F10614	Drumgath R at Lurganahone	J163318	Minor
F10615	Mayobridge R at Downstream Br	J142311	Minor
F10617	Clanrye North R at Hawkins Br	J128300	Minor
F10613	Loughbrickland Stream at Killysaven Villas	J075390	Minor
F10610	Newry R Tributary at Glen Br	J086364	Minor
F10616	Mullaghglass Stream at Mullaghglass	J064298	Minor
F10635	Burren R at Baileys Br	J358337	Primary
F10636	Shimna R at Ivy Br, Tollymore Forest	J353323	Primary
F10639	Annalong R at Annalong Br	J374198	Primary
F10640	Kilkeel R at A2 Road Br, Kilkeel	J313151	Primary
F10641	Aughrim R at Kilkeel	J305149	Primary
F10642	White Water R (South Down) at Whitewater Br	J267154	Primary
F10643	Cassy Water at Cassywater Br	J238149	Primary
F10644	Kilbroney R at Newtown Br	J189191	Primary
F10646	Ghann R at Green Park Br	J175192	Primary
F10647	Moygannon R at Moygannon Ford	J158188	Primary
F10629	Glen R at Donard Br	J373302	Secondary
F10628	Trassey R at Trassey Br	J309312	Secondary
F10630	Bloody Bridge R at Bloody Br	J388269	Secondary
F10631	Spences R at Glassdrumman Br	J377228	Secondary
F10632	White Water R (South Down) at Ballinamorna	J274192	Secondary
F10634	Moneydarragh Stream at Moneydarragh Hse	J364184	Minor
F10633	Mullagh R at Mullagh Br	J332160	Minor
F10648	Flurry R at Flurry Br	J072177	Secondary
F10649	Kilnasaggart R at Kilnasaggart Br	J060150	Minor
F10866	Slieve Gullion Stream at Meigh	J051202	Minor
F10651	Cully Water at Silver Br	H964180	Primary
F10652	Forkill R at Lower Br, Forkill	J015157	Primary
F10650	Creggan R below Creggan Rectory	H934154	Secondary
F10653	County Water (S Armagh) at Traynors Br	H893227	Secondary
F10654	Roogagh R at Garrison	G942518	Primary
F10657	County R (Fermanagh) at County Br	G938508	Primary
F10661	Erne R at Rosscor Viaduct	G987586	Primary
F10663	Garvary R at Larkhill	H009630	Primary
F10665	Waterfoot R at Letter Br	H085652	Primary
F10658	Blackslee Burn at Holme Bay	H109572	Minor
F10659	Hollow R at Lisnarrick	H198589	Minor
F10669	Erne R at Enniskillen	H231443	Primary
F10672	Lough-A-Hache R below Moorklough	H374307	Primary
F10675	Newtownbutler R at Newtownbutler	H418259	Primary
F10679	Termon R at Tullyhommon	H110667	Primary
F10681	Bannagh R at Bannagh Br	H162654	Primary
F10683	Drumnagreshial Trib at Drumnagreshial	H181682	Primary
F10680	Rotten Mountain R at Derryneve Br	H186678	Secondary

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F10688	Kesh R at Kesh Br	H180639	Primary
F10690	Glendurragh R at Edenamohill	H244664	Primary
F10691	Dooraa Tributary at Letterkeen	H182645	Primary
F10692	Dooraa Tributary at Killygarry Br	H205663	Primary
F10693	Edenclaw Tributary at Edenclaw	H232654	Primary
F10685	Lack R at Croneen	H256665	Secondary
F10684	Mantlin R at Mantlin Br	H184635	Secondary
F10687	Coolaghty R at Coolaghty	H257673	Minor
F10686	Drumboarty R at Drumboarty	H233668	Minor
F10700	Ballinamallard R at Ballycassidy Br	H228507	Primary
F10701	Ballinamallard R at Magheracross Br	H281537	Primary
F10702	Irvinestown Tributary at Tullyclea Br	H236530	Primary
F10703	Irvinestown Tributary at Necarne	H230565	Primary
F10704	Trillick Tributary at Carran Br	H310566	Primary
F10699	Kilskerry Burn at Kilskerry	H296548	Secondary
F10697	Ballinamallard R at Ballinapaste Br	H307578	Secondary
F10696	Trillick Tributary at Bohee	H333554	Secondary
F10694	Salry R at Salry	H256515	Minor
F10698	Foxhill Burn at Drumcreeen	H279529	Minor
F10695	Tullyrain R at Magheracross	H289541	Minor
F10714	Hollybrook R at Aghalurcher	H363311	Primary
F10715	Colebrooke R at Ballindarragh Br	H331360	Primary
F10716	Colebrooke R at Tullyreagh Br	H378441	Primary
F10717	Colebrooke R at Pollboy Br	H445434	Primary
F10718	Tempo R at A4 Road Br	H342392	Primary
F10720	Tempo R at Tattinweer Br	H363492	Primary
F10721	Many Burns R at Manyburns Br	H384474	Primary
F10722	Cleen R at Corralongford	H428453	Primary
F10706	Cooneen Water at Legatillida	H455396	Secondary
F10707	Cleen R at Kiltermon Br	H475482	Secondary
F10705	Raw R at Raw Br	H424426	Secondary
F10708	Ramult Burn at Ramult	H415464	Secondary
F10709	Coolcran Burn at Tattinweer	H363493	Secondary
F10710	Pubble Burn at Pubble Br	H342463	Secondary
F10711	Aghavea R at Boyhill	H355389	Secondary
F10713	Drumlught R at Drumlught	H346346	Minor
F10712	Lisnabane Burn at Lisnabane Br	H379447	Minor
F10728	Finn (Erne) R at Wattle Br	H425203	Primary
F10729	Finn (Erne) R at Ballyhoe Br	H464203	Primary
F10731	Finn (Erne) R at Rosslea	H537325	Primary
F10732	Lackey R at Carra Old Br	H485237	Primary
F10726	Drumshancorick R at Deer Park	H543337	Secondary
F10725	Killylacky R above Rose Lough	H505305	Minor
F10723	Crockada R at Derryvolan	H545356	Minor
F10724	Lough Tawy R at Crinash	H531371	Minor
F10727	Burnlougher Burn at Bruscaragh	H518364	Minor
F10734	Woodford R at Aghalane	H342194	Primary
F10735	Swanlinbar R at Thompsons Br	H253313	Primary
F10755	Drumersee Burn at Uragh	H206276	Secondary
F10754	Owengarr R at Glasdrumman Br	H226287	Secondary
F10753	Moher R at Corry Br	H234307	Minor

Station Number	Station Name	Irish Grid Reference	Type of Station*
F10736	Arney R at Drumane Br	H236367	Primary
F10737	Arney R at Brocka Br	H175375	Primary
F10738	Lower Lough MacNean at Ulster Way Footbridge	H132376	Primary
F10740	Belcoo R at Belcoo Br	H083384	Primary
F10743	Black R at B52 Road Br	H019435	Primary
F10744	Cladagh R at Gorteen	H132367	Primary
F10757	Lurgan R at Belcoo	H081392	Secondary
F10756	Florencecourt R at A32 Road Br	H194355	Secondary
F10759	Blunnick Burn at Blunnick	H152370	Minor
F10758	Lisblake Burn at Brockagh	H169373	Minor
F10761	Drumhack R at A509 Road Br	H235355	Minor
F10760	Drumharriff Burn at Knocknafadeela	H125385	Minor
F10746	Sillees R at Drumkeen New Br	H230413	Primary
F10747	Sillees R at Thompsons Br	H181448	Primary
F10748	Sillees R at Carr Br	H130471	Primary
F10750	Sillees R at Derrygonnelly Br	H118521	Primary
F10751	Boho Tributary at Boho	H134445	Primary
F10752	Screenagh R at Aghakeeran	H108492	Primary
F10762	Killycat Burn at Killycat Br	H176448	Minor

*Type of Station	Description
Primary	Larger rivers monitored chemically and biologically
Secondary	Smaller rivers with width exceeding 3 metres monitored chemically and biologically
Minor	Smaller rivers with width less than 3 metres monitored biologically

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**ENVIRONMENT
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*Our aim is to protect and conserve the
natural and built environment and to
promote its appreciation for the benefit
of present and future generations.*

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