Northern Ireland
Environment Agency

NORTH EASTERN
River Basin Management Plan Summary

December 2009

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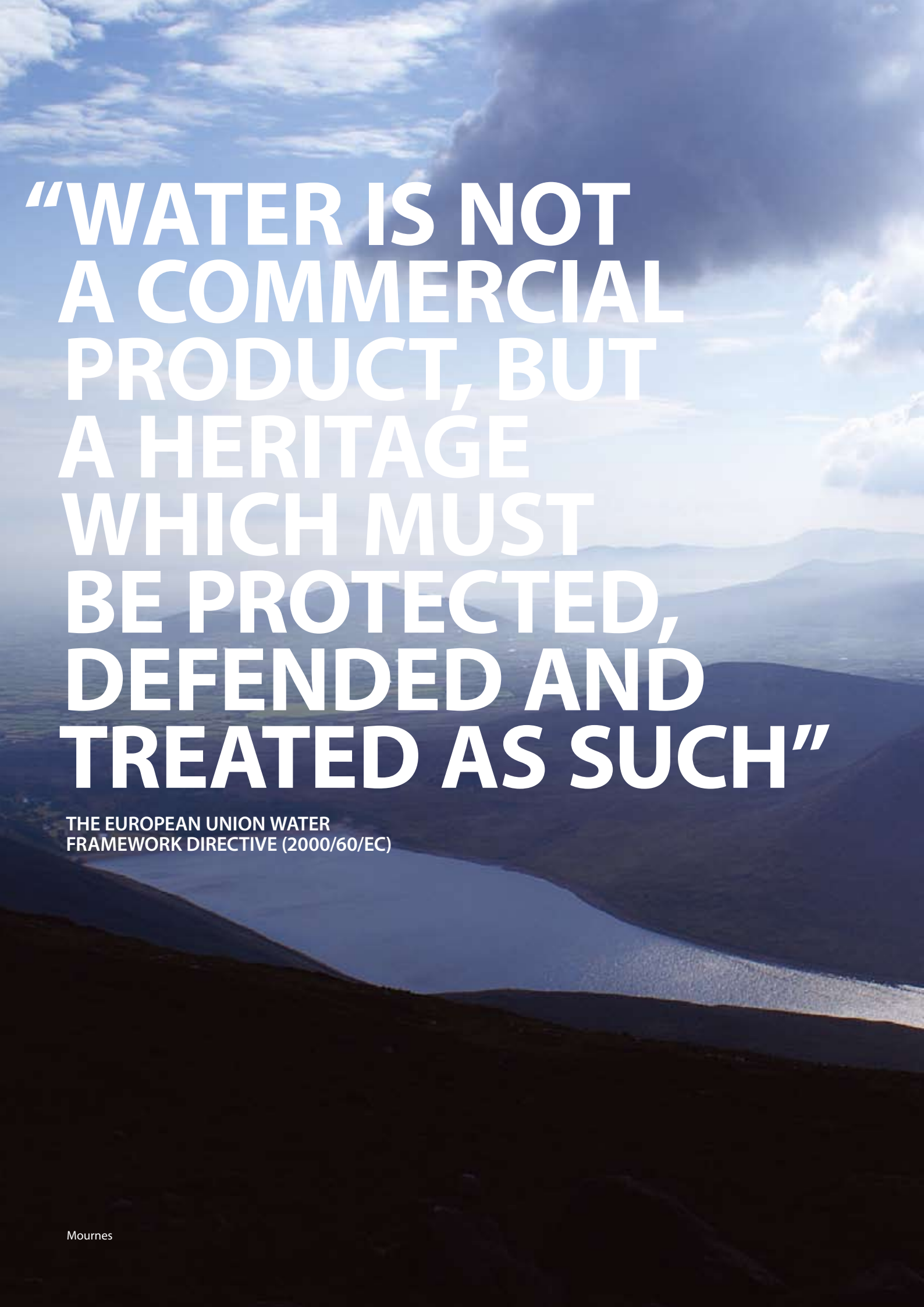

"WATER IS NOT A COMMERCIAL PRODUCT, BUT A HERITAGE WHICH MUST BE PROTECTED, DEFENDED AND TREATED AS SUCH"

THE EUROPEAN UNION WATER FRAMEWORK DIRECTIVE (2000/60/EC)

Mournes

Foreword

"Water is not a commercial product, but a heritage which must be protected, defended and treated as such." The European Union Water Framework Directive (2000/60/EC).

The publication of this Plan shows that Northern ireland is determined to protect and improve one of our most valuable assets: our water environment. We must not underestimate the importance of that environment both to us and to the plants and animals that depend on it. To us, it is the source of our drinking water, but we also use it for recreation and in the tourism, agriculture and business sectors. For many plants and animals, the water environment is a habitat or a source of food.

I have therefore worked with my colleagues in the Executive to bring forward an ambitous, though balanced, Programme of Measures to improve the management and quality of our rivers, lakes, marine waters and groundwater. Using **river basin planning**, we will take an integrated approach to the protection, improvement and sustainable use of the water environment, from source to sea.

Our aim is to provide a clean, healthy environment and considerable benefits for all the people of Northern Ireland, in the 21st century.

We are already making progress, but much remains to be done. We have to overcome the legacy of under-investment in our sewerage system and address the impacts of historical land-use practices.

We need sustainable solutions that take account of economic and social needs as well as environmental needs. We also need effective implementation to meet our goals and objectives, so I and my colleagues on the Executive will continue to monitor progress over the lifetime of the Plan.

EDWIN POOTS MLA
Minister of the Environment

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Executive Summary

The water environment in the North Eastern River Basin District is very special. Our economy, our health and our enjoyment of the environment depend on the way we maintain our rivers, lakes, transitional (estuarine) waters, coastal waters and groundwater. Our water environment is improving, but it continues to face some important challenges.

Last year we published a draft North Eastern River Basin Management Plan for consultation; we would like to thank all who responded. The feedback we received on that consultation has influenced this River Basin Management Plan. The comments and suggestions we received helped us revise our proposals to improve the water environment and have been addressed in the Plan.

The Plan has been developed with input from a wide range of statutory agencies, non government organisations, private individuals and companies. It says where the water environment needs to be protected or improved, the timeframe to make these improvements and how that can be achieved.

The Plan has three components:

1. This document provides a summary of the River Basin Management Plan for the North Eastern River Basin District. It describes the current condition of the water environment, our objectives for improving it, the measures that we will use to deliver these improvements, and how we will work together to implement the Plan;
2. our website www.ni-environment.gov.uk/wfd has an interactive map that provides access to information on local water bodies of interest.
3. the website also provides details of the technical work and methodologies used in developing the River Basin Management Plan;

The water environment is of key importance across a wide spectrum, whether it be as a source of drinking water, for recreational use or for use by industry and agriculture. The need for water protection and dealing with water pollution has been recognised for many years and there are a number of European Directives that afford special protection to identified areas that are important for nature conservation, bathing, economically important species of fish and shellfish, or for drinking water supply.

However, the Water Framework Directive requires us to assess the water environment in a more holistic manner. We consider impacts that go beyond water pollution and look at the impacts of water abstraction and impoundment, physical modifications by engineering activities and invasive alien species. The Directive also requires us to ensure that the existing, planned and supplementary measures being taken to deal with these impacts are both integrated and coordinated across river basins, and take into account the potential impacts of our changing climate.

New monitoring programmes and classification systems have been developed and applied to assess the impacts on the whole water environment, including rivers, lakes, transitional (estuarine) and coastal waters and groundwaters. The results for the North Eastern River Basin District indicate that 17% of the surface waters (rivers, lakes, transitional and coastal waters) are currently classified as good ecological status/good ecological potential or better. 88% of groundwaters are classified as good.

The main pressures and issues for those waters not achieving good status or better are:

- abstraction and flow regulation;
- diffuse pollution from rural and urban land, including nutrient enrichment;
- point source pollution from sewage and industry;
- changes to morphology (physical habitat);
- invasive alien species.

The Plan sets what are considered to be realistic objectives for the next three river basin planning cycles to 2015, 2021 and 2027.

A programme of measures to deliver these objectives has been drawn up, taking into account the range of existing and planned measures as well as identifying supplementary measures that are required to be put in place. The measures will be applied at a local level depending on the reasons identified for not achieving good status. Information leaflets have been produced for 26 Local Management Areas, across the Neagh Bann, North Western and North Eastern Districts. They include details of specific local measures identified to

improve the water environment in your area. These local measures can also be viewed on the interactive web map.

The assessment undertaken for the Plan indicates that implementation of the programme would result in 49% of the surface waters achieving at least good status or good ecological potential by 2015. This would be an overall improvement of 32% for surface waters. By 2027, 100% of groundwaters will achieve good status.

The River Basin Management Plan provides the primary means of coordinating and integrating the management and protection of the water environment in the North Eastern River Basin District. It will have to link with other relevant plans and programmes and will have to be taken into account by other public bodies when carrying out their duties and functions. This integrated approach should provide benefits for all those involved in the protection and enhancement of the water environment.


Brent Geese

Three components of the North Eastern River Basin Management Plan

Trassey River
Robert Thompson

Section 1
About the Plan

River basin planning takes an integrated approach to the protection, improvement and sustainable use of the water environment. It applies to groundwater (underground water) and to all surface water bodies, including rivers, lakes, transitional (estuarine) and coastal waters out to one nautical mile, as well as wetlands which are directly associated with ground or surface water.

The aim is to:

- improve the ecological health of our waters and prevent any further deterioration;
- support more sustainable use of water as a natural resource;
- create better habitats for wildlife in and around water;
- reduce or phase out discharges and emissions of hazardous substances;
- reduce the pollution of groundwater;
- contribute to mitigating the effects of floods and drought.

While the aim is to provide cleaner and healthier waters, we cannot ignore economic realities. Implementing the Water Framework Directive (WFD) will improve our information on the water environment and how it is managed, enabling us to take a balanced and cost-effective approach to water protection and improvement that will not penalise water users.

WFD is implemented through river basin planning, which introduces a six-yearly cycle of planning, action and review. Every six years a **river basin management plan** will be produced for each river basin district. In common with the rest of Europe we published draft Plans for consultation for the period from 22 December 2008 to 22 June 2009. The comments and suggestions we received helped us revise our proposals to improve the water environment. We published a response document on our website to show how we used your comments.

You can read the consultation responses on the **public participation** section of the website.

1.1 The legal and institutional framework

WFD was established in law in Northern Ireland on 22 December 2003 through the Water Environment (WFD) Regulations (Northern Ireland) 2003 (SR 2003 No. 544). These regulations identified the Department of the Environment as the competent authority for each river basin district within Northern Ireland. The Department of the Environment is required to coordinate the implementation of the Directive. Northern Ireland Environment Agency (NIEA), an agency within the Department, is the lead body on the technical work required for implementation of the WFD. Delivery of the WFD rests with the Department of the Environment, in partnership with the Department of Agriculture and Rural Development, the Department of Culture, Arts and Leisure and the Department for Regional Development.

An Inter-departmental Board has been established to oversee and coordinate strategic implementation of the Directive. The Board has established an Implementation Working Group to coordinate the activities of government departments and agencies that will be delivering the requirements of the Directive.

Competent authorities are listed in the **working together to implement the Plan** section of the website.

1.2 The administrative and technical framework

River basins (or catchments) have been assigned to **River Basin Districts**, which serve as the administrative areas for coordinated water management. If a water body crosses the borders of more than one EU Member State, it is assigned to an International River Basin District.

River basins in Northern Ireland and the Republic of Ireland have been assigned to a total of eight River Basin Districts. One of these Rivers Basin Districts lies wholly in Northern Ireland and four lie wholly in the Republic of Ireland. There are three International River Basin Districts: North Western, Neagh Bann and Shannon. The Shannon International River Basin District covers the Shannon river basin, which drains the midlands of the Republic of Ireland. Since it includes only a small portion of County Fermanagh, it is not illustrated in Map 1. However, the Fermanagh portion is included as part of the Shannon River Basin Management Plan.

The responsible bodies, Northern Ireland and the Republic of Ireland, are coordinating their water management actions through a North-South Working Group on Water Quality. This group is supported by the North-South Technical Advisory Group. A cross-border Implementation Group, including NIEA, Donegal County Council and Monaghan County Council was established to enhance the coordination of implementation of measures in the shared waters.

Within the UK, government has set up a number of technical working groups to ensure that the Directive is implemented as consistently as is appropriate within the devolved administrations across the UK. The UK Technical Advisory Group (www.wfduk.org) is a partnership of the UK environment and conservation agencies. It also includes partners from the Republic of Ireland.

1.3 The River Basin Management Plan

The North Eastern River Basin Management Plan has three components:

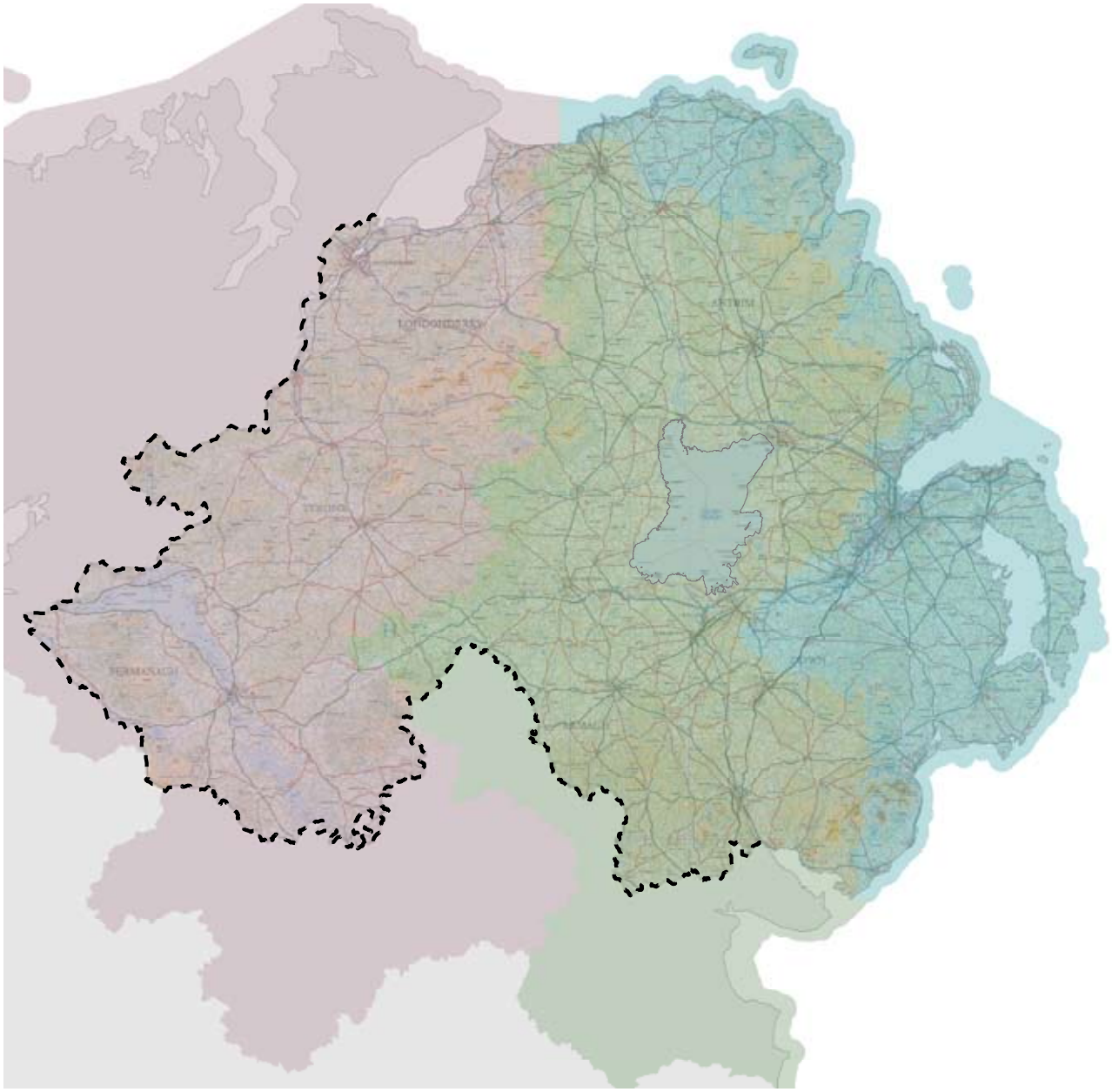
- this document is a summary of the Plan, which provides an overview of the condition of the water environment, our objectives for improving it and the measures we will use to deliver these improvements for the North Eastern River Basin District;
- our website www.ni-environment.gov.uk/wfd has an interactive web map that provides access to information on monitoring, classification, objectives and measures for rivers, lakes, transitional and coastal waters and groundwater;
- the website also provides details of the technical work, methodologies and supporting information used in developing the River Basin Management Plan.

Silent Valley
Robert Thompson

Map 1 River Basin Districts

Map Key

- Neagh Bann
- North Western
- North Eastern
- International Border



1.4 Working together to implement the Plan

The river basin planning process seeks to involve everyone who is interested in, or may be affected by, the water environment and the way it is managed. The production of the Plan has been coordinated by NIEA but has involved a wide range of organisations that have an interest in the water environment.

Northern Ireland has a layered approach to consultation and public involvement, based on a Northern Ireland WFD Stakeholder Forum, which is linked to a network of nine Catchment Stakeholder Groups. The Groups include representatives from agriculture, businesses, planning authorities, environmental organisations and other water users. They provide a forum for anyone interested in local water issues to raise their concerns with, and have them addressed by, both statutory agencies and non-government organisations at a local level. The North Eastern River Basin District includes the Bush and Glens, Belfast Lough and Lagan, Strangford and Lecale, and part of the Carlingford and Mourne Catchment Stakeholder Groups (Map 2).

Find out about your catchment stakeholder group on the **public participation** section of the website.

Portrush Exhibition

1.5 Education and raising awareness of the Plan

NIEA operates an active Schools Education programme. We produce a variety of free educational resources from Key Stage 1 to A level; they are designed with the revised curriculum of Northern Ireland in mind using local examples. The resources are available for download from our website.

NIEA works closely with other organisations such as the Environmental Education Forum and Tidy NI, and supports initiatives such as Eco School and the Young Environmentalist Awards.

More information for teachers and pupils is available from our homepage www.ni-environment.gov.uk and the interactive web map provides information on the quality of our local water environment.

NIEA undertakes a range of pollution prevention initiatives targeted at improving education and awareness and advice to the public. NIEA promotes good practice with respect to storage, use and disposal of hazardous chemicals including oil, garden and household chemicals, paint or detergent. This is supported by a range of guidance notes e.g. Pollution Prevention Guidelines & Oil Care Campaign.

NIEA also supports and promotes other organisations' initiatives. For example, Northern Ireland Water raises awareness of the need for water conservation by hosting events at its Silent Valley Education Centre and organising educational visits to schools and communities. They also publish educational leaflets and run campaigns, such as "Bag it and Bin it" and water audit. Loughs Agency operates successful outreach programmes for schools, including Salmon in the Classroom, and Adopt a River.

NIEA will work to integrate the Plan into our existing Schools Education Programme; in particular providing information on local water bodies, as themed educational resources, to be used in the classroom and as part of other initiatives.

Find out more about these water initiatives through the **useful links** section of the website.

1.6 What's in this document

Section 2 assesses the wider impacts of the Plan.

Section3 considers the economic value of our water environment.

Section 4 of this document provides a brief description of the North Eastern River Basin District.

Section 5 sets out the current status of our water environment.

Section 6 covers our objectives for improving the water environment. For most waters, the improvement is scheduled to be made by 2015, but some improvements will not be made until 2021 or 2027. This longer-term view is important, as it will set the context for the subsequent plans, which will be developed every six years.

Section 7 describes the measures that will be taken to improve all aspects of the water environment and to protect it from deterioration. In proposing measures to deal with the main pressures, it looks at the sectors contributing to those pressures and identifies the measures that are required to protect and improve the affected water bodies.

Section 8 sets out the expected implications of climate change for the water environment.

Section 9 sets out how we will work together to ensure the successful implementation of the Plan and its integration with other plans and programmes in Northern Ireland.

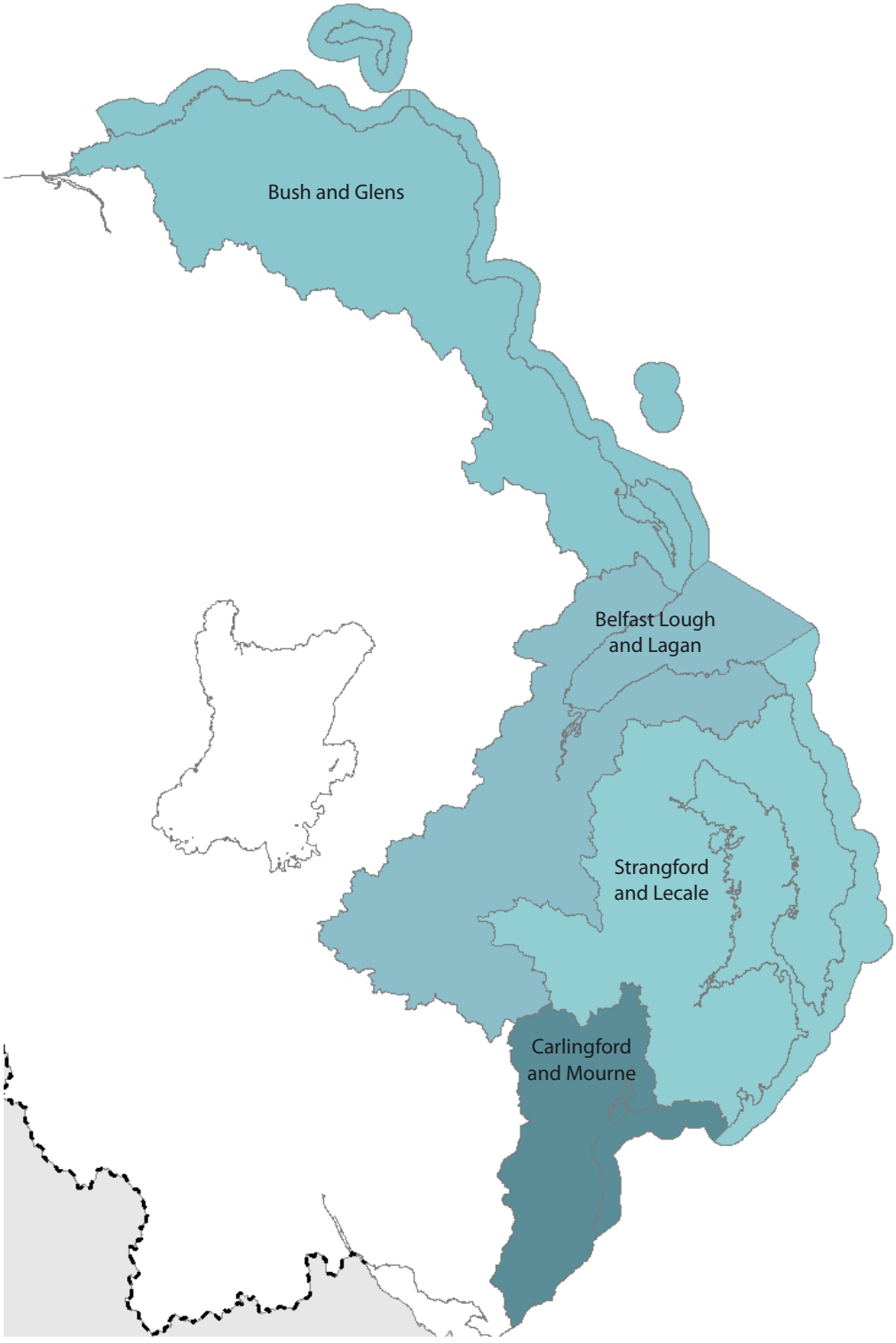
Education

King Scallop

Map 2 Catchment Stakeholder Groups in the North Eastern River Basin District

Map Key

- Bush and Glens
- Belfast Lough and Lagan
- Strangford and Lecale
- Carlingford and Mourne



White Park Bay
Robert Thompson

Section 2

Assessing the impacts of the Plan

The Plan identifies the existing, planned and supplementary measures, that are required to be taken to meet WFD objectives. Some of the supplementary measures may require new or revised legislation, changes in policy or funding. These additional requirements will be considered as part of the existing workings of government in setting and agreeing priorities for action and funding.

The Plan represents the integration of many existing measures such as the Nitrates Action Programme, Abstraction & Impoundment Licensing and Northern Ireland Water's Capital Investment Programme. The costs and benefits of these measures were assessed prior to their introduction, and funding has either already been assigned to them through the current Programme for Government, or will be bid for through the normal budget process for 2011-2014. A strategic Regulatory Impact Assessment identifying the cost and benefits and implications of implementing the measures required has been prepared for the River Basin Management Plan, following the draft Plan consultation. Further information on the strategic Regulatory Impact Assessment is provided in Section 7.12.

Harbour

2.1 Strategic environmental assessment

In addition, all proposed public plans, including the River Basin Management Plan, are subject to a strategic environmental assessment under the Strategic Environmental Assessment Directive. This identifies and assesses the wider environmental impacts of plans or programmes. Strategic Environmental Assessment *Environmental Reports*, which assess the Plans and the measures being proposed, were published for consultation along with the draft Plans during the period 22 December 2008 to 22 June 2009.

Strategic environmental assessment for the River Basin Management Plans considered the impacts associated with a suite of measures, some required under eleven EU Directives listed in the WFD and supplementary measures to further assist in achieving default objectives where the required measures would not be enough. *Environmental Reports* provide further detail on the alternatives considered. An objectives led approach was used to assess the alternatives. The assessment was primarily qualitative in nature comparing the likely impacts of the alternatives against strategic environmental objectives. Further details of the assessment can be found in the *Environmental Reports* which are available on the website.

Where impacts of proposed supplementary measures were identified, mitigation measures were proposed for inclusion in the River Basin Management Plan. They have been reviewed and considered as to how the measures will be addressed during the implementation of the plan. Strategic Environmental Assessment also requires that monitoring be carried out in order to identify, at an early stage, any unforeseen adverse effects due to implementation of a plan or programme, and to be able to take remedial action. The mitigation measures are detailed in the *Strategic Environmental Assessment Mitigation Measures and Environmental Monitoring Programme* document, which is available on the website.

Strategic Environmental Assessment Statements have also been produced as part of the strategic environmental assessment process. The main purpose of the statements is to provide information on the decision-making process and to document how environmental considerations, the views of consultees and the recommendations of the *Environmental Reports* have been taken into account in the River Basin Management Plans.

They also illustrate how decisions were taken, thereby making the process more transparent. The *Strategic Environmental Assessment Statements* are available on the website.

2.2 EU Habitats Directive Assessment

In accordance with requirements of the Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 and amending regulations (which transpose the EC Habitats Directive) an Article 6 assessment of the implications for Natura 2000 sites has also been carried out. Natura 2000 sites are a network of protected sites throughout the European Union: Special Areas of Conservation designated in accordance with the Habitats Directive, and Special Protection Areas designated in accordance with the requirements of the Birds Directive (Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds).

The Article 6 assessment, examined the possible impacts to EU designated sites including Special Protection Areas and Special Areas of Conservation. Where impacts were identified, mitigation measures were proposed for inclusion in the River Basin Management Plans. The mitigation measures have been reviewed and considered as to how the measures will be addressed during the implementation of the Plan. The mitigation measures are detailed in the *Strategic Environmental Assessment Mitigation Measures* document and are available on the website.

NIEA and other government departments and agencies have a statutory obligation when carrying out their functions to have regard to the Habitats Directive as required under the Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (as amended). A number of the existing measures set out in Section 7 are subject to this requirement.

Key documents on **assessing the impacts of the Plan** are available on the website.

Horse Mussel Beds

Kinbane
Robert Thompson

Section 3

The economic value of water and cost recovery of water services

3.1 The economic value of our water environment

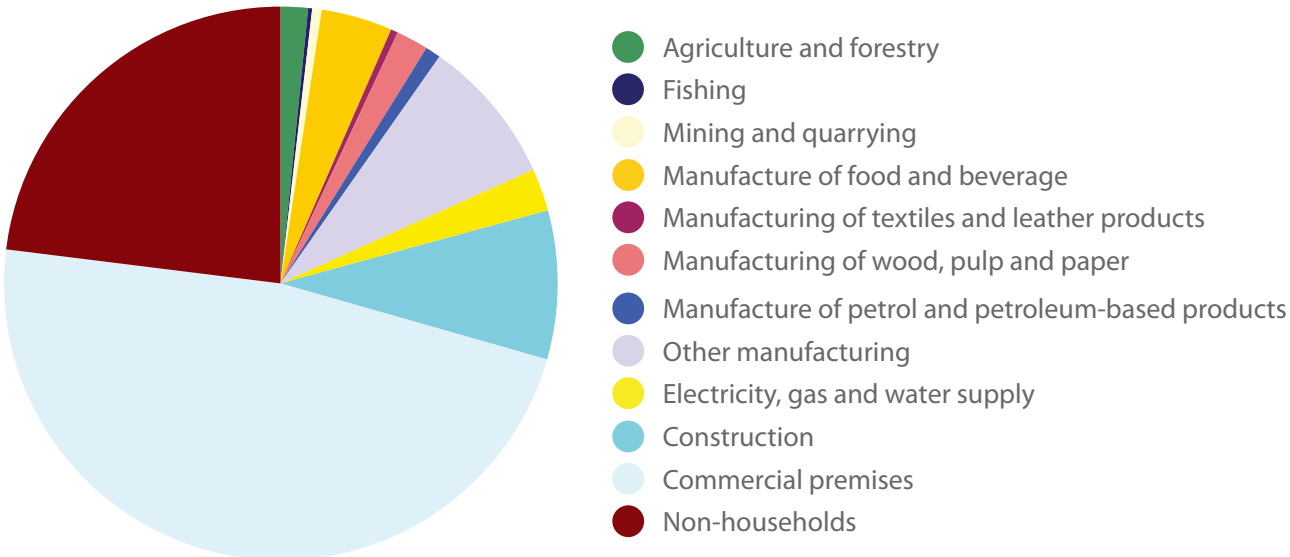
The economic importance of water use in Northern Ireland was described in the 2005 Article 5 Economic Analysis Summary Report. Several key documents have been published since then which provide strategic frameworks, goals and targets to help secure economic prosperity in Northern Ireland. These include the UK Shared Framework for Sustainable Development, Northern Ireland's Sustainable Development Strategy, Investment Strategy for Northern Ireland and Northern Ireland's Programme for Government 2008 – 2011. All these documents recognise the importance of sustainable development encompassing economic, social and environmental considerations.

Several of the sectors considered to be of strategic importance in Northern Ireland have close links with the water environment: they include agriculture, manufacturing industry, (including food and beverages), water services industry, construction industry, commercial businesses, navigation and transport. Two key sectors in particular, agriculture and the water industry will need to take action in response to this River Basin Management Plan.

Gross Value Added by sector in Northern Ireland.

In order to assess the significance of water use, the activities for which water is used were considered for the updated Article 5 Economic Analysis Summary Report. The uses can be consumptive, as for production of mineral water, or non-consumptive, as for cooling of industrial facilities. The relative contributions made by different sectors were considered in terms of Gross Value Added to the economy and employment and are shown in Figure 1 below.

Figure 1 Gross Value Added by sector in Northern Ireland



Source: Article 5 Economic Analysis Summary Report – Entec 2004 and National Statistics Office – as updated by DRD Economics Branch, 2009

Collectively, the key water-users, agriculture and manufacturing industry, accounted for around a fifth of all Gross Value Added in the Northern Ireland Economy. Water has a significant cooling use in power stations and with the rest of the utilities sector brings major water consumers to close to a fifth of all Gross Value Added. The remaining four fifths of the economy (by Gross Value Added) use water in cooking, sanitation and related uses.

Pesticide Spraying

3.2 Cost recovery of water services and water efficiencies

New Regulatory, Institutional and Funding Arrangements for Water & Sewerage Industry

The Water and Sewerage Services (Northern Ireland) Order 2006 ('the Order') provides the regulatory and financial framework for the water and sewerage industry. Responsibility for delivery of water and sewerage services rests with a government owned company: Northern Ireland Water. Northern Ireland Water is run on a commercial basis and subject to independent environmental and economic regulation.

The Order sets out a framework for funding of water and sewerage services to be met by consumers. Water pricing is in place for agriculture and industry through (largely) metered water charges. Trade effluent charges are also in place. It is considered that households already make a contribution through the regional rate.

Water Pricing for Agriculture & Industry

Water pricing arrangements for the agriculture and industrial sectors have been in place for many years. The majority of these customers are metered and charged according to usage. This is in line with the Directive's requirement for users to use water resources efficiently and promotes the polluter pays principle. The bulk of non-essential or discriminatory water use is by non-domestic water users who account for around 30% of the total water consumed in Northern Ireland. The continued roll out of metering in that sector will incentivise efficient use of water resources and help achieve the aims of the Directive. Water and sewerage charges were extended to all non-domestic customers on 1st April 2008.

Water Pricing for Households

It is considered that households make a contribution towards the costs of water and sewerage services through contributions paid through the domestic regional rate. It is estimated that this contribution equated to about half of the level of funding required to provide services to domestic customers in 2008/09. The remaining funding requirement is raised through central Government taxes.

The necessary regulatory and financial structures are in place to implement any Northern Ireland Executive decisions on future funding arrangements. This includes models which apportion the cost of providing water and sewerage services between the customer groups (including households) in line with the requirements of WFD on the recovery of costs for water services. In the absence of specific additional household water and sewerage contributions, the Northern Ireland Executive continues to provide Northern Ireland Water with monthly subsidy payments (on behalf of customers).

These monthly payments reflect the anticipated profile of customer payments (if customers were actually paying). The Northern Ireland Executive has not agreed a methodology by which domestic customers will make payments. Any policy decisions will take account of the fact that there have not been any water scarcity issues within the river basin area during the last 10 years. Northern Ireland Water continually monitors the storage levels in all impounding reservoirs and takes all reasonable steps to maximise water storage so as to minimise the effect to customers of any prolonged dry weather spells.

Key documents relating to the **economic value of water** are available on the website

Promotion of Efficient and Sustainable Water Use

To help meet the sustainable water use aims as described in the WFD, the Order places a duty on Northern Ireland Water to promote the efficient use of water by customers. The independent Utility Regulator has the power to enforce this duty.

It is an offence to waste water from a water source allowing a water source to run to waste or by abstracting more than is licensed under the Abstraction and Impoundment Licensing Regulations (NI) 2006. The abstraction licenses issued to Northern Ireland Water during 2007 will be reviewed in coming years to ensure compliance with the Directive in terms of both water quantity standards and ecological need. Fees and charges under the Abstraction and Impoundment (Licensing) Regulations (NI) 2006 will be introduced in early 2010.

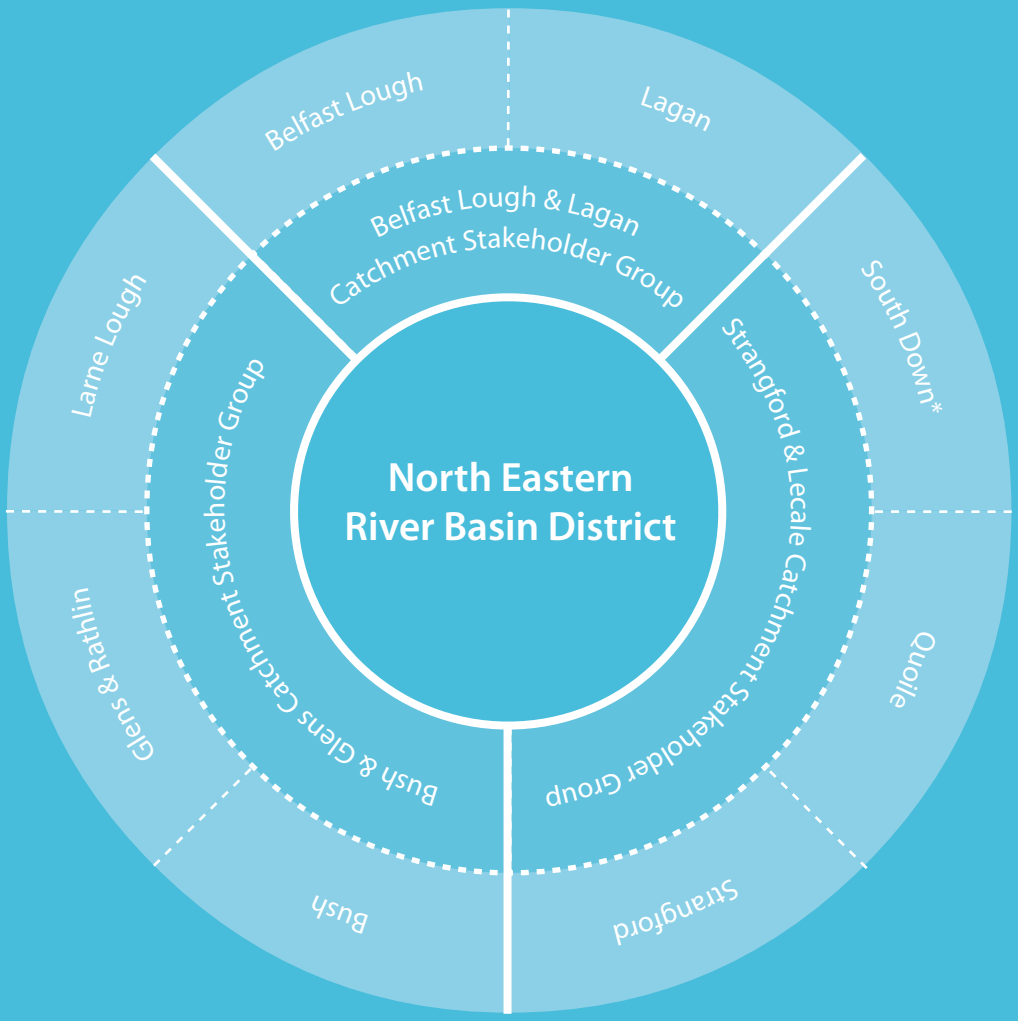
Northern Ireland Water currently has an extensive programme for promoting and improving water efficiency and conservation.

This includes:

- continuing to invest in reducing water mains leakage to reduce the 2008/09 leakage levels by 7.6% for 2012/13;
- attending major public exhibitions, hosting events at its Silent Valley Education Centre and organising educational visits to schools and communities;
- travelling throughout the River Basin areas using its Waterbus (mobile classroom) to teach pupils about issues such as water efficiency;
- publishing education leaflets for customers on water topics such as using water wisely;
- running campaigns designed to increase awareness of the need for water conservation and more environmentally friendly lifestyle choices and behaviours;
- implementing and enforcing the requirements of the Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 which include an offence of installing or failing to maintain a fitting which wastes or misuses water supplied by Northern Ireland Water;
- by adding to the monitoring network in Northern Ireland to more accurately measure the volumes abstracted from each of the surface and groundwater sources currently operated by Northern Ireland Water; more detailed monitoring may identify reductions in volume or sources in the future;
- delivering catchment scale projects with support from NIEA officials to monitor and identify mitigation works which may be required under the Directive to ensure compliance.

Dunseverick
Robert Thompson

North Eastern River Basin District



Key facts

WFD water bodies

111 river water bodies
3 lake water bodies
16 coastal water bodies
3 transitional water bodies
8 groundwater bodies
25 heavily modified water bodies

Protected Areas

13 water dependent Special Area of Conservation
9 water dependent Special Protection Areas
20 Bathing Waters
7 Shellfish Waters
667.5km Freshwater Fish Directive rivers/canals
2km² Freshwater Fish Directive lakes
7 Urban Waste Water Directive sites

Main Towns (population, NISRA, 2001)

Belfast Urban Area (276,459)
Lisburn Urban Area (71,465
Newtownabbey Urban Area (62,056)
Bangor (58,388)
Carrickfergus (27,201)

Main Land Use

Agriculture, urban industry and fish farming

** South Down is partly within the Carlingford & Mourne Catchment Stakeholder Group, Neagh Bann River Basin District.*

Section 4

About the North Eastern River Basin District

The North Eastern River Basin District has a land area of just over 3000km^2, with a further 1000km^2 of marine waters. It takes in large parts of Counties Antrim and Down and a small portion of County Londonderry. The district is flanked by the Antrim Plateau and Glens of Antrim to the north and the Mourne Mountains, which include Slieve Donard, the highest peak in Northern Ireland, to the south.

Over 0.7 million people live in the District which includes the most densely populated region of Northern Ireland, the Belfast Metropolitan Area, and surrounding commuter areas including Lisburn, Newtownabbey, Carrickfergus, Bangor and Newtownards. Most of the main urban areas are located beside rivers or on the coast. In rural areas, many people live in small villages or single dwellings.

Industry is mainly concentrated around the urban areas with much of the rest of the district given over to farming. Farmland in the Lagan valley and other lowland areas is very productive. Commercial fish farming is also significant in the area, whilst boating is a popular recreational activity.

4.1 Surface waters

The principal **river systems** are the Lagan, Bush and Quoile. Smaller river basins include those draining the Glens of Antrim, and the County Down coastline, including the Ards Peninsula. The main **lakes** within the District are Lough Mourne, Clea Lakes and the Silent Valley, all of which are used for public water supply.

Our **transitional and coastal waters** extend from the limits of the transitional waters inland out to one nautical mile from baseline. For open coast, that baseline is the low water mark, while for sea loughs, the baseline is a series of bay closing lines across the entrances to the loughs. The North Eastern District has an extensive coastline including Larne, Strangford and Belfast Loughs and the North Coast and Ards Peninsula.

The WFD recognises that some water bodies will have changed to such a degree that they can no longer be restored to their original condition without compromising their current use. For example, some waters have been deepened to allow for navigation; others have flood defences or have been dammed to provide a source of drinking water. They are called **heavily modified or artificial water bodies** and within the North Eastern River Basin District we have 25 of them: 18 rivers, 2 lakes, 2 coastal waters and 3 transitional waters. The rivers include reaches of the Shimna, Ballyholme, Enler, Connswater, Blackstaff, Lagan, Clowney, Burn Gushet, Bush, Copeland Water, Annalong, Kilkeel, Inver and Woodburn systems. The lakes are Silent Valley Reservoir and Lough Mourne. The coastal waters are Belfast Harbour and Larne Lough North. The transitional waters are the Connswater, Tidal Lagan and Quoile Pondage.

4.2 Groundwater

Groundwater occurs to some degree from nearly all rock types within the district. Significant supplies are found in the Lagan and Enler Valleys within sandstone aquifers and near Dundonald and Comber within sand and gravel deposits. In the past, these aquifers have been used extensively for public supply, and still represent an important strategic resource that requires management and protection.

4.3 Protected areas

The District supports important habitats and wildlife, including areas identified as requiring special protection under existing European legislation. These areas need action to protect their surface water or groundwater, or to conserve habitats or species that directly depend on those waters. Protected areas may be part of a water body, for example bathing waters, or may be a group of water bodies, for example designated under Freshwater Fish Directive.

The protected areas in the North Eastern River Basin District are summarised in Table and shown on the interactive web map. The condition of protected areas is described in Section 5.

The protected areas in the North Eastern River Basin District are shown on the **interactive web map**.

Table 1 Protected areas in the North Eastern District

Protected Area Type	Location
Waters used for the abstraction of drinking water (drinking water protected areas)	
This is a new category of protected area which replaces the system of drinking water protection previously provided by the Surface Water Abstraction Directive (75/440/EEC) and will also incorporate groundwaters.	There are 26 drinking water protected areas
Areas designed to protect economically significant aquatic species	
Freshwater Fish Directive (78/659/EEC)	625km of rivers are identified as salmonid and 37km of rivers & 5.5km of canals are identified as cyprinid, and 2km^2 lakes designated.
Shellfish Waters Directive(79/923/EC)	There are 7 shellfish waters within Larne Lough, Strangford Lough (3), Killough Harbour, Dundrum Bay and Belfast Lough.
Bathing Waters	
These are bathing waters identified under the Bathing Water Directives (76/160/EEC)	There are 20 identified bathing waters in the North Eastern District: Portstewart, Portrush - Mill West, Curran East, Whiterocks, Portballintrae (Salmon Rock), Ballycastle, Waterfoot, Carnlough, Ballygally, Brown's Bay, Helen's Bay, Crawfordsburn, Ballyholme, Groomsport, Millisle, Ballywalter, Tyrella, Murlough, Newcastle, Cranfield (Nicholson's).
Nutrient Sensitive Areas	
Areas designated as sensitive under the Urban Waste Water Treatment Directive (91/271/EEC) and the Nitrates Directive (91/676/EEC)	There are 7 Urban Waste Water Treatment Directive sensitive areas; Inner Belfast Lough, Tidal Lagan, River Lagan catchment, River Bush catchment, North end of Strangford Lough, River Enler catchment, Quoile Pondage & catchment. A total territory approach has been adopted in Northern Ireland for the Nitrates Directive.
Areas designated for the protection of habitats or species (Natura 2000 sites)	
These are areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection. Habitats Directive (92/43/EEC)	There are 13 water dependent Special Areas of Conservation: Rathlin Island, Aughnadarragh, Ballykilbeg, Breen Wood, Garry Bog, North Antrim Coast, Garron Plateau, Hollymount, Murlough, Eastern Mournes, Strangford Lough, Turmennan and Lecale Fens.
Birds Directive (79/409/EEC)	There are 9 water dependent Special Protection Areas: Larne Lough, Strangford Lough, Rathlin Island, Outer Ards, Killough Bay, Swan Island, Antrim Hills, Belfast Lough and Sheep Island.

Waterfall, Annalong River
Robert Thompson

Section 5

Assessing the quality of our water environment

Our understanding of the state of Northern Ireland's water environment has developed as we have adapted to the requirements of the WFD. Now, when assessing water quality, we consider both ecological and chemical quality, as well as the pressures that can affect them. The WFD has also introduced, for the first time, a formal classification system for lakes.

We expect our understanding to improve over time as monitoring data, and the scientific techniques used to interpret them, develop and improve.

5.1 Classifying the status of water bodies

WFD requires us to protect the status of water bodies from deterioration and, where necessary and practicable, to restore water bodies to good status. Classification of water bodies helps us in planning what measures might be required for improvements; it will eventually show how our actions have benefited the environment.

In classifying surface waters and groundwater, we followed the guidance developed by the UK Technical Advisory Group (NIEA contributed to the production of this guidance throughout). It recommended what should be included in classification and how data (including data on ecological and chemical quality) are combined and presented. NIEA has been working with the Republic of Ireland and other Member States to try to ensure Northern Ireland's classification schemes are comparable with those of Europe.

We have different classification systems for surface waters, heavily modified water bodies and groundwater.

WFD requires us to estimate the level of confidence and precision associated with the results from monitoring programmes. This has been carried out using UK Technical Advisory Group guidance. Confidence in class of the overall status of water bodies is described as high, medium or low and reported on the interactive web map. Low confidence in class indicates that further investigation is required.

5.2 Surface water classification

The ecological quality of surface waters reflects:

- biological quality elements (invertebrates, plants fish, phytobenthos and phytoplankton);
- general chemical and physicochemical quality elements (phosphorus, in rivers and lakes, nitrogen in transitional and coastal waters, dissolved oxygen, and pH);
- specific pollutants (ammonia and other potentially ecologically toxic substances);
- hydromorphological quality elements (water flow and physical modifications).

Different classification systems were used for rivers, lakes, and transitional and coastal waters to take account of factors like the ecological differences between free-flowing, standing waters and transitional and coastal waters.

For each water body, the ecological quality elements were classified individually. Chemical quality was determined by the levels of certain hazardous and dangerous substances. The ecological and chemical results were combined to give an overall status in one of five classes:

- High
- Good
- Moderate
- Poor
- Bad

If a water body is classified as high or good status then it has a healthy ecology, which deviates only slightly from natural conditions, is an important natural asset and can support a wide range of uses such as recreation, fishing and drinking supply. If a water body is classified as moderate, poor or bad then the ecology is adversely affected and the range of uses that can be supported is reduced.

Read about how we classified **rivers** and **lakes**, and **transitional** and **coastal waters** on the website.

Heavily modified and artificial water bodies

Some water bodies have been modified to such an extent that they can no longer be restored to their original condition without compromising their current use (heavily modified water bodies). Others water bodies have been created where no water body previously existed (artificial water bodies). Heavily modified and artificial water bodies were identified by considering urban, residential and commercial land use, water storage, navigation, and the wider environment.

There are 4 classes for the status of heavily modified and artificial water bodies:

- good ecological potential or better (GEP)
- moderate ecological potential (MEP)
- poor ecological potential (PEP)
- bad ecological potential (BEP)

The classification system for heavily modified and artificial water bodies takes into account the modified nature of these water bodies. Their ecological potential is assessed for water quantity, water flow and physical habitat depending on whether reasonable effort has been made to maximise the quality of the ecology and habitats. The ecological potential classification also reflects the chemical quality of the water.

Heavily modified and artificial water bodies were assessed using guidance produced by the UK Technical Advisory Group. We hosted a series of workshops with expert participants from organisations including Waterways Ireland, Rivers Agency, Northern Ireland Water, Loughs Agency and Northern Ireland Ports and Harbours to assign an initial classification of good ecological potential or better, or moderate ecological potential or worse.

For river water bodies initially assigned good ecological potential or better, physicochemical and specific pollutant classification data was analysed, and, where appropriate, the classification was downgraded from good ecological potential to moderate ecological potential.

Then the classification of all heavily modified and artificial river water bodies was further refined using the status of biological elements including invertebrates, diatoms, macrophytes and fish. Where a biological element was directly impacted by the modification, the overall classification was not downgraded; for example, if the fish population upstream of an impoundment is directly impacted by the modification, the site was not downgraded due to the fish status.

Following the initial classification agreed during the workshops, heavily modified lakes were also assessed using biological and supporting physicochemical elements that are not impacted by modification. These elements included phytobenthos, phytoplankton and total phosphorus.

For coastal and transitional waters, the process of classifying ecological potential included an assessment of measures and best practice already in place to mitigate the modified or artificial characteristics of the water body.

Read about how we classified h**eavily modified water bodies** on the website.

Quality of our surface water bodies

The classification results indicate 16% of waters in the North Eastern District are at good status or better, and 2% are classified as good ecological potential or better. 65% are classified as less than good status, with the remaining 17% at moderate ecological potential or worse. The results are illustrated in Figures 2 and 3, and Tables 2 and 3 and the quality of individual water bodies can be viewed on the interactive web map.

Marine Monitoring

5.3 Groundwater classification

We assessed groundwater bodies by looking at the main land-use pressures likely to be affecting them: they included chemical (diffuse and point sources) and quantitative (water abstraction and quarry dewatering) pressures. Using the available monitoring data from 2000 to 2008, we considered:

- the scale, frequency and distribution of the pressures;
- the nature of the link between the pressure and the groundwater;
- trends in groundwater (and surface water) quality and levels;
- the relationship between groundwater bodies and the surface water bodies and wetland systems to which they eventually discharge.

Groundwater bodies are assigned to either **good** status or **poor** status, for chemical quality and water quantity. 7 groundwater bodies (88%) in the North Eastern District are classified as good for chemical quality and water quantity. Results are illustrated in Figures 4 and 5.

Read about how we classified **groundwater** on the website.

5.4 Condition of our protected areas

Protected areas have their own monitoring and assessment requirements to determine their condition. They are often assessed for additional pollutants or requirements relevant to their designation that are not included in the WFD. For example, faecal coliform levels are assessed within shellfish and bathing waters. Managing protected areas within the framework of river basin planning, will allow us to streamline our monitoring and assessment work and integrate their protection into river basin plans. The condition of protected areas in the North Eastern River Basin District is summarised in Table 4 and illustrated on the interactive web map.

The quality of individual water bodies can be viewed on the interactive web map.

Drinking water protected areas

Drinking Water Protected Areas have been identified, within which public and private abstractions from surface and groundwaters must be protected. This requirement of WFD supersedes the obligations of the Surface Water Abstraction Directive. NIEA will work with Northern Ireland Water to assess risks to protected areas serving large public water supplies. The Northern Ireland Water Drinking Water Safety Plans, to be completed at the end of 2010, and the water quality monitoring carried out by NIEA will be used to identify how best to reduce the risks.

Protected Areas for economically important species:

Freshwater Fish

The Freshwater Fish Directive imposes standards for the protection of game (salmon and trout) and coarse fisheries. Under the Directive around 668km of rivers and canals and 2km^2 of standing waters (lakes and reservoirs) greater than 50 hectares in area have been designated, in the North Eastern River Basin District, as either salmonid (suitable for game fish) or cyprinid (suitable for coarse fish).

The designated waters are required to comply with imperative quality standards and should aim to achieve guide standards. Compliance is assessed annually using the monitoring results for the calendar year and compliance figures for 2008 are given in Table 4.

The Freshwater Fish Directive will be revoked at the end of 2013. The UK Technical Advisory Group is working to ensure that WFD standards provide at least the protection afforded under the Directive.

Shellfish waters

Shellfish waters are designated under the Shellfish Waters Directive in order to ensure a suitable environment for shellfish growth. There is close cooperation between NIEA, who monitor shellfish waters and shellfish for compliance with the Shellfish Waters Directive, and the Food Standards Agency, who monitor shellfish flesh for compliance with the Food Hygiene Regulations.

Mandatory and guideline standards are associated with the Shellfish Waters Directive and monitoring is carried out before and after spawning within designated shellfish waters. In some cases these standards have now been superseded by the environmental quality standards developed for

WFD where they exist. In the North Eastern District, summary compliance figures for 2007 for Larne Lough, Strangford Lough and Dundrum Bay are given in Table 4.

During 2009 the Department of the Environment for Northern Ireland, following consultation, identified several new shellfish waters and amalgamated many small ones into larger areas. Additional sites in Belfast Lough and Killough were designated in 2009. In the past, pollution reduction programmes for shellfish waters have guided discharge standards for wastewater treatment works and sewerage systems. In addition, tighter controls on agricultural practices have been introduced through the Nitrates Action Programme across the total territory of Northern Ireland, which will contribute to better shellfish water quality. Pollution reduction programmes are currently being revised to reflect these changes and to incorporate the new designations.

Bathing Waters

Bathing Waters are areas protected for recreational bathing use and must meet mandatory and guideline standards for microbiological quality in order to protect human health. Waters that comply with the guideline standards are termed excellent quality and waters complying with the mandatory standard are termed good quality. Those bathing waters that fail to comply with the mandatory standards are recorded as poor and this constitutes a failure under the Bathing Water Directive. In the North Eastern District, 20 areas are identified as bathing waters. The summary compliance figures for 2009 are given in Table 4.

In Northern Ireland there are currently 24 identified bathing waters. The water quality standards of the Bathing Waters Directive are used to set discharge limits for coastal waste water treatment works and sewerage systems. In addition, tighter controls on agricultural practices have been introduced through the Nitrates Action Programme across the total territory of Northern Ireland, which will contribute to better bathing water quality.

Nutrient Sensitive Protected Areas

Nutrient sensitive areas comprise nitrate vulnerable zones and polluted waters designated under the Nitrates Directive and areas designated as sensitive areas under the Urban Waster Water Treatment Directive in relation to nutrient enrichment.

A total territory approach has been adopted in Northern Ireland under the Nitrates Directive. Under the Urban Waste Water Treatment Directive, Inner Belfast Lough, the Tidal Lagan and the River Lagan catchment, the River Bush Catchment, the North end of Strangford Lough, the River Enler catchment, and the Quoile Pondage and catchment have been designated as sensitive. Waste water treatment works discharging into these areas, with a population equivalent greater than 10 000, are required to have nutrient reduction, or another form of further treatment in place within seven years of the designation.

Natura 2000 Sites

Special Areas of Conservation (Habitats Directive) and Special Protection Areas (Birds Directive) are assessed as being in favourable or unfavourable condition. These areas have been examined to determine if water dependent features are present.

In the North Eastern River Basin District we have identified 13 Special Areas of Conservation that have water dependent features. Rathlin Island, Aughnadarragh and Ballykilbeg are assessed as favourable.

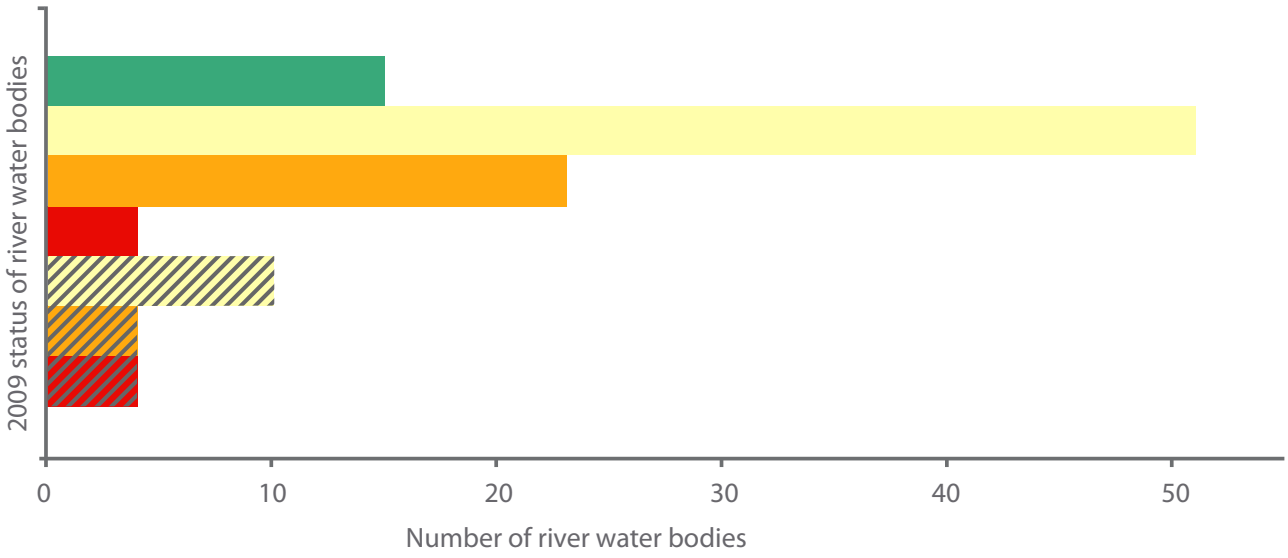
Breen Wood, Garry Bog, North Antrim Coast, Garron Plateau, Hollymount, Murlough, Eastern Mournes, Strangford Lough, Turmennan and Lecale Fens are assessed as unfavourable.

There are 9 Special Protection Areas that have water dependent features. Larne Lough, Strangford Lough, Rathlin Island, Outer Ards and Killough Bay are assessed as favourable. Belfast Lough and Sheep Island are assessed as unfavourable. Swan Island and Antrim Hills are not yet assessed.

Measures to address unfavourable status can be viewed on the interactive web map.

The condition of individual protected areas can be viewed on the **interactive web map.**

Figure 2 Overall status of river water bodies in the North Eastern District



Key

High Good Moderate Poor Bad

GEP (HMWB) MEP (HMWB) PEP (HMWB) BEP (HMWB)

Table 2 Overall status of lake water bodies in the North Eastern District

	2009 Status of lake water bodies
	Unit: No. of water bodies
High	—
Good	—
Moderate	—
Poor	—
Bad	1
GEP	1
MEP	—
PEP	1
BEP	—

Figure 3 Overall status of coastal water bodies in the North Eastern District

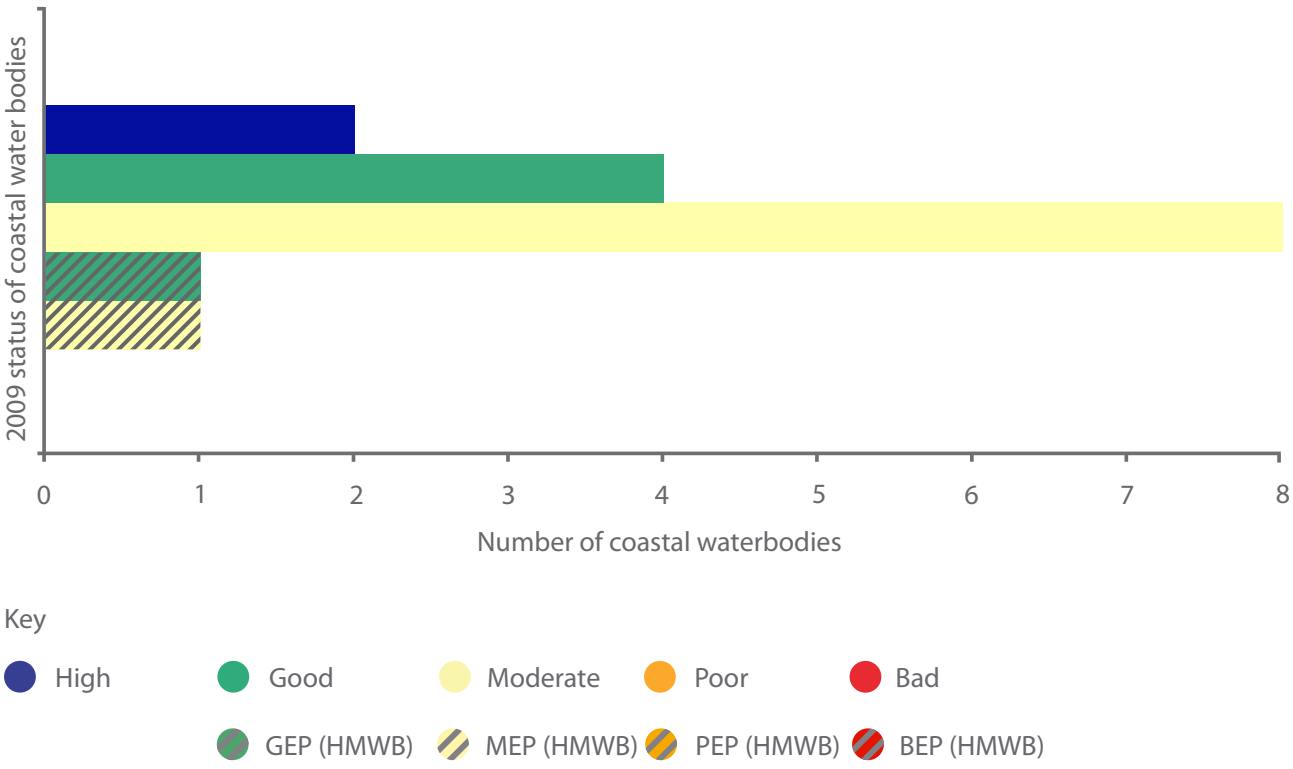


Table 3 Overall status of transitional water bodies in the North Eastern District

	2009 Status of transitional water bodies
	Unit: No. of water bodies
High	0
Good	0
Moderate	0
Poor	0
Bad	0
GEP	0
MEP	2
PEP	0
BEP	1

Figure 4 Chemical status of groundwater bodies in the North Eastern District

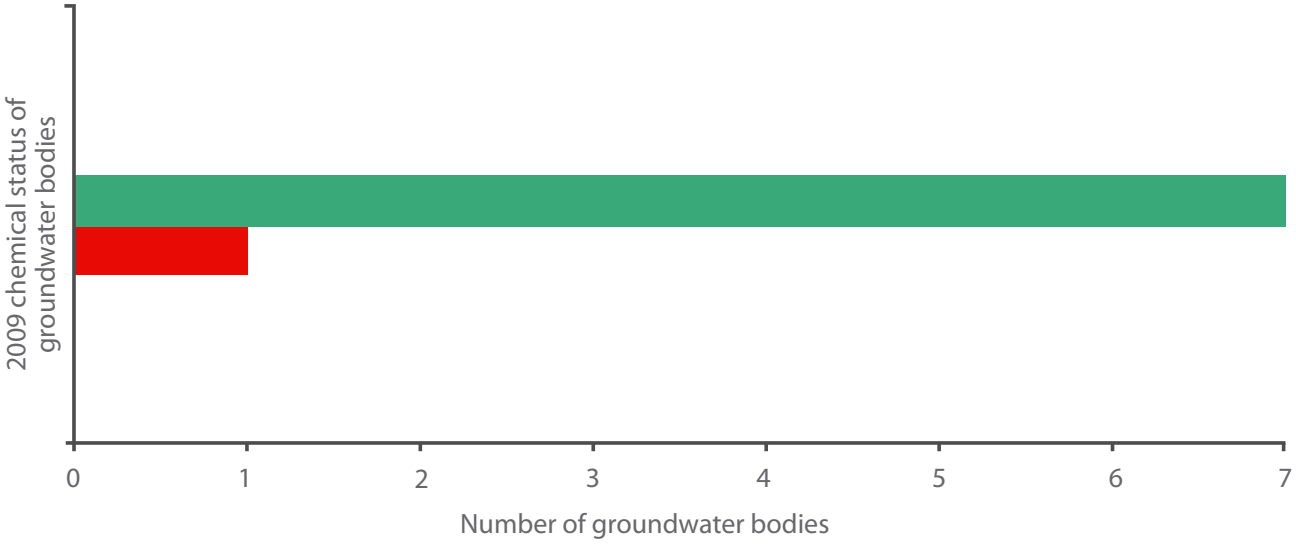
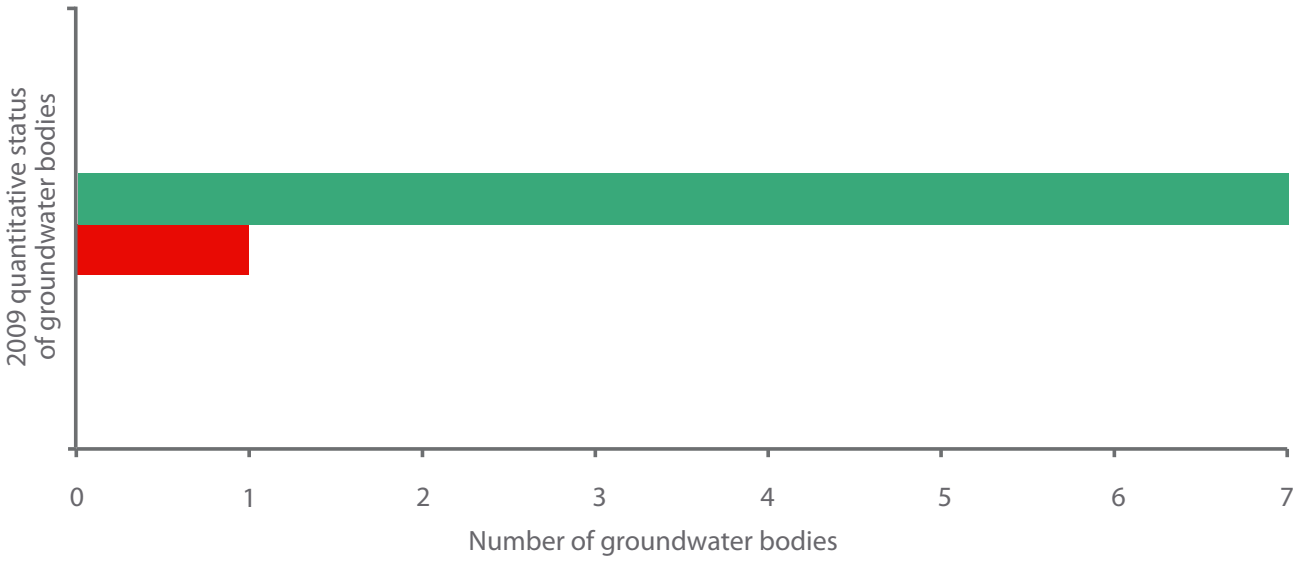


Figure 5 Quantitative status of groundwater bodies in the North Eastern District



Key

Good Poor

Table 4 Summary of the condition of our protected areas in the North Eastern River Basin District

Waters used for the abstraction of drinking water (drinking water protected areas)		
This is a new category of protected areas that will be assessed in conjunction with the Drinking Water Safety Plans currently being compiled by Northern Ireland Water. 26 areas are identified in the North Eastern District.		
Areas designed to protect economically significant aquatic species		
Compliance with Freshwater Fish Directive (78/659/EEC)	Pass	Fail
Rivers (salmonid)	575km (92%)	50km (8%)
Rivers (cyprinid)	22km (60%)	15km (40%)
Canals (cyprinid)	5km (92%)	0.5km (8%)
Lakes	0.6km^2 (30%)	1.4km^2 (70%)
Compliance with Shellfish Waters, 2007 Directive (79/923/EC)		
Mandatory Standards	5 (100%)	
Guideline Standards	2 (40%)	
Bathing Waters		
Compliance with Bathing Water Directive 2009 (76/160/EEC)		
Excellent Standard	7 (35%)	
Good Standard	11 (55%)	
Poor Standard	2 (10%)	
Nutrient Sensitive Areas		
7 areas designated as sensitive under the Urban Waste Water Treatment Directive (91/271/EEC). A total territory approach has been adopted in Northern Ireland for the Nitrates Directive (91/676/EEC)		
Areas designated for the protection of habitats or species (Natura 2000 sites)		
Compliance with Habitats Directive (92/43/EEC)		
Favourable	3	
Unfavourable	10	
Not yet assessed	0	
Compliance with Birds Directive (79/409/EEC)		
Favourable	5	
Unfavourable	2	
Not yet assessed	2	

Glenam

Section 6

What we plan to achieve by 2015 and beyond

Establishing environmental objectives to deliver improvements in water quality is a key part of the river basin planning process. Environmental objectives aim to:

- provide at least good status for all water bodies;
- prevent deterioration in status;
- promote sustainable development;
- achieve specific standards for protected areas.

The objectives set the water status to be achieved for all surface water bodies and groundwaters for each six-year planning cycle, from 2009. They should provide an appropriate balance between protecting and improving the water environment and ensuring that sustainable activities can continue and flourish.

6.1 Our starting point

We based our objectives on the classification results for 2009 using the guidance on environmental standards developed through the UK Technical Advisory Group. The classification results for the North Eastern River Basin District show that 21 out of 133 surface water bodies (16%) and 7 out of 8 groundwater bodies (88%) are already achieving the standards required for good status or higher. 2 heavily modified water bodies (2%) have been classified as being at good ecological potential or better. These waters will be managed to ensure that we continue to protect them from any deterioration.

In the North Eastern River Basin District, 87 of our surface water bodies (65%) and 1 groundwater body (12%) are below good status. 23 heavily modified water bodies (17%) are below good ecological potential. The condition of these water bodies limits the uses to which they can be put for social and economic development and therefore, objectives have been set to improve the quality of these waters over the lifetime of the Plan. Sometimes deterioration in water quality has a single major cause but often many different factors are interlinked and require detailed investigation to determine the best approach to improving water quality. However, we are confident that, through the implementation of the Plan, enhancements will be carried out and further improvements towards good status will be possible. Such improvements will benefit the natural environment and our quality of life as well as supporting other water uses that will encourage economic development and recreational use.

6.2 Alternative objectives

The Plan identifies objectives to be achieved at each 6 year cycle until 2027. The WFD recognises that achieving good status for surface water bodies may not be possible within the first cycle for the following reasons:

- the scale of improvements may take several cycles, for reasons of technical feasibility;
- carrying out the improvements by 2015 may be disproportionally expensive;
- natural conditions may not allow for timely improvements.

In such cases, as long as the water body is not allowed to deteriorate, the necessary improvements may extend over several planning cycles. The WFD also allows a less stringent objective to be set, where it is considered that good status cannot be achieved by 2027. However, we have set extended deadlines in preference to less stringent objectives where an alternative objective was considered necessary.

There are other exceptions where alternative objectives can be set. The less stringent alternative objective of good ecological potential (see Section 4) can be set for heavily modified or artificial water bodies that cannot achieve good status.

The objectives set for 2015 to 2027 will be reviewed in each subsequent planning cycle.

6.3 How we set the Plan's objectives

In setting environmental objectives we have tried to be both ambitious and realistic. The WFD states that we should aim to achieve good status, or good ecological potential, in all water bodies, except where appropriate extensions are determined. We have aimed to set an objective of good status in 2015 for water bodies, except where there are reasons why this is not feasible.

Where it is considered that good status cannot be achieved by 2015 we aim to prevent deterioration in status and achieve good status as soon as feasible thereafter. For each waterbody, the pressures causing less than good status were examined to determine whether good status is likely to be achieved by 2015, or a further extension is required to 2021 or later. The judgement on what was considered achievable was informed by the objectives established through a series of workshops carried out in 2008. The workshops examined, on a water body by water body basis, the impacts observed and the measures proposed to deliver good status and what was considered feasible with current knowledge and technology. This information from the workshops was combined with improved information on the measures to evaluate and review the objectives for the Plan. This review took into account the monitoring information available as well as known impacts and planned improvements occurring in each water body.

Read how we set environmental objectives for **rivers and lakes, transitional and coastal waters, heavily modified water bodies** on the website.

6.4 Our environmental objectives

By 2015 we believe that we will be able to achieve good status, or better, in 61 out of 133 of our surface water bodies (46%), and good ecological potential or better in 4 of our heavily modified water bodies (3%). 7 out of 8 of our groundwater bodies (88%) will be maintained at good status.

We have identified 68 surface water bodies and 1 groundwater body where it will be more feasible and cost-effective to implement actions over a longer period of time than 2015.

We believe that, by 2027, taking into account further improvements in managing and protecting our waterways, we will achieve the objectives set out for each water body type in Figures 6 to 11.

6.5 Objectives for protected areas

Protected areas have been designated because of their economic, environmental or social importance. The legislative instruments under which the protected areas were established have their own associated objectives and standards. These objectives and standards and the deadlines for implementation set out in the legislation for the protected areas must be adhered to. In circumstances where both protected area and WFD objectives/standards apply then the more stringent objective/standard applies. Where no deadline is stated in the specific protected area legislation, the deadlines set out in the WFD will be employed where it is appropriate.

Objectives for individual water bodies can be viewed on the **interactive web map.**

Figure 6 Current status and proposed objectives for river water bodies in the North Eastern District

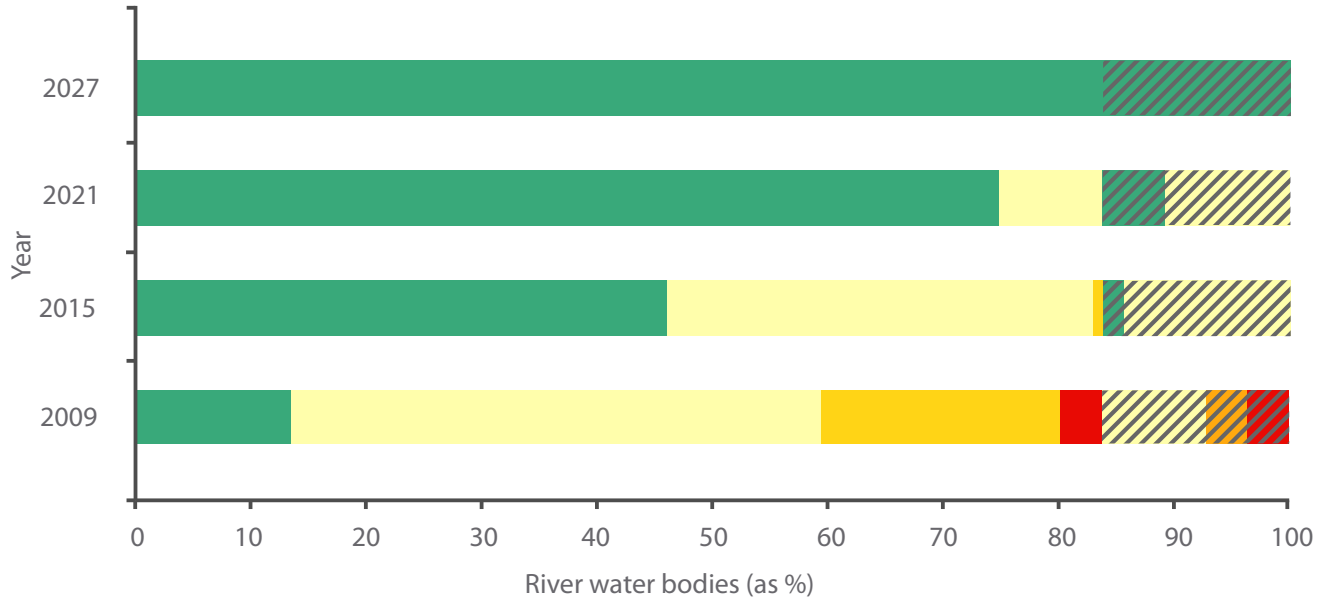
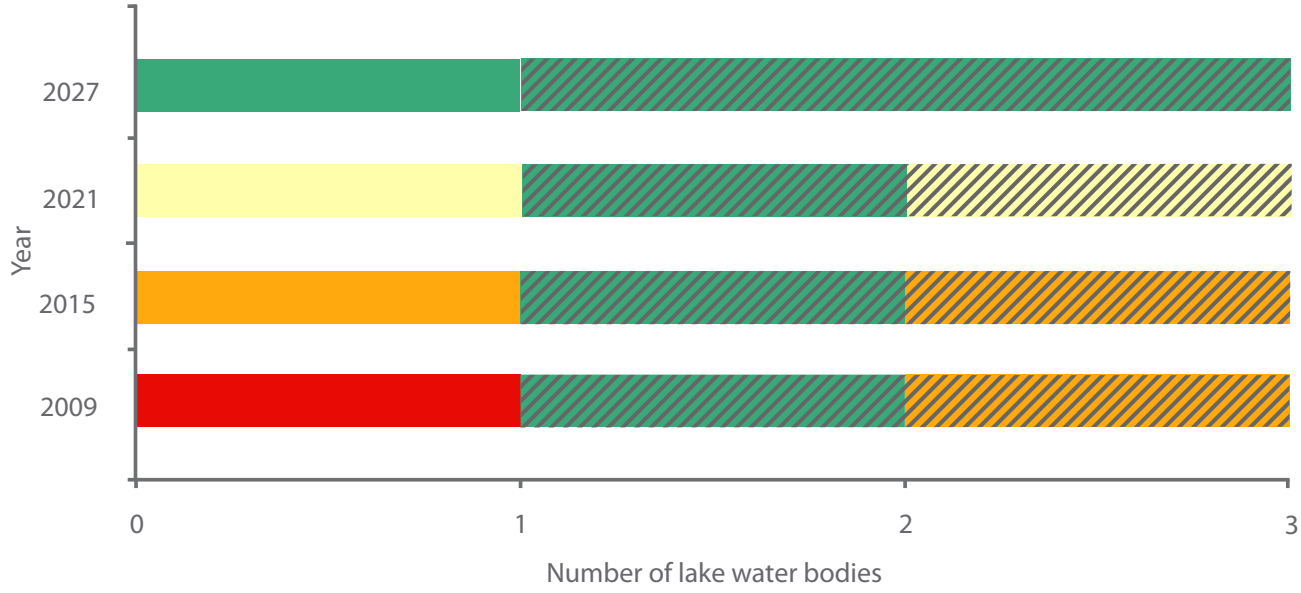


Figure 7 Current status and proposed objectives for lake water bodies in the North Eastern District



Key

High
Good
Moderate
Poor
Bad
GEP (HMWB)
MEP (HMWB)
PEP (HMWB)
BEP (HMWB)

Figure 8 Current status and proposed objectives for coastal water bodies in the North Eastern District

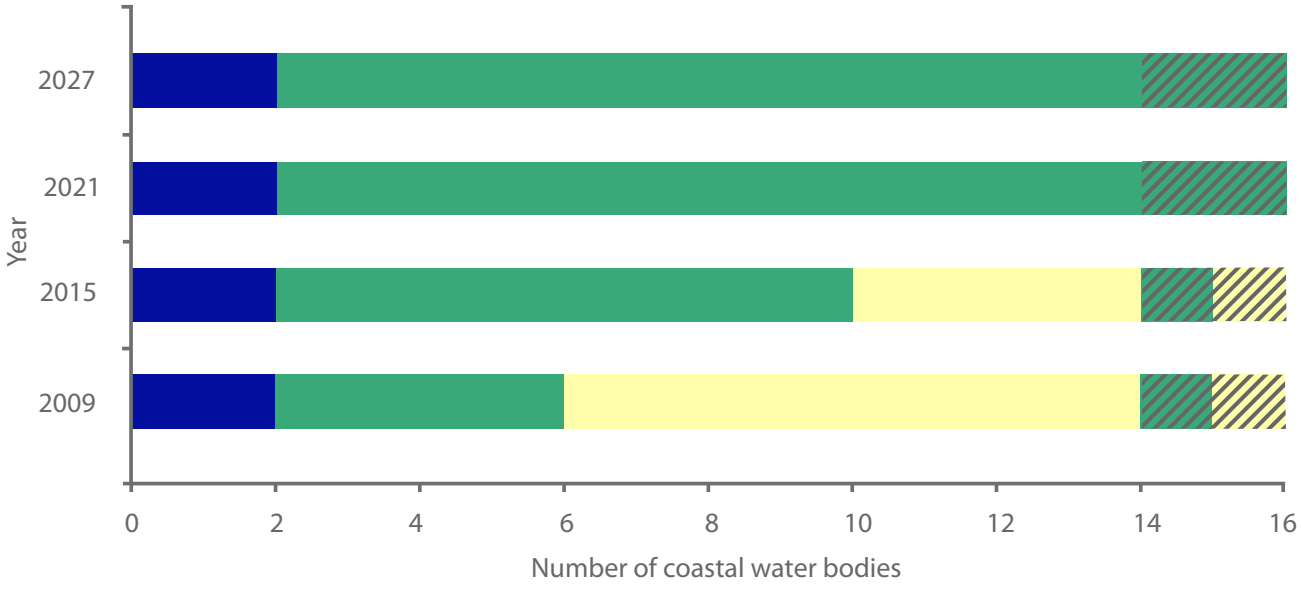
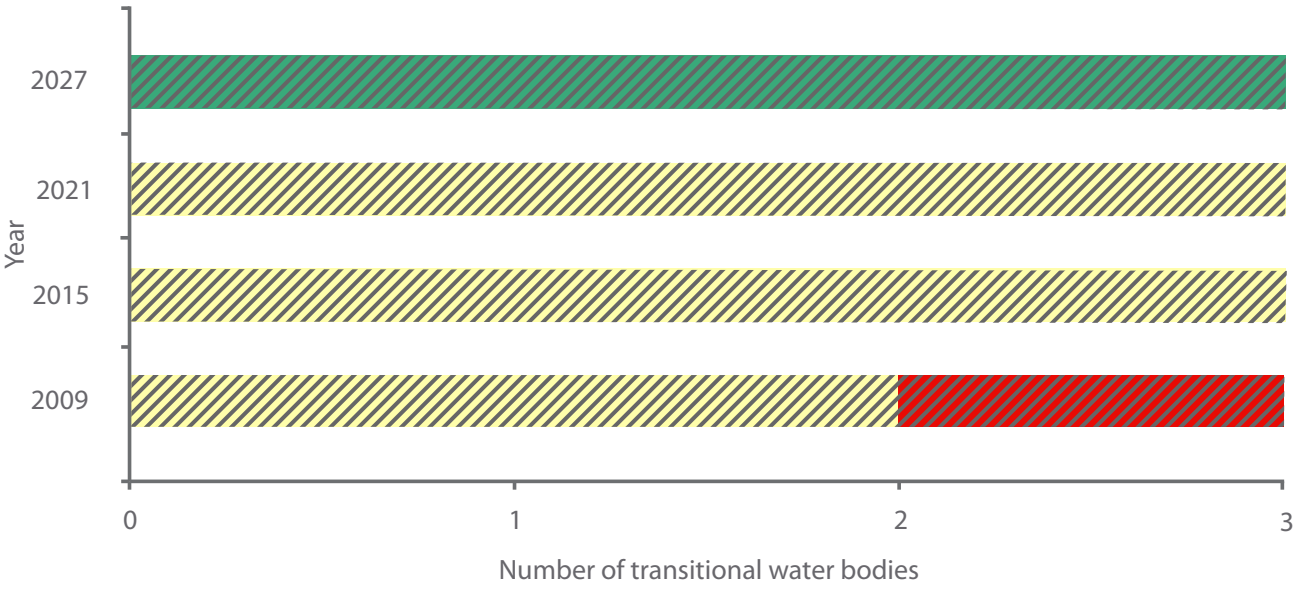


Figure 9 Current status and proposed objectives for transitional water bodies in the North Eastern District



Key

High
Good
Moderate
Poor
Bad
GEP (HMWB)
MEP (HMWB)
PEP (HMWB)
BEP (HMWB)

Figure 10 Current chemical status and proposed objectives for groundwater bodies in the North Eastern District

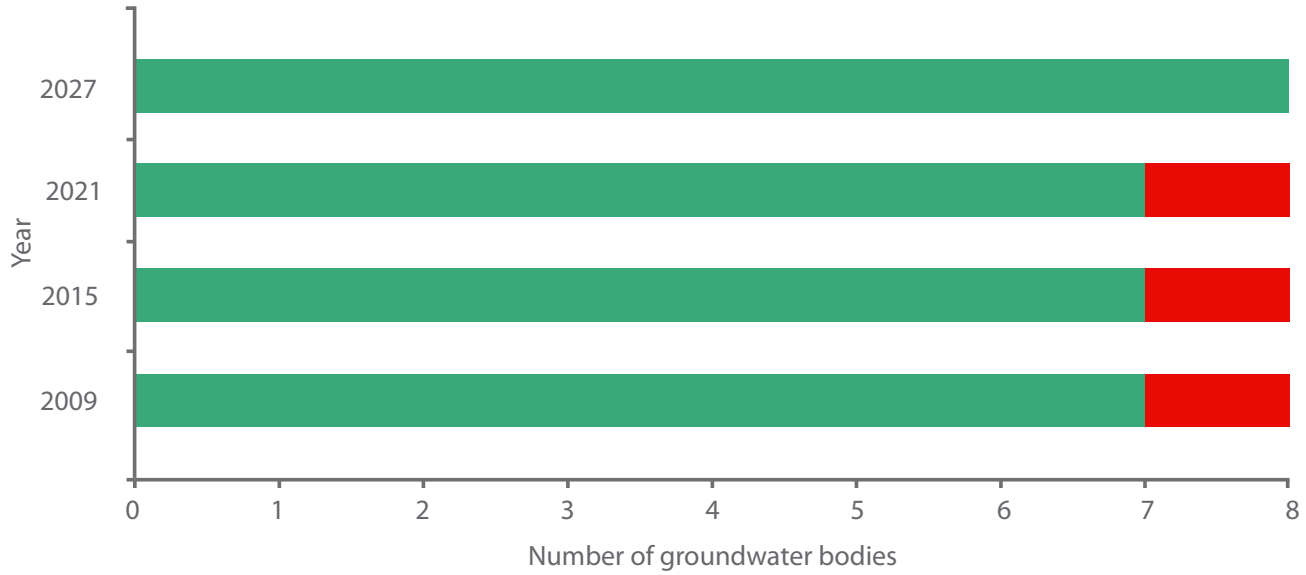
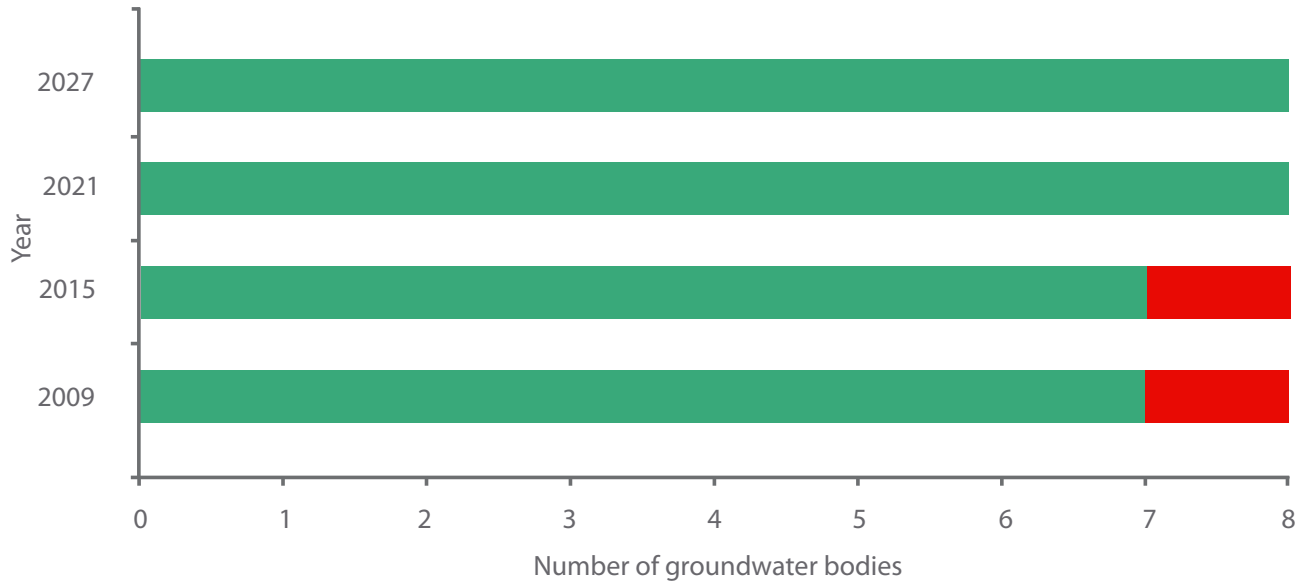


Figure 11 Current quantitative status and proposed objectives for groundwater bodies in the North Eastern District



Key

Good Poor

Puffin
John Doherty

Section 7

The measures we will use to achieve environmental objectives

Our environmental objectives set out what we want to achieve; the next step is to work out how we are going to do that. That means developing a programme of measures, which is a vital step in the river basin planning process.

A **measure** includes:

- the **action** to be taken;
- the **mechanism** — the policy, legal and financial tools for promoting or ensuring the taking of that action. Those tools might include, for instance, regulatory requirements or a management agreement. Some mechanisms apply across the European Union while others are specific to Northern Ireland.

Existing and planned measures

These measures aim to ensure that existing water uses are appropriately managed and that the water environment remains at good status. They may require observing best practice or implementing existing licence conditions: often unnoticed actions, carried out by land and water managers.

As well as preventing deterioration in the condition of water bodies and protected areas, these measures may counter possible impacts of new pressures: for instance, the impact of a new housing development could be countered by increasing the treatment capacity of a wastewater treatment works.

Existing and planned measures are set out in Sections 7.1 to 7.11.

Supplementary measures

Where a water body is at less than good status, or a protected area does not meet the required conditions, active improvement is required. Improvement measures may combine regulatory and voluntary measures. In some instances the responsible land or water manager will work with other agencies and voluntary bodies to ensure that the improvements take place as quickly and as effectively as possible. One of the key functions of the Catchment Stakeholder Groups is to develop the partnerships necessary to support these land and water managers.

Supplementary measures are set out in Sections 7.1 to 7.11.

Programme of measures: a summary

Our programme of measures addresses the key pressures affecting the water environment by setting out:

- existing and planned measures that are already being taken in this river basin district and the improvements expected from those measures; and
- supplementary measures proposed for each sector in order to deliver the objectives of the plan.

Existing and planned measures (where public funding is already available) contribute significantly to preventing deterioration and to improving the condition of the water environment. Some of these measures are associated with other European directives (e.g. the Urban Waste Water Treatment Directive) but also contribute to achieving the WFD objectives.

Where existing or planned measures will not deliver the required level of protection or scale of improvement, supplementary measures have been identified. These supplementary measures will be undertaken by NIEA and a wide range of Government Departments, agencies and other non-government organisations.

In addition, where there is low confidence in the classification, further investigation will be applied as the appropriate measure.

We can achieve the greatest gain by concentrating our efforts on those pressures that pose the greatest threat to our water environment. The main pressure types are:

- abstraction and flow regulation;
- diffuse and point source pollution;
- changes to morphology (physical habitat);
- invasive alien species.

We have identified the key sectors contributing to each pressure type:

River Basin Management Plan - Pressures	Key sectors
Abstraction and flow regulation	7.1 Water supply, industry, agriculture and flood control
Diffuse and point source pollution	7.2 Agriculture 7.3 Collection and treatment of sewage 7.4 Urban development 7.5 Forestry 7.6 Industry and other business 7.7 Waste
Freshwater morphology Marine morphology	7.8 Historical engineering, urban development, public water supply, hydropower, agriculture, forestry 7.9 Ports and harbours, aggregate industry, fishing and aquaculture industry
Invasive alien species	7.10 All Sectors
All	7.11 Fisheries

Sections 7.1 to 7.11 list the key measures - **existing, planned** and **supplementary** - applicable to each sector.

We used your responses from the draft consultation to identify the measures below:

- promote efficient use of water
- introduce seasonal discharge consents, where possible, to promote installation of reed beds and constructed wetlands for sewage treatment
- improve septic tank maintenance, installation and design
- review and investigate the effectiveness of wetlands in the reduction of nutrient loadings
- develop action plans for designated freshwater pearl mussel Special Areas of Conservation
- Facilitate River Trusts across Northern Ireland.

Read more about **Programmes of Measures** on the website.

The first four of these measures listed have been integrated as appropriate in sections 7.1 to 7.11. The last two measures listed do not apply directly to key sectors and are not included in sections 7.1 to 7.11, but are described below:

Improvement Required	Actions	Responsible Organisations	Delivery mechanism	Lead Department/ Agency	Support Provider	Deadline for delivery of action (year end)
Protection of freshwater pearl mussel sites in NI	Develop action plans for designated freshwater pearl mussel Special Areas of Conservation	All	Freshwater pearl mussel action plans	NIEA	All	2012
Protection of rivers	Facilitate River Trusts across NI	All	River Trust Working Groups River Trust Action Plans Community Engagement	NIEA	Public Participation	2012

All of the measures listed in [1]Sections 7.1 to 7.11 will be applied at a local level depending on the reasons identified for not achieving good status. In addition, in Section 9 we discuss how we will work together with stakeholders to implement the Plan. This includes how we will **deliver specific local measures** to improve the water environment in your area.

[1] Abbreviations and acronyms are described in full in the **glossary** on the website. The support provider has been listed, where relevant, in each table.

7.1

Key Sectors: **Water supply, industry, agriculture , hydropower and flood control**
Pressure Type: Abstraction and flow regulation

Summary of existing and planned actions

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechanism (year end)
Improve flows in rivers and levels in lakes	Control of abstraction and impoundment activities	Water Abstraction and Impoundment (Licensing) Regulations (NI) 2006 Water Resources (Environmental Impact Assessment) Regulations (Northern Ireland) 2005	NIEA		In place
	Reduce leakage rates	Leakage reduction targets to be reviewed through the Price Control process	NIW	DRD / Northern Ireland Authority for Utility Regulation (NIAUR)	2013
	Improve efficiency of use	Guidance and publicity on industrial best practice. Information for customers on how to use water efficiently e.g. Use Water Wisely campaigns	NIW		In place
Allow fish migration	Construction of fish passes where weirs are built or reinstated	Fisheries Act (Northern Ireland) 1966 Foyle and Carlingford N Ireland Fisheries Order (2007)	DCAL, Rivers Agency, Loughs Agency		2015
	Fisheries protection measures at all water abstraction sites	Fisheries Act (Northern Ireland) 1966 Foyle and Carlingford N Ireland Fisheries Order (2007)	DCAL, Rivers Agency, Loughs Agency		In place

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7.1

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechanism (year end)
Protect drinking water sources and provide safe drinking water	Monitor raw water quality and undertake risk assessment of raw water entering water treatment works	Water Supply (Water Quality) Regulations (Northern Ireland) 2009	NIW	DRD, NIEA (Drinking Water Inspectorate)	In place
	Reduce contamination of public drinking water	Water Supply (Water Quality) Regulations (Northern Ireland) 2009	NIW, NIEA (Drinking Water Inspectorate)	DRD	In place
	Enforce compliance. Complete catchment and treatment risk assessments for all water supply systems.	Development of Drinking Water Safety Plans	NIW	DRD	2010
Flooding Control	Manage development where flood risk is an issue Raise public awareness of the causes and impact of flooding	Planning Policy Statement 15 (Planning and Flood Risk)	DOE	Rivers Agency	In place
Promote sustainable development of public water supply	Provide for additional demand whilst minimising environmental harm	NI Water Resource Strategy 2002-2030 Water Resource Plan. Drought management plan. Education and awareness campaigns	NIW	NIEA , DRD	2002-2030
	Reduce level of leakage	Level of Leakage Targets based on economic cost	NIW	DRD / Northern Ireland Authority for Utility Regulation (NIAUR)	In place

7.1

Key Sectors: **Water supply, industry, agriculture and flood control**

Pressure Type: Abstraction and flow regulation

Summary of supplementary measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of action (year end)
Improve flows in rivers and levels in lakes	Monitor actual abstraction and compensation flows	Water Abstraction and Impoundment (Licensing) Regulations (NI) 2006	NIEA	NIW , DRD	Started May 2009 and ongoing
	Develop biological tools to assess the ecological impacts of changes in hydrology	Research and development	NIEA		2012
	Monitor pressures and impacts and incorporate the newly developed biological monitoring tools	Northern Ireland's Monitoring Programme	NIEA		2011
	Develop our understanding of the relationship between groundwater and surface waters	Research and development	NIEA	NIW , DRD	2011
	Targeted assessment of water resource availability to set management priorities	Research and development	NIEA	NIW , DRD	2012
Allow fish migration	Develop tool for assessing the extent to which barriers impede migration of a wide range of species	SNIFFER steering group	NIEA , Loughs Agency	DCAL	2011

7.2

Key Sector: Agriculture

Pressure Type: Diffuse and point source pollution

Summary of existing and planned measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechansim (year end)
Reduction in nutrient inputs **&** **Reduction in organic waste (organic matter, faecal pathogens, & ammonia)**	Compliance with closed spreading periods for the application of organic manures and chemical fertilisers Meet land application restrictions e.g. distances from waters, weather and ground conditions and application methods Determine chemical nitrogen and phosphorus fertiliser application needs to meet the crop requirement Meet requirements for livestock manure storage i.e. capacity, construction standards and maintenance Calculate livestock manure loading to land Adopt land management practices which reduce nutrient run-off Implement nutrient management planning Regulate controls on application of organic wastes including sewage sludge, dairy sludge and fish farm waste	Nitrates Action Programme Regulations (Northern Ireland) 2006 (NAP Regulations)	DOE/DARD		In place
		Phosphorus (Use in Agriculture) Regulations (Northern Ireland) 2006 (Phosphorus Regulations)	DOE		In place
		Silage, Slurry and Agricultural Fuel Oil (SSAFO) (Northern Ireland) Regulations 2003	DOE		In place
		The Pollution Prevention and Control Regulations (Northern Ireland) 2003	DOE		In place
		Single Farm Payment Scheme - Cross-Compliance including Good Agricultural and Environmental Conditions	DARD/DOE		In place
		The Farm Nutrient Management Scheme(FNMS)	DARD		Complete
		Northern Ireland Countryside Management Scheme (NICMS)	DARD		In place
		The Sludge (Use in Agriculture) Regulations (Northern Ireland) 1990 (The Sewage Sludge Regulations)	DOE		In place
		Waste Management Licensing Regulations (Northern Ireland) 2003	DOE		In place
		Environmental Impact Assessment (Agriculture) Regulations (NI) 2007	DARD		In place
		The Code of Good Agricultural Practice for the Prevention of Pollution of Water, Air and Soil (COGAP)	DARD		In place
		Advice, education and training	DARD		In place
		Manure Efficiency Technology Scheme (METS)	DARD		In place

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7.2

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechansim (year end)
Reduction in pesticide inputs	Regulate pesticide use and storage Comply with restrictions on pesticide marketing Control pesticide spraying Ensure appropriate disposal of dilute pesticides and washings Ensure standardised sale and supply of approved pesticides Use of crop protection management plans Ensure safe transport of pesticides Certify competence of operators	Cross-Compliance Statutory Management Requirements	DARD	DOE	In place
		The Code of Good Agricultural Practice for the Prevention of Pollution of Water, Air and Soil (COGAP)	DARD		In place
		Groundwater Regulations (Northern Ireland) 2009	DOE		In place
		The Water (Northern Ireland) Order 1999	DOE		In place
		Foyle Fisheries Act (Northern Ireland) 1952	Loughs Agency		In place
		Fisheries Act (Northern Ireland) 1966	DCAL, Loughs Agency		In place
		Food and Environment Protection Act 1985 (FEPA) Part III	DARD		In place
		The Control of Pesticides (Amendment) Regulations (Northern Ireland) 1997	DARD		In place
		Plant Protection Products Regulations (Northern Ireland) 2005	DARD		In place
		Waste Management Licensing Regulations (Northern Ireland) 2003	DOE		In place
		Voluntary Initiative for pesticides (VI)	DARD	DOE	In place
		BASIS (Registration)	DARD	DOE	In place
		Local Environmental Risk Assessment for Pesticides (LERAP)	HSENI		In place
		Pollution Prevention Guidelines (PPG)	NIEA		In place
		Advice, education and training	DARD		In place

7.2

Key Sector: **Agriculture**

Pressure Type: Diffuse and point source pollution

Summary of supplementary measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of action (year end)
Reduction in Phosphorus inputs	Reduce P content of feedstuffs in NI and undertake a study to assess the reductions in P and the environmental benefits of lower P levels in diets	Voluntary agreement	DARD	DOE, AFBI	2010
	Ensure sustainable use of manures with a high phosphorus content, particularly poultry and pig manures	Voluntary agreement	DARD	DOE, AFBI	2012
	Produce a report on the current P budget for NI to support a review of the need to give statutory effect to phosphorus balances	Research and development	DARD	DOE, AFBI	2009
Address diffuse pollution from agricultural sources	Develop a diffuse pollution model to identify areas affected by diffuse pollution	Research and development	NIEA	DARD	2011
	Develop and implement Local Management Area action plans to target advice and regulatory action	Local Management Area plans	NIEA	DARD	2010
Reduction in nutrient inputs & Reduction in organic waste (organic matter, faecal pathogens, & ammonia)	Review and investigation of the effectiveness of wetlands in the reduction of nutrient loadings	Research and development	NIEA	DARD	2012

7.3

Key Sector: **Collection and treatment of sewage**

Pressure Type: Diffuse and point source pollution

Summary of existing and planned measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechanism (year end)
Reduction in pollution	Comply with discharge standards in quality and quantity	PC10 and subsequent Investment Programmes (PC13) Urban Pollution Management studies The Water (Northern Ireland) Order 1999 Water and Sewerage Services (Northern Ireland) Order 2006 Pollution Prevention and Control Regulations (Northern Ireland) 2003 Urban Waste Water Treatment Regulations (Northern Ireland) 2007 Compliance with other Directives e.g. Shellfish, Bathing Waters, Freshwater Fish Education campaigns	NIW	DRD, NIEA, NIAUR	2012
	Reduce contaminants at source		NIW	DRD, NIEA	In place
	Reduce un-consented losses of waste water to marine, river and lake environments Address unsatisfactory CSOs through assessment of environmental impact and planned investment		NIW	DRD, NIEA	In place
Reduction in nutrient and dangerous substances	Comply with existing water directives Reduce nutrient and dangerous substance loadings to sewer Improve water quality to meet objectives		NIW	DRD, NIEA	In place

7.3

Key Sector: **Collection and treatment of sewage**
Pressure Type: Diffuse and point source pollution

Summary of supplementary measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of action (year end)
Reduction in pollution from unsewered properties	Review waste water consent conditions to ensure that adequate controls and emission limits are set	The Water (Northern Ireland) Order 1999	NIEA	NIW, DRD	2012
	Develop mathematical models for all of Northern Ireland to look at cumulative impacts of discharges at a catchment scale	Research and Development	NIEA		2011
	Address the environmental impacts of inadequate private sewerage discharges and support sustainable development as part of PC10	The Water (Northern Ireland) Order 1999	NIEA	NIW, DRD	2012
	Improve existing controls on septic tanks Develop mapping and methods to calculate the vulnerability of receiving waters	The Water (Northern Ireland) Order 1999 Development control and enforcement practices Guidance to address improved procedures for site selection, design, installation and construction supervision	NIEA		2010
	Research to examine legislative requirements and responsibilities to identify best practice in relation to (OWWTS)* Improve existing controls, support updated guidance for new systems and to prioritise actions in areas with high concentrations of existing OWWTS	Policy and guidance on OWWTS Pollution Prevention Guidelines (PPG4)	NIEA		2011

Continued on next page

* On-site Waste Water Treatment Systems

7.3

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of action (year end)
Reduction in pollution from unsewered properties	Investigate provision of main sewers or OWWTS maintenance programmes in priority areas (existing systems, large unsewered populations where water quality is threatened)	Maintenance programmes	NIEA, NIW		2011
	Ban sale of Domestic Laundry Cleaning Products (DLCPs) containing more than 0.4% Phosphorus	Development of UK-wide legislation	DOE	DEFRA	2015
	Identify potential constraints on development	The Water (Northern Ireland) Order 1999	DOE	DRD/ PS/ NIW	2012
	Introduce seasonal discharge consents where possible to promote installation of reed beds and constructed wetlands for sewage treatment	The Water (Northern Ireland) Order 1999 SIMCAT model	NIEA	NIW	2012
	Review and investigate the effectiveness of wetlands in the reduction of nutrient loadings	Research and development	NIEA		2012
	Improve septic tank maintenance, installation and design	Awareness programme Guidance to improve procedures for site selection, design, installation and construction supervision	NIEA	NIW	2012

7.4

Key Sector: **Urban development**

Pressure Type: Diffuse and point source pollution

Summary of existing and planned measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechanism (year end)
Reduction in pollution and flood risk	Control pesticide sale, supply, storage, advertisement and use	Food and Environment Protection Act 1985 (FEPA) - Part III	DARD		In place
		The Control of Pesticides Regulations (Northern Ireland) 1987	DARD		In place
	Assess potential environmental impacts of new roads	Roads (Environmental Impact Assessment) Regulations (NI) 1999	DRD		In place
	Encourage use of SuDS through development control	DOE Planning Service Planning Policy Statement 15	DOE		In place
	Control pollution in developed areas	Pollution Prevention Guidelines	DOE		In place
	Adopt SuDS for all new motorways, dual carriageways and improvements to roads of that standard and above, where technically and economically feasible	Guidance for Sustainable Drainage Systems (CIRIA manual C697 on design and construction standards)	DRD	NIEA	In place
	Restrict use of chemicals for manufacturing, importing and distribution or sale	The REACH Enforcement Regulations 2008	HSE	NIEA	In place

7.4

Key Sector: **Urban development**

Pressure Type: Diffuse and point source pollution

Summary of supplementary measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of action (year end)
Reduction in pollution and flood risk	Introduce wider use of SuDS in appropriate circumstances	(Draft) Strategy to promote the uptake of SuDS in NI. 'Managing Stormwater'	DOE	DRD, NIW, RA	2010 - Subject to ministerial approval
	Grant planning permission only for proposals where SuDS are provided as an integral element of the overall scheme design (new residential developments of 10 or more dwellings)	Updated planning policy PPS7	PEPG	Planning Service	2010
	Require hard standings in certain situations to be either porous or permeable	Planning (General Development) Order (Northern Ireland) 1993	Planning Service	PEPG	2011
	Consider use of buffer strips for development adjacent to rivers and lakes	Review of Non-Householder Permitted Development Rights	DOE Planning Service	DRD, NIW	2012
	Develop a strategy to identify water quality problems caused by misconnections and take actions to resolve the problems	UK Good Practice Document - Investigation and rectification of drainage misconnections Education and awareness raising	DOE	DRD	2012
Control of diffuse and point sources of pollution	Review diffuse pollution sources and options for control	The Groundwater Regulations (NI) 2009 Groundwater Daughter Directive (GWDD) Article 6	NIEA		2012
	Assess diffuse loads and allow for their prioritisation of new actions	Diffuse pollution screening and modelling tool	NIEA		2012
	Promote and adopt good practice with respect to storage, use and disposal of hazardous chemicals including oil, garden and household chemicals, paint and detergent	Education and awareness raising Pollution Prevention Guidelines Oil Care Campaign	NIEA		2012
		The safe use of pesticides for non-agricultural purposes	HSENI	NIEA	In place

7.5

Key Sector: Forestry
Pressure Type: Diffuse and point source pollution

Summary of existing and planned measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechanism (year end)
Reduce Sedimentation and Nutrient Input	Catchment management planning Site planning and forest operations	UK Forestry Standard	Forest Service		In place
		Forest and water guidelines (2003)	Forest Service		In place
		Alternative energy grants	Forest Service		In place
		UK Woodland Assurance Standard	Forest Service		In place
		Woodland Grant Scheme	Forest Service		In place
		Environmental Impact Assessment (Forestry)	Forest Service		In place
		Northern Ireland Forestry – A strategy for sustainability and growth	Forest Service		In place
		Guidance Paper - Application of Sewage Sludge to Forestry Land	Forest Service	AFBI	In place
		Environmental Guidelines for Timber Harvesting	Forest Service		In place
		Groundwater Regulations (Northern Ireland) 2009	NIEA		In place
		The Water (Northern Ireland) Order 1999	NIEA		In place
Reduce Pesticide Inputs	Comply with restrictions on pesticide marketing Ensure standardised sale and supply of approved pesticides Ensure safe transport of pesticides Control pesticide spraying Ensure appropriate disposal of dilute pesticides and washings Implement crop protection management plans Certify competence of operators	Food and Environment Protection Act 1985 (FEPA) – Part III	NIEA/HSENI		In place
		The Control of Pesticides (Amendment) Regulations (Northern Ireland) 1997	DARD/ HSENI		In place
		Plant Protection Products Regulations (Northern Ireland) 2005	DARD		In place

7.5

Key Sector: Forestry
Pressure Type: Diffuse and point source pollution

Summary of supplementary measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of action (year end)
Reduce nutrient loading in sensitive areas	Introduce more stringent controls for the most sensitive areas, when scientific evaluation establishes a need e.g. phased felling of smaller harvesting coup rather than felling a large forest block all at once	Statutory Regulations Forest & Water Guidelines Codes of practice UK Forestry Standard	Forest Service	NIEA	2012
Ensure appropriate future development and reduce impacts on water quality	Promote the establishment of new native riparian woodland adjacent to existing waterways using low intensity techniques		Forest Service	NIEA	2012
	Improve maps indicating where forests should be developed taking account of sensitive and protected areas		Forest Service	NIEA	2012
	Assess operations on a catchment basis		Forest Service	NIEA	2012

7.6

Key Sectors: **Industry and other business**
Pressure Type: Diffuse and point source pollution

Summary of existing and planned measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechanism (year end)
Reduction in pollution	Trade effluent inspections, Water Order consent and PPC permit reviews Ensure good standards of practice in relation to environmental impact from fish farming and aquaculture	The Water (Northern Ireland) Order 1999	DOE		In place
		The Pollution Prevention and Control Regulations (Northern Ireland) 2003	DOE		In place
		The Water and Sewerage Services (Northern Ireland) Order 2006	NIW		In place
		Groundwater Regulations (Northern Ireland) 2009	DOE		In place
		European Community Regulation on Registration, Evaluation and Authorisation of Chemicals (REACH); The REACH Enforcement Regulations 2008	HSE	NIEA	In place
		Fisheries Act (Northern Ireland) 1966	DARD		In place
		The Foyle and Carlingford Fisheries (Northern Ireland) Order 2007	Loughs Agency		In place
		Environmental Impact Assessment Regulations (Northern Ireland) 2007	NIEA		In place
		Pollution Prevention Guidelines	NIEA		In place
		Pollution incident response plans	NIEA		In place
		Environmental Code of Practice for Aquaculture Companies and Traders (ECOPACT)	DARD		In place
		Education and awareness raising	NIEA		In place
	Assess environmental impacts of proposed extraction	Environmental Impact Assessment Regulations (Northern Ireland) 2007	DOE		In place
	Reduce pollution from the aggregates sector	Voluntary Aggregates Levy Credit Scheme	DOE		In place
	Comply with existing water directives	Water Order consent reviews IPC permit reviews Trade effluent inspections	NIEA		In place

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7.6

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechanism (year end)
Reduction in pollution	Reduce nutrient and dangerous substances loadings from industrial discharges	Water Order consent reviews IPC permit reviews Trade effluent inspections	NIEA		In place
		REACH	HSE		In place
	Prevent pollution of the water environment by toxic substances Set minimum design standards for new and existing above ground oil storage facilities, codifying existing good practice to ensure that oil storage facilities are adequately constructed	Pending Oil Storage Regulations	DOE		2010
	Reduce impact from fish farming in marine waters	Environmental Impact Assessment (Fish Farming in Marine Waters) Regulations	DARD		In place
Reduction in nutrients and dangerous substances	Review minerals planning permissions	Review of Old Mineral Permission (ROMP) under Planning Reform Order 2006	DOE		Ongoing –possible 2011
	Ensure the development and management of sites under best practice guidance	Planning Policy Statement on Planning and Minerals (PPS 19)	DOE		2012 - Subject to drafting and Ministerial approval

7.6

Key Sector: **Industry and other business**
Pressure Type: Diffuse and point pollution

Summary of supplementary measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of action (yearend)
Protection of groundwater & Control of diffuse and point sources of pollution	Review diffuse pollution sources and options for control	The Groundwater Regulations (NI) 2009 Groundwater Daughter Directive (GWDD) Article 6	NIEA	DOE	2012
Improved Point Discharge Controls	Review Water Order consents, Groundwater authorisations and PPC permits (to ensure that adequate controls and emission limits are set to achieve new water quality standards in receiving waters) Develop mathematical models for all of Northern Ireland to look at cumulative impacts of discharge consents at a catchment scale	Review of consents/ authorisations/permits: PPC permit reviews Trade effluent inspections Research and Development REACH	NIEA, NIW HSENI, NIEA		2012
Control of diffuse and point sources of pollution	Collate further evidence on the nature and extent of the impacts of: • washing activities and • construction sites with a view to identifying the need, if any, for additional controls	Water Order discharge consents Pollution Prevention and Control (PPC) permits Pollution Prevention Guidelines (5,6,13, 23)	NIEA		2010
	Review diffuse loads and prioritise of new actions Apply screening tool to take a wider look at the potential diffuse source contributions from other sectors (e.g. amenity, recreation and transport sectors) Review diffuse pollution sources and options for control to establish a baseline from the evidence collated by NIEA in looking at certain activities and modelling loads Consider effectiveness of a range of control options from advice/guidance, to general binding rules through to consenting /authorisation	The Groundwater Regulations (NI) 2009 NI Better Regulation Strategy	NIEA DETI	PEPG All NI Government Departments	2012

7.7

Key Sector: Waste
Pressure Type: Diffuse and point source pollution

Summary of existing and planned measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechanism (year end)
Reduction in discharges/ impacts from waste disposal and contaminated land	Prosecute those responsible for illegal deposit of controlled waste Remove waste illegally dumped in Northern Ireland and return it to Republic of Ireland	Water (Northern Ireland) Order 1999 and The Waste & Contaminated Land (Northern Ireland) Order 1997	DOE/ NIEA		In place
		The Litter (Northern Ireland) Order 1994	District Councils		In place
		EU Shipments of Waste Regulations	NIEA, DEHLG		In place
	Recover monetary benefit from illegal activities which harm the environment	Proceeds of Crime Act (POCA) 2002	DOE		In place
	Consent and regulate effluent discharges	Groundwater Regulations (Northern Ireland) 2009 / The Water (Northern Ireland) Order 1999			In place
	Regulate waste related activities	The Waste & Contaminated Land (Northern Ireland) Order 1997			In place
		Landfill Regulations (Northern Ireland) 2003			In place
		The Pollution Prevention and Control Regulations (Northern Ireland) 2003			In place
		Waste Management Licensing Regulations (Northern Ireland) 2003 as amended			In place
		Strategic plan for closure of Landfill sites in NI			In place
	Provide an integrated approach to changing behaviour and attitudes towards waste	Guidelines Waste Management Strategy Waste Management Monitoring Strategy	DOE		In place
		Advice, Education and Training	DOE		In place

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7.7

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechanism (year end)
	Remove litter from waterways	Voluntary schemes and campaigns	NIEA, LA	All	In place
	Ensure better management of waste from construction through adoption of sustainable construction practices	Site Waste Management Plans	DOE	NIEA	2010
	Ensure Best Practice on production of aggregates from inert waste	Quality Protocol for the production of aggregates from inert waste in Northern Ireland	Waste and Resources Action Programme	DOE	In place
	Exercise effective regulatory control over historical contamination sites	Contaminated Land regime Contaminated Land Regulations The Waste & Contaminated Land (Northern Ireland) Order 1997 The Environmental Liability Directive	DOE		2010
	Manage waste from the extractive industries	Mining Waste Directive & Mining Waste Regulations	DOE		2009
	Acquire additional powers to deal with illegal disposal e.g. contaminated land, producer responsibility and access to illegal waste, and powers to remove	The Waste & Contaminated Land (Northern Ireland) Order 1997	DOE		In place

7.7

Key Sector: Waste
Pressure Type: Diffuse and point source pollution

Summary of supplementary measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of action (year end)
No supplementary measures have been identified for this sector					

7.8

Key Sectors: **historical engineering, urban development, public water supply, hydropower, agriculture, forestry**
Pressure Type: Freshwater morphology

Summary of existing and planned measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechanism (year end)
Control modifications to surface waters	Implement requirements for planning permission	Planning (Northern Ireland) Order 1991	DOE		In place
	Control modifications to designated sites	The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995	NIEA		In place
	Control culverting activities	Schedule 6 of the Drainage (Northern Ireland) Order 1973 as amended	Rivers Agency		In place
		Planning Policy Statement 15 (Planning and Flood Risk)	DOE		In place
	Control drainage schemes Consider significant effects on the environment of any proposed works River enhancement works where appropriate Provide advice and guidance	Drainage Environmental Impact Assessment Regulations	Rivers Agency		In place
		Watercourse Maintenance Manual	Rivers Agency		In place
		Water Order (NI) 1999	NIEA		In place
Control removal of substrate from rivers	Prevent the unauthorised removal of material from river beds	Fisheries Act (Northern Ireland)1966	DCAL		In place
		Foyle and Carlingford Fisheries (Northern Ireland) Order 2007 (applies to the Foyle and Carlingford areas)	Loughs Agency		In place

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Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechanism (year end)
Protection of fisheries and habitats	Construct fish passes where weirs are built or reinstated	Fisheries Act (Northern Ireland)1966	DCAL		In place
		Foyle and Carlingford Fisheries* (applies to the Foyle and Carlingford areas)	Loughs Agency		In place
	Habitat improvement for Atlantic Salmon	Atlantic Salmon Management Strategy for Northern Ireland	DCAL, LA		In place
		NASCO Resolutions and Agreements	DCAL		In place
	Alleviate the impacts of drainage maintenance works on habitat using mitigation measures (and where funding permits, fishery rehabilitation measures)	Rivers Agency's Service Level Agreement with DCAL Inland Fisheries and Loughs Agency Education and advice	RA/DCAL/ LA		In place
	Provide environmental support and advice on new flood defence schemes and maintenance work	Education and advice	Rivers Agency		In place
Rehabilitation of the aquatic environment & Establish riparian vegetation	Encourage / promote use of Buffer strips	Northern Ireland Rural Development Programme	DARD	NIEA	In place
		Northern Ireland Countryside Management Scheme (NICMS)	DARD	NIEA	In place
		Agri-environment improvement schemes	DARD	NIEA	In place
	Encourage in-stream enhancement programmes	Guidance and advice	Loughs Agency		In place
Protection of fisheries and habitats	Appraise barriers to fish movement	Research and Development	DCAL	NIEA	In place

* (Northern Ireland) Order 2007

7.8

Key Sectors: **Historical engineering, urban development, public water supply, hydropower, agriculture, forestry**
Pressure Type: Freshwater morphology

Summary of supplementary measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of action (year end)
Control modifications to surface waters	Produce appropriate guidance to supplement legislation offering control over physical modifications	Interdepartmental Working Group	DOE PEPG	DCAL, NIEA, DARD Rivers Agency	2010
Implementation of restoration measures	Assess technical feasibility and cost effectiveness of restoration measures	Economic appraisal	DARD Rivers Agency	DCAL, NIEA	2012
	Develop and implement restoration measures on selected water bodies	Guidance on hydromorphology legislative controls	DARD Rivers Agency	NIEA DCAL	2012

7.9

Key Sectors: **Ports and harbours, aggregate and fishing / aquaculture industry**
Pressure Type: Marine morphology

Summary of existing and planned measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechanism (year end)
Protection of the aquatic marine environment	Regulate all harbour works	Control of works within harbours under the Harbour Works (Environmental Impact Assessment) Regulations (Northern Ireland) 2003	DRD, DARD (fishery harbours)		In place
		Marine Works (Environmental Impact Assessment) Regulations 2007	NIEA		In place
	Regulate specific offshore works	Food and Environment Protection Act 1985 Part II	NIEA	DARD, MCA	In place
Better management of dredging activities within harbours	Adopt industry or best practice standards	Existing Harbour Works Regulations	DRD, DARD	NIEA	In place
Enhanced Management Practices	Regulate deposits of material to the coastal and marine environment	Food and Environment Protection Act 1985 Part II	NIEA		In place
	Control of marine aggregate extraction from seabed	The Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Marine Dredging) (England and Northern Ireland) Regulations, 2007	NIEA	DOE	In place
	Protect fish and assure free passage	Fisheries Act (NI) 1966	DCAL/ LA		In place
	Protect the aquatic environment, specifically fisheries	Foyle and Carlingford Fisheries (Northern Ireland) Order 2007	LA		In place
	Regulate aquaculture and shellfisheries	Foyle and Carlingford Fisheries (Northern Ireland) Order 2007	LA		In place
	Control dredging for fish	The Inshore Fishing (Prohibition of Fishing and Fishing Methods) Regulations (NI), 1993 (amended in 2008)	DARD		In place
	Manage disposal of Dredged Material and promote good dredging practice	OSPAR Guidelines for the Management of Dredged Material	DRD & Dredging Industry		In place
		Central Dredging Association guidelines 'Environmental Aspects of Dredging'			

7.9

Key Sectors: **Ports and harbours, aggregate and fishing / aquaculture industry**
Pressure Type: Marine morphology

Summary of supplementary measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of action (year end)
Management of dredging activities	Develop and implement protocol for maintenance dredging to ensure compliance with the Habitats, Birds & Water Framework Directives	Dredging protocol	DRD	NIEA	2012

7.10

Key Sector: **All sectors**
Pressure Type: Invasive alien species

Summary of existing and planned measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechanism (year end)
Prevent establishment of species not native to NI	Prevent release or escape of non native species	The Wildlife 1985 (NI) Order	NIEA	DOE	In place
	Amend Wildlife Order to include species which could present a problem	The Wildlife 1985 (NI) Order	NIEA	DOE	2010
	Control non- native fish species	The Fisheries Act (NI)1966 Prohibition of Introduction of Fish Order (NI) 1979	DCAL, Loughs Agency		In place
	Control molluscan shellfish	Molluscan shellfish (Control deposit) Order (NI) 1972	DARD		In place
	Control release of ballast water	UK Maritime Ballast Water Convention	Maritime and Coastguard Agency / International Maritime Organisation	DOE	2015
Control of alien species	Control the use of herbicides to control invasive plants in or near water	Control of Pesticides (Amendment) Regulations (Northern Ireland) 1997 Plant Protection Products Regulations 2005	DARD		In place
	Implement management protocols to control Giant Hogweed, Himalayan Balsam, Japanese Knotweed and Zebra Mussels	Environmentally Sensitive River Maintenance Guidelines / Management Protocols	DARD Rivers Agency	Contractor operatives	In place
	Control spread of zebra mussels	Zebra Mussel Management Strategy for Northern Ireland 2004-2010	NIEA	AFBI, QUB, NIW, DCAL, Waterways Ireland, NPWS	In place
		Raise awareness among water users through Zebra Mussel Control Group	NIEA		In place

Continued on next page

7.10

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechanism (year end)
Education and awareness	Promote the use of best practice and management plans for Giant Hogweed, Himalayan Balsam, Japanese Knotweed, Didemnun and Floating Pennywort	Invasive Species Ireland Project Invasive Species Technical Working Groups	NIEA , NPWS		In place
	Promote educational materials and awareness leaflets including codes of practice for Marina Operators, Recreational Water Users, Horticulture and Marine Aquaculture	Dedicated website at www.invasivespeciesireland.com	NIEA , NPWS		In place
Local Action	Develop risk assessments and management plans for species that are established or likely to become established	Invasive Species Ireland Project	NIEA , NPWS	Enviro Centre, Quercus	2012
	Provide aid to enable local invasive species eradication measures	Develop Management Plans for high risk species and wide spread species	NIEA		In place
		Natural Heritage Grant Aid Programme	NIEA		In place
		Partnership Projects	Various		In place

Key Sector: **All sectors**
Pressure Type: Invasive alien species

Summary of supplementary measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of action (year end)
Control of alien species	Targeted eradication of alien species at a catchment scale for Giant Hogweed, Japanese Knotweed and *Spartina Anglica*	Catchment Scale Eradication Projects	NIEA		2012

7.11

Key Sector: Fisheries
Pressure Type: All pressures

Summary of existing and planned measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechanism (year end)
Protection of fisheries and habitats	Protect fish and assure free passage	Fisheries Act (N Ireland) 1966	DCAL/ LA		In place
	Protect the aquatic environment Alleviate the impacts of drainage maintenance works on habitat using mitigation measures (and where funding permits, fishery rehabilitation measures)	Rivers Agency's Service Level Agreement with DCAL Inland Fisheries and Loughs Agency. Education and advice	RA/DCAL/ LA		In place
	Reinstatement of polluted waters	The Fisheries (Amendment) (Northern Ireland) Order 1991	DCAL		In place
	Establish scientific basis for conservation & management	Research & development	AFBI	DCAL	In place
	Reintroduction of salmon stock	Local projects	DCAL/LA		In place
	Protect the aquatic environment, specifically fisheries	Foyle and Carlingford Fisheries (N Ireland) Order (2007)	LA		In place
	Advice, education and guidance through visitor centre, outreach programmes and school based learning	Rivers Agency Service Level Agreement with DCAL Inland Fisheries and Loughs Agency	DCAL/RA/ LA		In place
Protection and restoration of Salmon populations	Tagging schemes, fish counting/juvenile stock assessment, habitat improvement works	Atlantic Salmon Management Strategy for Northern Ireland / NASCO Resolutions and Agreements	DCAL/LA		In place
		Salmon Management Plan			
Protection and maintenance of eel populations	Regulate commercial eel fisheries	National Eel Management Plan for three eel river basins	DCAL/LA		In place
Establish measures for the recovery of the stock of European eel	Implement eel management plans	European Fisheries Funding	DCAL/LA		2010

Continued on next page

7.11

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery of mechanism (year end)
Protection and maintenance of coarse fish and pike populations	Manage coarse fish and pike	The Fisheries (Amendment) Byelaws (Northern Ireland) 2003	DCAL/ LA		In place
		The Fisheries (Conservation of Coarse Fish) Byelaws (Northern Ireland) 2008			
Improved Fishery management	Provide advice and guidance on matters relating to the conservation, protection, development and improvement of salmon and inland fisheries to angling clubs, fishery owners, and a range of other water users and interested parties	Angling development programme Voluntary action	DCAL/ LA		In place
	Promote and develop angling	The Fisheries Act (NI) 1966, as amended	DCAL/ LA		In place
	Prohibit sale of rod caught salmon	Salmon Management Strategy	DCAL/ LA		2011
		Commercial Fishing Regulations			
	Promote catch and release, quotas, use of barbless hooks, early closures and shortened season	Angling Regulations	DCAL/ LA		2011
	Scientific evaluation of each salmon population and its habitats at catchment or sub catchment level	Management targets and Catchment Management Plans	DCAL/ LA	AFBI	In place - 2013
	Complete DNA based study in 2009 to determine genetic structure of salmon populations at catchment/sub catchment	AFBI research programme			
	Replicate Catchment Status Reports for the Roe and Faughan catchment and for the rest of the tributaries within the Foyle and Carlingford Area and implement real time management strategies	Management targets and Catchment Management Plans			

7.11

Key Sector: **Fisheries**
Pressure Type: All pressures

Summary of supplementary measures

Improvement Required	Actions	Delivery mechanism	Lead Department / Agency	Support Provider	Deadline for delivery (year end)
No supplementary measures have been identified for this sector					

7.12

Costs and benefits of the programme of measures

A strategic Regulatory Impact Assessment of the supplementary measures contained within the River Basin Management Plans was undertaken.

In summary, the Impact Assessment determined that against estimated costs of between £3m - £15m (discounted over 15 years) the likely quantifiable net benefit that would accrue lies in the range £23m - £25m (also discounted over 15 years).

In addition, the assessment noted the following potential key non-monetised benefits:

- significant benefits to the tourism and recreation sectors due to general improvements to the water environment.
- significant benefits for the non-water environment including biodiversity and soil quality, and benefits of adapting to climate change and greater flood resilience.
- potential savings at farm-level through catchment management plans and measures to target diffuse pollution.
- moderate savings possible through water efficiency measures in reduced water bills to consumers, business and agricultural sectors (depending upon measures agreed and taken forward).
- avoid costs to Northern Ireland Water, NIEA, and the Rivers Agency (and potentially other sectors) through early-warning mechanisms to guard against invasive alien species. Improved biodiversity from removal of invasive alien species and river restoration activity.

The assessment of costs, risks and benefits was based on data and expert judgement, with input and review from NIEA, Department of Culture Arts and Leisure, Department of Agriculture and Rural Development and external stakeholders. Interviews were completed to establish the nature of the proposed measures, those impacted and their likely administrative costs. External stakeholders, drawn mainly from the Northern Ireland WFD Stakeholder Forum, were also consulted on the likely impacts. Costs and benefits took account, as far as possible, of the range of economic, social and environmental factors. Impacts were monetised as far as possible and the potential significance of non-monetised costs and benefits were highlighted where significant. Information was mainly taken from:

- the UK Collaborative Research Programme reports and databases;
- other relevant data and research, including regulatory impact assessments, government reports, and academic research.

Costs and benefits estimates should be taken as indicative. The assessment should be viewed as best current knowledge.

The assessment was conducted using the following guidelines:

- costs and benefits were assessed across the whole of Northern Ireland;
- impacts were considered as they applied to Northern Ireland, its regulatory framework, natural environment, citizens and economy;
- information from all three river basin management plans and accompanying Strategic Environmental Assessments were considered as a whole. However, more specific, localised information was included where it was judged relevant to the achievement of WFD objectives by 2015;
- as many of the supplementary measures were still at an early stage of development, it was not possible to determine precise detail on their costs and benefits. However, a strategic Regulatory Impact Assessment will assist the policy process in determining likely costs, benefits and risks (where information is available) to guide further development of policy options.

The cost estimates are subject to considerable uncertainty, particularly where the measures are innovative or where the number of sites at which it will be necessary to take action is not yet known. The costs included are based on national estimates and will be further refined locally to deliver the objectives set in the river basin management plans.

In the assessment the measures are categorised as:

- existing and planned, for example,
  - — regulatory - measures designed to impose a form of regulation on a sector;
  - — voluntary - working with an industry to identify further measures to improve water status
- supplementary, for example,
  - — enabling – measures to improve regulator's understanding and knowledge of a pressure e.g. development of a GIS tool;
  - — working with the charitable sector – measures to facilitate and fund work being undertaken by the charities for improvements to the water environment.


Glenarm Fish Farm


Tompot
Andrew Rankin

Bottle Nosed Dolphin
Laurie Campbell

Section 8

The environmental implications of climate change in Northern Ireland

8.1 Climate change in Northern Ireland

The latest report of the Intergovernmental Panel on Climate Change (IPCC2007) states that evidence for warming of the global climate system is unequivocal, citing evidence from observation of increases in average air and ocean temperatures, widespread melting of snow and ice, and rises in average global sea levels.

Locally, observed trends in climate change indicators have shown changes in the growing, breeding and migration seasons, leading to shifts in species abundance and diversity. The report *Climate Change Indicators for Northern Ireland* (EHS 2004) indicated that nine of the fifteen warmest years on record since 1840 have occurred since 1990. It also provided evidence of thirteen indicators including:

- an increase in average temperatures;
- a lengthening of the growing season;
- a decrease in the number of snow days; and
- progressively earlier spring sightings of swallows and butterflies.

The report Preparing for Climate Change in Northern Ireland, published by the Department of the Environment and the Scotland and Northern Ireland Forum for Environmental Research (SNIFFER) in 2007 reviewed the potential impact of climate change in Northern Ireland and made a number of recommendations for adaptation. The assessments in this report were based on the UK climate change scenarios published under the UK Climate Impacts Programme (UKCIP02).

The latest Climate Projections, prepared by the UK Climate Impacts Programme (UKCIP09), were published in July 2009. These provide climate projections for the UK up to the end of the current century, based on a combination of observed trends and on simulations from a number of climate models, which in turn are based on three greenhouse gas emission scenarios. It is now possible to access information at a river basin district scale, with pre-prepared maps and graphs available for each of the River Basin Districts of the UK including Northern Ireland. Temperature and summer and winter precipitation maps are available for the 2020s, the 2050s and the 2080s. While offering greatly improved outputs, UKCIP09 does not significantly alter the basic messages from UKCIP02. Current projections suggest that we can expect recently observed trends to continue and accelerate, leading to warmer and wetter winters, hotter and drier summers, heavier rainfall events, raised sea levels and possible increases in storm surges.

Government departments, agencies and other organisations have parts to play in the implementation of this River Basin Plan and other associated plans and programmes. It will be important to ensure that all are aware of the risks of climate change to successful implementation of the plan and where relevant, that they incorporate responses to these risks within their own climate change adaptation strategies. To assist with this process, and following a key recommendation in the SNIFFER 2007 report, the Northern Ireland Climate Change Impacts Partnership (NICCIP) has been established by the Department of the Environment. NICCIP was formally launched under independent chairmanship in 2008. Its aim is to widen the understanding and knowledge of the impacts of climate change within Northern Ireland and the adaptation actions necessary to deal with it. Many of the partners in the implementation of the river basin management plan are members of NICCIP.

The UK Climate Change Act 2008 provides a legally binding framework to address the dangers of climate change. The Northern Ireland Assembly has granted legislative consent to the extension of its provisions to Northern Ireland; they became law on 26 November 2008. Under the Act, the Government must report at least every five years on the risks to the UK of climate change, and must publish a programme setting out how these impacts will be addressed. An Adaptation Sub-Committee of the Committee on Climate Change will provide advice to and scrutiny of the Government's adaptation work. In Northern Ireland, DOE will be responsible for the undertaking of an NI risk assessment in 2011, and also for the development of an NI adaptation programme.

Key documents relating to the implications of **climate change** for the water environment are available on the website.

8.2 The environmental implications of climate change in Northern Ireland

Changing climate is different from other issues addressed within the river basin management plan in that it may, through influence on other pressures, impact many aspects of the management of the water environment (Table 5).

Table 5 Summary of environmental implications of climate change

Pressure type	Potential implications of climate change
Abstraction and flow regulation	• increases in autumn and winter rainfall will increase resources for water supply and hydropower generation. Conversely, lower summer rainfall may lead to reductions in resources during the summer. • increased likelihood of summer droughts will lead to reduced resources but higher abstraction demands (particularly from irrigation), which may compromise the security of drinking water supplies. There may also be a consequent potential to cause salination of some aquifers, which would be exacerbated by anticipated sea level rises. • drier, hotter summers will increase demand for water and water-related products and activities, putting pressure onabstractions.
Diffuse & point source pollution	• higher river flows will reduce the impact of pollution in rivers, but may increase loading of pollutants to the sea. This could increase the risk of the failure of microbiological standards in bathing waters and shellfish waters. • higher rainfall with more intense episodes may increase loads of diffuse pollutants from both urban and rural areas. • during periods of lower summer flow, some point source discharges may no longer be adequately diluted. • lower summer flows can also cause reduction in sewer base flows, leading to blockages and potential flooding risks. • higher intensity rainfall in summer following dry periods will increase combined sewer overflow discharges and consequent damage to aquatic life. • lower summer river flows, along with higher temperatures, reducing the dissolved oxygen in water bodies, will provide less dilution for discharges, leading to increased sewage treatment costs and energy usage. • enhanced algal and plant growth due to increased temperature and increased nutrient run-off will exacerbate the effects of eutrophication. Increased temperature may also cause problems through dissolved oxygen depletion.

Continued on next page

Table 5 Summary of environmental implications of climate change

Pressure type	Potential implications of climate change
Changes to morphology	• the possibility of more frequent and severe river flooding will increase requirements for flood defence schemes and sustainable flood management. • more intense rainfall and higher flows will result in higher rates of river erosion. • higher rainfall will lead to an increased risk of slope failure causing local hazards and the input of sediments into watercourses. • increased erosion from land can lead to siltation of fish spawning gravels and increased nutrient loading to loughs and marine waters. • rising sea levels will impact on low-lying coast and transitional waters, and may be exacerbated by larger and more frequent storm surges. This will cause increased coastal flooding in vulnerable areas and more coastal erosion.
Invasive alien species	• higher temperatures, changing hydrological conditions and water quality may provide more favourable conditions for invasive non-native species and allow the spread of rare or non-native diseases including those of aquatic species. • changes in seasonal cycles may have impact on the interactions between species (for example, reduced pollination, changes in migration timing) leading to competition between species and earlier or delayed fish spawning. • there will be changes in the abundance and distribution of native species and the length of growing season. • higher temperatures will be less favourable for some native species. • habitats may be affected by changes in land use for example the introduction of new crops to suit new climates, or increased production of biofuel. • increased riparian and coastal erosion may adversely affect key native species.

8.3 Measures to address the implications of climate change on the water environment

Climate change is not explicitly included in the text of the WFD. One of the requirements of the Directive is however that measures must be "effective, sustainable, and cost effective under changing conditions". The water environment is particularly vulnerable to the effects of climate change, and for this reason the European Commission has identified water management as a priority area in which the impacts of climate change must be taken into account. That must happen in all of the key steps of implementation including characterisation, the analysis of pressures and impacts, economic analysis, monitoring, design of the programmes of measures and the objective-setting process. Fortunately, the cyclical approach of WFD implementation makes it well suited to adaptation to climate change.

Temperature increases, seasonal rainfall variations, and other climate changes which have been detected within the UK and the Republic of Ireland, are likely to affect the existing pressures and impacts identified in the WFD Article 5 Characterisation Summary Report. In some circumstances, climate change may make it more difficult to achieve WFD objectives. It is not anticipated that climate change will require significant amendments to currently planned implementation during the first cycle - it is however important that, during the first cycle, climate change is taken into account when implementing measures and in planning for the second cycle plans. There is also potential for synergies between WFD objectives and climate change adaptation aims.

Table 6 lists some of the generic measures which may be required to address the impacts of climate change on the water environment. This has been updated to reflect several issues raised during the draft Plan consultation process. It also incorporates the outputs of a SNIFFER workshop held in June 2009. The workshop examined the impacts of climate change on the implementation of the Plan. The workshop was organised on behalf of NIEA and the Environmental Protection Agency as a cross-border event.

The measures in Table 6 will help ensure that we:

- protect waters from deterioration due to climate change; and
- take into account climate change factors when developing and implementing measures to improve the water environment.


Hymalayan Balsam

Table 6: Summary of measures to address the implications of climate change

Action Required	Mechanism	Lead Department/Agency
Take account of changes in flow regimes	Ensure that licences take account of change projections (e.g. UKCIP09 projected new low-flow regimes).	Northern Ireland Environment Agency
	Ensure that flood management plans and Strategic Flood Maps take account of climate change scenarios and are adequate for projected flow regimes.	Rivers Agency
	Assess impact of new rainfall patterns on combined storm overflow inputs to water bodies.	Northern Ireland Environment Agency /Northern IrelandWater
	Use appropriate climate change scenarios to inform modelling and other decision making tools in setting and reviewing discharge consents and other regulatory controls.	Northern Ireland Environment Agency
Assess impact of new climate on flooding	Review historical hydrology data for climate driven trends.	Rivers Agency
Ensure groundwater abstractions are sustainable	Review groundwater abstraction licences to assess likely future water requirement and groundwater levels.	Northern Ireland Environment Agency
Understand existing and future trends in run-off of pollutants	Assess existing data for long term trends.	Northern Ireland Environment Agency
	Assess factors (including land use changes) which influence whether pollutant concentrations are likely to increase or decrease as a result of increased run-off.	
Understand the impact of higher temperatures and changing hydrology on protected species and areas and on non-native species	Continue project on climate change and biodiversity (Natural Heritage Research Partnership with QUERCUS (Queen's University Belfast)).	Northern Ireland Environment Agency
	Participate in Invasive Species Ireland project.	Northern Ireland Environment Agency/ National Parks and Wildlife Service (ROI)

Action Required	Mechanism	Lead Department/Agency
Enhance awareness of magnitude and potential impact of sea level rise and frequency and impact of storm surges	Continue projects ongoing with Natural Heritage Research Partnership with QUERCUS.	Northern Ireland Environment Agency
During cycle 1, ensure that action is taken to ensure that changing climate is taken into account in preparation for cycle 2	Climate Change to be taken into account in characterisation and objective-setting process for RBMP cycle 2.	Northern Ireland Environment Agency / all agencies involved in planning and delivery of programmes of measures

Unless appropriate adaptation strategies are adopted, accelerating climate change may damage the physical, biological, and chemical processes which underpin the achievement of WFD objectives. Understanding these impacts is key to ensuring that the implementation of measures takes account of all potential impacts of climate change, both positive and negative.

The NS SHARE Further Characterisation work package, included an assessment of potential climate change impacts. The NS SHARE report Overview assessment of long term issues – climate change literature review examined how climate change might affect the implementation and achievement of the objectives of the WFD and how the relevant agencies within river basin districts can incorporate it into their planning. It also provides a useful source of reference material in this area alongside the SNIFFER report and other sources.

As part of the process to ensure that implementation of this River Basin Management Plan takes climate change into account, a workshop was held on 23 June 2009. Facilitated by SNIFFER, it brought together climate change and WFD scientists from Northern Ireland and the Republic of Ireland. The key objectives of the workshop were to discuss:

- what needs to be done in the first river basin plan cycle in relation to climate change adaptation;
- what needs to be done to adapt to our changing climate for the second cycle of river basin plans;
- any gaps in mechanisms in place in either jurisdiction; and
- research needs.

Together, the evidence and analysis of SNIFFER 2007, the projections available from UKCIP09, and the outputs of the SNIFFER workshop of June 2009, provide a starting point for integrating climate change awareness and adaptation within the implementation of this River Basin Plan. Research may need to be commissioned during the first cycle to ensure that this approach is continued and developed in future planning and implementation cycles.

Glenarriff Glen
Robert Thompson

Section 9

Working together to implement the Plan

The Plan has been developed through consultation and engagement with interested parties. We need to continue to work in partnership with other organisations to help us deliver the environmental objectives we have set in a coordinated way.

A record of consultation and public engagement can be viewed on the **working together to implement the Plan** section of the website.

There are a number of existing plans and programmes that contribute to the management of water bodies and act as drivers for change to the water environment. Our water objectives can only be achieved if these plans and programmes in other water protection policy areas are coordinated and integrated. We have compiled a register of plans and programmes that are relevant to this river basin management plan, including:

- land use and spatial plans (e.g. NI Regional Development Strategy)
- agriculture (e.g. Countryside Management Scheme)
- water supply and treatment (e.g. Drinking Water Safety Plans)
- waste management (e.g. NI Waste Management Strategy)
- natural heritage conservation plans (e.g. local biodiversity action plans)
- forestry (e.g. NI Forestry - A Strategy for Sustainability and Growth)
- fisheries (e.g. fisheries action plans)
- coastal (e.g. Marine Bill)
- flooding (e.g. flood risk management plans)
- climate change (eg. UK Climate Change Act 2008)

There is a two-way relationship between river basin management plans and other water protection plans and programmes. Each must influence the others objectives. For example, this coordinated approach could mean prioritising investment (under the Northern Ireland Water Capital Investment Programme) to eliminate known impacts on protected habitats where wastewater discharges are inadequately treated.

There are also a number of projects and initiatives - run, for example, by local communities, angling groups and voluntary environmental organisations - that will help us achieve the objectives we have set for our waters. We have been collating information on the projects and initiatives in this District but we acknowledge that there are other projects that are successfully contributing to improving and restoring our waters.

We will continue to work with the Implementation Working Group, Northern Ireland National Stakeholder Forum, Catchment Stakeholder Groups and stakeholders interested in local water issues. The River Basin Management Plans will be implemented through Local Management Areas during the 2010 to 2015 cycle. Information leaflets have been produced for 26 Local Management Areas, across the Neagh Bann, North Western and Northern Eastern Districts. They include details of the characteristics and quality of the water environment and specific local measures identified to improve the water environment in your area. These local measures can also be viewed on the interactive web map.

Information leaflets for local management areas are available on the **working together to implement the Plan** section of the website.


Newcastle

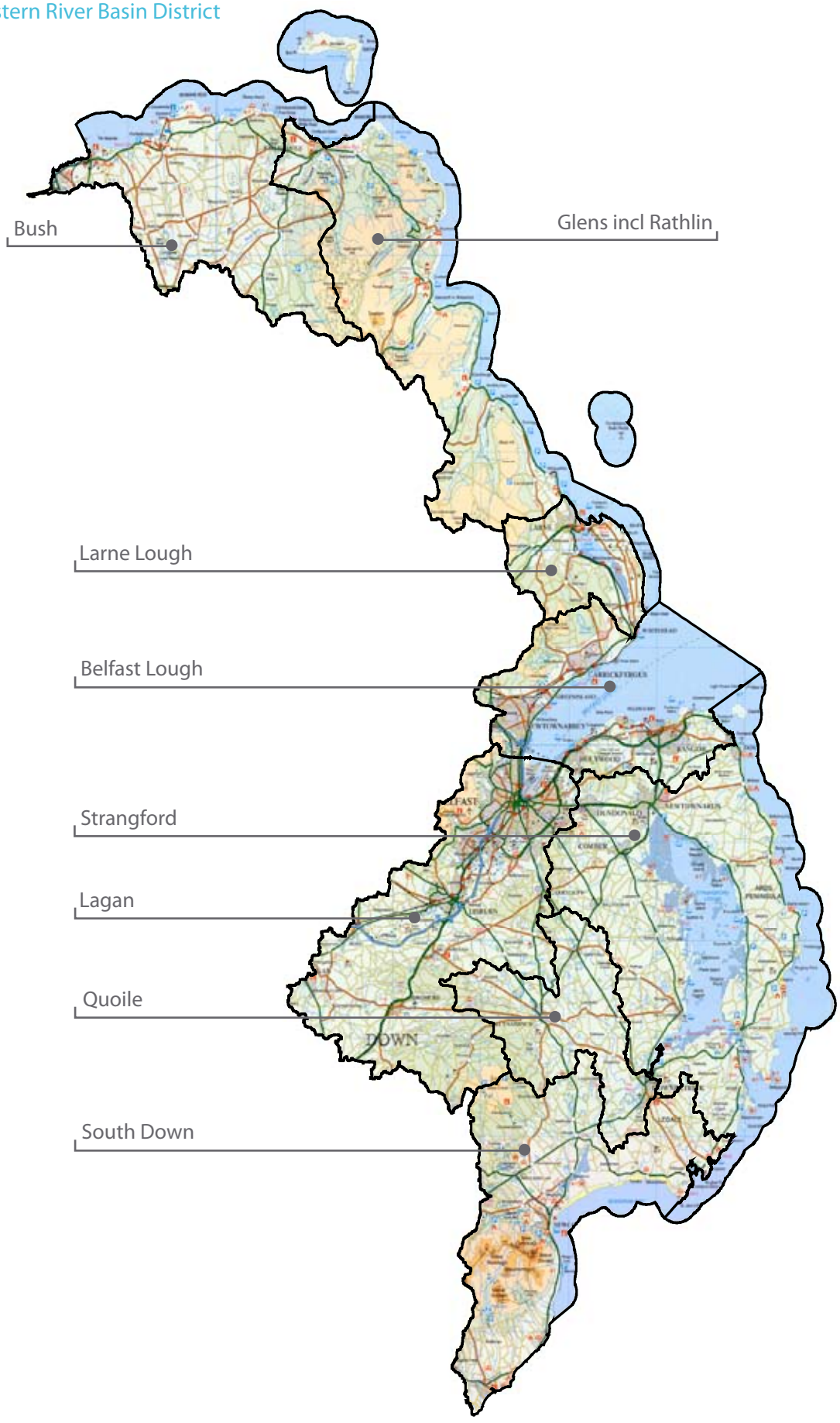
We will work with stakeholders, through Catchment Stakeholder Groups, to develop focused Local Management Area Plans in the North Eastern District (Map 3). These Local Management Area Plans will be implemented on a three-year rolling programme as set out below:

- South Down, Strangford, Lagan and Bush in 2010
- Quoile, Belfast Lough and Glens & Rathlin in 2011
- Larne Lough in 2012

During the implementation of the Plans we will monitor and report on progress against the agreed objectives and measures. Some of the measures will take some time to deliver the required objectives so progress will be reviewed during the remainder of the river basin cycle. The review will assess progress, revise priorities and, where appropriate, reclassify status in light of new data and updated assessment.

A register of plans and programmes & information on local initiatives for the North Eastern River Basin District can be found on the **working together to implement the Plan** section of the website.

Map 3 North Eastern River Basin District



Water Pollution Hotline

Freephone* 0800 80 70 60

This line is manned 24 hours a day, 7 days a week.
*Mobile calls are charged at standard network rates.

Cover Image

River Dun, Cushendun, Co. Antrim

Photographers

NIEA would like to thank the following photographers for their contribution to the River Basin Management Plan documents—

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Maps

North Eastern River Basin District

The North Eastern River Basin District has a land area of just over 3000km^2, with a further 1000km^2 of marine waters. It takes in large parts of Counties Antrim and Down and a small portion of County Londonderry. The district is flanked by the Antrim Plateau and Glens of Antrim to the north and the Mourne Mountains, which includes Slieve Donard, the highest peak in Northern Ireland, to the south.

Our aim is to protect, conserve and promote the natural environment and built heritage for the benefit of present and future generations.

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