

protection. This will result in a reduction in the environmental burden of hazardous chemicals and will make a significant contribution to the delivery of good chemical status under the Water Framework Directive (WFD).

KEY LEGISLATION RELATED TO AQUACULTURE ACTIVITIES AND FISH FARMS

Fisheries Act (Northern Ireland) 1966

Under this legislation the Department of Agriculture and Rural Development are responsible for the licensing of fish and shellfish farms in Northern Ireland. Licences provide a demonstrably open, participative and effective system of control within the aquaculture sector and guarantee good standards of practice in relation to environmental impact.

Environmental Impact Assessment (Fish Farming in Marine Waters) Regulations (Northern Ireland) 1999

Any application for a fish culture licence in respect of a marine fish farm (excluding shellfish) will be subject to the provisions of the Environmental Impact Assessment (Fish Farming in Marine Waters) Regulations (Northern Ireland) 1999 where any part of the proposed development:

- is in a sensitive area
- is designed to hold in biomass of 100 tonnes or greater
- will extend to 0.1 hectare or more of the surface area.

The Foyle and Carlingford Fisheries (Northern Ireland) Order 2007

This Order amends the Foyle Fisheries Act (Northern Ireland) 1952 and confers powers on the Foyle, Carlingford and Irish Lights Commission to develop and licence aquaculture and to develop inland fisheries.

KEY LEGISLATION RELATED TO MINING AND QUARRYING ACTIVITIES

In Northern Ireland the Department for Enterprise Trade and Investment (DETI) grant prospecting and mining licences for exploration and development of minerals. Planning permission for mineral development is also required under the planning system. Applications for all new mines and quarries above a size threshold require an Environmental Impact Assessment under the Environmental Impact Assessment Regulations (Northern Ireland) 2007. Under these regulations an Environmental Statement must accompany a planning application which assesses the environmental, social, cultural etc. impacts of the proposed extraction.

In Northern Ireland a Review of Old Mineral Permission (ROMP) for quarries and mines under the Planning Reform (Northern Ireland) Order 2006 is providing better information about these sites and their environmental impact. Provisions have been included in the Planning Reform Order that require owners and operators currently holding planning permissions for quarries in Northern Ireland to submit updated versions of the planning conditions attached to those permissions to Planning Service. The Department of the Environment (DOE) have powers to review mineral permissions which may result in the setting of new environmental standards as conditions of existing planning permissions. ROMP can also require an Environmental Impact Assessment to be carried out on mineral sites under the Environmental Impact Assessment Regulations.

CODES OF PRACTICE AND GUIDELINES

Pollution Prevention Guidelines

There are a range of Pollution Prevention Guidelines (PPG) that have been produced jointly by agencies across the UK, that relate to the control of pollution from industry, they include:

- PPG 6 - to assist those in the construction and demolition industry with responsibility for managing the environmental impact of their activities;
- PPG 7 - to assist all who are involved in the planning, management and maintenance of fuelling facilities such as retail filling stations and company bulk fuel installations, including those where only diesel is handled;
- PPG 13 - to assist those using high pressure water and steam cleaners;
- PPG 17 - to assist all who design and operate dairies and other milk and milk product handling operations in the avoidance of water pollution and the minimisation of waste;

Summary of existing actions					
Pressure Type: DIFFUSE AND POINT SOURCE POLLUTION					
Key Sectors: INDUSTRY & OTHER BUSINESSES					
Improvement Required	Actions	Responsible Organisations/ Sectors	Delivery mechanism and support	Support Provider/ Regulator	
Reduction in pollution	Reduction in pollution at source from industrial discharges	NI Water, NIEA	Trade effluent inspections, Water Order consent and PPC permit reviews	NI Water, NIEA	
	Reduction in pollution from the aggregates sector	Aggregates sector	Voluntary Aggregates Levy Credit Scheme	DOE	
	Comply with existing water directives	NIEA, NI Water	Water Order consent reviews IPC permit reviews Trade effluent inspections	NIEA	
Reduction in nutrients and dangerous substances	Reduce nutrient and dangerous substances loadings from industrial discharges	NIEA, NI Water	Water Order consent reviews IPC permit reviews Trade effluent inspections REACH	NIEA	
	Review of minerals planning permissions	Mining and quarrying sector	Review of Old Mineral Permission (ROMP) under Planning Reform Order 2006	DOE	

Pressure Type: DIFFUSE AND POINT SOURCE POLLUTION

5.7 Key Sector: WASTE

5.7.1 Introduction

Waste disposal sites (including old un-lined landfills) may produce lesser discharges to waters than wastewater treatment plants and industries, but residues or waste products from previous activities may have seeped into the ground and continue to threaten groundwater and surface waters. Our knowledge of these sites is incomplete and needs updating to assess the scale of this problem. We have good records of today’s engineered landfills but not of the contents or locations of past landfills. The Northern Ireland Environment Agency (NIEA) has a database that lists hundreds of potential areas of land contaminated by previous use in Northern Ireland.

There are at least 200 unregulated or illegal waste management facilities throughout Northern Ireland. NIEA receive approximately 1,000 reports of alleged illegal dumping each year. Estimates suggest that in 2002–2004, a minimum of 250,000 tonnes of household waste from Ireland were illegally dumped in Northern Ireland; the cost of removal is likely to exceed £28 million. The two jurisdictions have agreed joint enforcement operations to penalise and deter illegal activities. Ireland has agreed to let a contract to begin the process of removing illegally disposed of waste and legally dispose of it in that jurisdiction.

5.7.2 What causes the environmental impact?

The potentially harmful properties of landfill leachates result from the presence of:

- high levels of ammonia and suspended solids;
- dissolved solids;
- toxic compounds;
- immiscible organic chemicals;
- high chemical/biochemical oxygen demand (COD/BOD);
- high levels of nutrients;
- microbiological contaminants.

Some components of leachates are List I or List II substances under the Groundwater Directive on the basis of their toxicity, bioaccumulation and persistence. Landfilled waste decays over a period of decades and therefore the pollution from leachate and gas continues to be emitted over a long period of time.

5.7.3 What action are we already taking?

KEY LEGISLATION

Water (Northern Ireland) Order 1999

The Water Order identifies responsibilities for addressing water pollution incidents and the requirement to consent discharges to waters. NIEA applies the principles of integrated pollution prevention, the polluter pays principle and the precautionary approach when dealing with historic, unregulated sites. Licensed sites in Northern Ireland are monitored regularly for compliance. Waste management facilities currently operating under the terms of a licence are also required to hold a discharge consent under the Water (NI) Order. Discharges to the water environment from landfill and other large waste management facilities are controlled by permit conditions.

Groundwater Regulations (Northern Ireland) 1998

The Groundwater Regulations implement the 1980 Groundwater Directive which seeks to protect groundwater by preventing the direct discharge of certain hazardous substances into groundwater and subjecting the discharge of other substances to an authorisation procedure.

The Waste & Contaminated Land (Northern Ireland) Order 1997

The Waste and Contaminated Land Order is the primary control for regulated waste management. Northern Ireland's Waste and Contaminated Land Order has been amended to include new measures for the investigation, enforcement and prevention of waste offences, with increased penalties and new powers to stop, search and seize vehicles used in committing offences. The powers of NIEA to direct the removal of waste are limited and the responsibility for removing the waste from land remains with the defendant.

Under the Waste and Contaminated Land Order (NI) 1997 Article 27 only allows NIEA to direct a keeper of waste (if identifiable) to remove the waste on lands to a licensed facility. The cost of removal and disposal of the waste is far in excess of the penalty for breach of such a direction. Where NIEA investigates and identifies no responsible person then the incident may be referred to the district council for consideration of an Article 28 Notice under the Waste and Contaminated Land (Northern Ireland) Order 1997 as amended by the Waste (Amendment) (Northern Ireland) Order 2007.

It should be noted that Article 28 gives a district council powers to enter a site and remove the waste. NIEA has issued requests by virtue of Article 24(2) of the Council Regulation (EC) No. 1013/2006 on Shipment of Waste Regulations to the Dublin City Council, requiring them to ensure that the waste on the land is removed and taken back to Ireland for disposal.

Proceeds of Crime Act (POCA) 2002

The vast majority of waste crime is carried out in order to make money, and the potential income from such activity is vast. NIEA is determined to ensure that the proceeds of illegal activities which harm the environment are recovered, removing them from use by offenders to fund further illegal activity.

NIEA have developed links with a number of agencies via the Organised Crime Task Force partnership leading to confiscation of the proceeds of criminal conduct under the Proceeds of Crime Act (POCA) and have successfully concluded on a number of criminal confiscation investigations resulting in the granting of Confiscation Orders in respect of persons convicted on counts of keeping and disposing of illegal waste. This relates to more serious waste offences which were classified as serious crime because of the financial gain involved. In 2007- 2008 this led to confiscation of assets worth more than £833,000 following prosecution in four cases involving illegal dumping of waste. This new enforcement method is likely to act as a deterrent to other potential offenders. NIEA now has its own team of financial investigators, accredited under the POCA by the National Policing Improvement Agency. NIEA is now able to carry out its own confiscations and money laundering investigations.

Landfill Regulations (Northern Ireland) 2003

This legislation places stringent requirements on landfill operators to ensure the environment is protected. No new phases of landfilling designed in accordance with the Landfill Regulations and operated under a PPC permit have been identified as a risk to surface water or groundwater status.

The Pollution Prevention and Control Regulations (Northern Ireland) 2003 (PPC Regulations)

Both new and existing refuse disposal sites are regulated under the PPC Regulations; the latter often include older, poorly engineered phases. Other sites where waste deposition has now ceased are regulated and controlled through the Waste Management Licensing Regulations. In 2007/08 NIEA received in excess of 50 PPC permit applications to meet the European Union Landfill Directive standards.

Waste Management Licensing Regulations (Northern Ireland) 2003

NIEA is responsible for processing applications for waste management licences, exemptions, pollution prevention and control permits and the registration of waste carriers. End of life vehicles (ELVs) have the potential to release harmful substances into the environment if they are not stored, treated and disposed of properly. ELVs are classed as hazardous waste until they have been fully treated and de-polluted. As a result of concerns about the environmental and economic impacts of waste vehicles, the European Union adopted the End of Life Vehicles Directive (2000/52/EC) in October 2000. NIEA approve and monitor the Authorised Treatment Facilities to ensure that ELVs are treated correctly. NIEA also investigate and take enforcement action against operators of illegal sites. These sites threaten the environment and undermine legitimate operators.

During 2007 - 2008 NIEA issued 42 Waste Management licences (WML) and registered 56 waste exemptions. A total of 12 new licences were issued for End of Life Vehicles Authorised Treatment facilities. In line with the recent change in agricultural waste legislation NIEA received 1,395 applications for an agricultural exemption during 2007 - 2008.

STRATEGIES AND GUIDELINES

The Northern Ireland Waste Management Strategy 2006 – 2020 'Towards Resource Management' provides a framework for the development and achievement of effective resource and waste management practices in Northern Ireland. The policies and actions identified in the Strategy are applicable to all controlled wastes.

NIEA has developed a monitoring strategy under their waste licensing and authorisations responsibility. A monitoring plan is now in place which outlines target visits for each authorised site based on a risk rating system. Facilities that are perceived as being at a higher risk of causing environmental pollution are inspected more frequently as a result.

A Strategic Plan for the Closure of Landfill Sites in Northern Ireland was finalised at the start of 2008. NIEA also issued guidance on land spreading exemptions, and published Relevant Convictions policy and guidance.

NIEA is the competent authority for movements of waste into and out of Northern Ireland from and to other countries outside the UK and therefore proactively carry out visits to facilities to not only audit transboundary movements, but also to provide advice on the Transfrontier Shipment Regulations.

ADVICE, EDUCATION AND TRAINING

NIEA continues to provide a high level of advice and guidance to legitimate producers, carriers and managers of waste. For example 'The Safe Storage And Disposal Of Used Oils' pollution prevention guidelines are intended to help everyone that handles used oils, from people carrying out a single engine oil change to large industrial users.

Education and awareness campaigns endeavour to provide an integrated approach to changing behaviour and attitudes towards waste, aimed at encouraging waste prevention, maximising the use of waste as a resource, and increasing reuse, recycling and recovery.

VOLUNTARY SCHEMES AND CAMPAIGNS

NIEA continued to provide grant aid to District Councils to cover the last two years of the Waste Management Grant Scheme (2006 -2008). This helped Councils invest in the minor infrastructure needed to implement their Waste Management Plans. In addition, funding also continued for recycling fridges and hazardous WEEE (Waste, Electrical and Electronic Equipment e.g. fluorescent tubes and cathode ray tubes). Ongoing support was also provided to a range of non-governmental bodies, including WRAP (Waste and Resources Action Programme), NETREGS, Tidy NI and also Community Waste Innovation Fund projects

TIDY NI's one aim is to enable the public and private sector agencies to deliver more effectively on Local Environmental Quality, and relate it to the needs of their community. Much of the work is pertinent to The Litter (NI) Order 1994 and The Waste and Contaminated Land (NI) Order 1997.

Wake up to Waste campaign aims to work with industry trade bodies and other key stakeholders to develop best practice guidance and support industry-led awareness training. The Wake up to Waste Website is currently under review.

The Northern Ireland Hazardous Waste Forum consists of key stakeholders and has been established to advise on a way forward for hazardous waste reduction, recovery and management.

5.7.4 What improvements will current measures achieve?

Northern Ireland has a range of legislation dealing with the establishment and operation of waste management facilities. Legislation for dealing with contaminated lands and development of brownfield sites is being prepared currently; the legislation is supported by policies and guidance on best practice for addressing water pollution problems. The current regulatory controls assign the responsibilities for managing these sites. The challenge is to enforce these controls, particularly to deal with historic, unregulated sites.

5.7.5 What further actions can we take to deliver environmental improvements?

NEW LEGISLATION AND GUIDANCE

- Additional powers for illegal disposal**
- a) Additional powers to deal with illegal disposal (including the illegal disposal of waste on agricultural land) are currently under consultation.
- European Union 'Mining Waste Directive'**
- b) The EU Directive on the Management of Waste from the Extractive Industries was adopted in 2006. Its aims are to prevent or reduce, as far as possible, any adverse effects on the environment, and any resultant risks to human health. The DOE are in the process of introducing legislation to give legal effect to this Directive.
- Contaminated land regime**
- c) Contamination can occur through a wide range of mechanisms and is commonly found, for example, on ex-commercial premises such as petrol filling stations where spillages of materials have occurred over time. NIEA uses PPC permit conditions and Waste Management Licensing closure procedures to ensure waste operators manage and reduce the contaminant footprint of older sites/phases and associated groundwater contamination. However there are historic areas of waste disposal that are not subject to effective regulatory control. Measures to address these pressures would need to be implemented to tackle contaminated land. The DOE has proposed the implementation of a contaminated land regime to cover the determination and remediation of contaminated land. Remediation notices could be served under the new controls listing the measures required to remediate the land to a condition that is suitable for use. A register detailing contaminated land sites, available for public inspection, would also be compiled.
- Provisions for a Northern Ireland contaminated land regime are contained within Part III of the Waste and Contaminated Land Order (NI) 1997, which is expected to be commenced by late 2009. Contaminated Land Regulations and associated statutory guidance will also be introduced at this time.
- Protocol for production of aggregates**
- d) A Quality Protocol for the production of aggregates from inert waste in Northern Ireland is in preparation.
- Adoption of sustainable construction practices**
- e) The DOE will bring forward proposals for public consultation to introduce the requirement for major developments to include a Site Waste Management Plan. Developers and contractors will be required to produce Site Waste Management Plans to ensure better management of waste from construction. Proposed amendments to Building Regulations may require developers to provide for segregated collection containers appropriate to the development.

Summary of existing actions					
Pressure Type: DIFFUSE AND POINT SOURCE POLLUTION					
Key Sectors: WASTE					
Improvement Required	Actions	Responsible Organisations/ Sectors	Delivery mechanism and support	Support Provider/ Regulator	
Reduction in Organic Waste	Prosecution of illegal deposit of controlled waste	All	Water (Northern Ireland) Order 1999 and The Waste & Contaminated Land (Northern Ireland) Order 1997	DOE/ NIEA	
		All	The Litter (Northern Ireland) Order 1994	District Councils	
	Recovery of benefit from illegal activities which harm the environment	All	Proceeds of Crime Act (POCA) 2002	DOE	
		Waste Industry	Groundwater Regulations (Northern Ireland) 1998 / The Water (Northern Ireland) Order 1999		
	Regulation of waste related activities	Waste Industry	The Waste & Contaminated Land (Northern Ireland) Order 1997		
		Waste Industry	Landfill Regulations (Northern Ireland) 2003		
		Waste Industry	The Pollution Prevention and Control Regulations (Northern Ireland) 2003		
		Waste Industry	Waste Management Licensing Regulations (Northern Ireland) 2003		
	Provide an integrated approach to changing behaviour and attitudes towards waste		All	Codes of Practice & Guidelines	DOE
			All	Advice, Education and Training	DOE

Pressure Type: FRESHWATER MORPHOLOGY

5.8 Key Sectors: HISTORICAL ENGINEERING, URBAN DEVELOPMENT, PUBLIC WATER SUPPLY, HYDROPOWER, AGRICULTURE & FORESTRY

5.8.1 Introduction

Many of Northern Ireland's rivers and lakes have a history of engineering interventions. These have had an important role in the growth of its economy. Embankments, erosion protection and dredging have allowed urban development and cultivation of agricultural land adjacent to rivers and lakes. Weirs have helped irrigate crops and generate energy. Bridges, culverts and other similar structures underpin Northern Ireland's transport network. We have also physically modified many of our waters for water supply and treatment, coastal defence/protection, forestry, fisheries and for navigational and recreational purposes. The resulting changes to the physical habitat of our water environment include the straightening and deepening of rivers, lowering of lake water levels, the reinforcement of banks, the culverting of rivers and the installation of bridges, weirs and impoundments.

The Water Framework Directive (WFD) requires that Member States to ensure that the physical condition of surface waters supports ecology. We have classified our surface waters for morphology, however morphological quality elements only contribute to status classification for water bodies at high ecological status (i.e. if the water is at high status for all other parameters a morphological impact can cause it to be downgraded to good status). A Rapid Assessment Technique (commonly referred to as RAT) has been used to assess high status river sites. The tool classifies river morphology by scoring it based on departure from naturalness. In terms of lake morphology classification, a lake MiMAS tool (Morphological Impact Assessment System) was used and again was only used in the status classification for lake water bodies at high ecological status.

Fifteen rivers were classified as high status for biology and chemistry. Eight of these were downgraded to good status due to morphological pressures, the remaining seven were not downgraded because no morphology assessment was available. One lake classified as high status was downgraded due to morphological pressures.

Heavily Modified Water Bodies

In some areas rivers and lakes have been altered to such a degree that attempting to return them to a natural condition would now be economically or technically infeasible. Such water bodies have been designated as Heavily Modified Water Bodies (HMWBs). Instead of "good ecological status", the environmental objective for HMWBs is 'good ecological potential' (GEP), which has to be achieved by 2015. These designated water bodies will require mitigation measures that maximise their ecological potential, as opposed to 'restoring' the natural condition. The Northern Ireland Environment Agency (NIEA) has held a series of workshops to define ecological potential of the designated HMWBs. Due to the numbers of HMWBs (68 in total) a UK technique was used to determine ecological potential based on whether all possible mitigation measures were in place in a water body. For example, where all mitigation measures for the water use are in place GEP or better is assigned. Where all mitigation measures for the water use are not in place 'Moderate Ecological Potential' or worse is assigned. More information on the process that was used to assess whether a water body was heavily modified and how ecological potential was defined can be found on the Quality of Our Water Environment section of the NIEA website.

5.8.2 What causes the environmental impact?

Morphological alterations arising from anthropogenic sources can cause significant changes in ecology, can result in habitat loss and can change how much and how fast water drains off the land. Examples of activities causing morphological alterations which can lead to damage or loss of habitats and changes to ecological processes are listed below:

- Construction of impounding structures such as dams and weirs on rivers and lakes for water supply and hydro-electric power;
- Dredging for navigation causing disturbance to the substrate;
- Construction of flood walls or embankments for flood defence;
- Historic planting of forests close to the banks of rivers;
- Land-use pressures from agriculture and urbanisation such as straightening, channelisation and culverting of rivers;

Old weirs and dams may impede fish movements and can restrict the access of migratory fish to upstream spawning areas, limiting the fish productivity of a catchment and its potential for fisheries. Straightening and deepening of rivers for navigation can result in direct habitat loss and can reduce storage of flood water within the system which can result in an increased risk of flooding. Engineering structures within the water environment such as culverts, bank reinforcement structures and pipes reduce habitat diversity of rivers and lakes and adversely affect their appearance reducing their amenity value. Historic planting of forests up to the bank of rivers resulted in the river being densely shaded and resulted in the loss of natural bankside vegetation. New plantations are planted with buffer zones to protect riparian and aquatic zones from disturbance.

Some of Northern Ireland's most productive agricultural land is located alongside rivers. However there are difficulties with farming land in the vicinity of rivers as rivers can erode into fields and floods can threaten livestock and damage crops. This has led to programmes to straighten and deepen rivers, reinforce banks and construct flood defences. The adverse impacts of such alterations, however, are often expressed at a local and catchment level affecting ecology and flood risk downstream.

- Straightening and deepening of rivers, draining of wetlands and lowering of lake water levels has been undertaken to allow for agricultural production on the flood plain. This results in a loss of habitat diversity and reduces fish breeding and growing areas and can result in the loss of riparian wetlands.
- Bank reinforcement to protect land from erosion reduces habitat diversity and adversely affects the appearance of rivers. The loss of habitat can result in a decline in fish populations unless measures are taken to enhance in stream features.
- Loss of natural bankside vegetation from ploughing up to the edge of rivers or allowing cattle and sheep to graze up to the water can lead to bank erosion, increased sedimentation and also loss of food and shelter for wildlife.

The effect of physical modifications on one receiving stream may be small, but the combined effect can change water quality and flooding behaviour in a district, which may result in increased risk of flooding. Types of morphological changes and their associated impacts are presented in table 5.8(a) below.

Table 5.8(a) Types of changes in morphology and their potential impact

Impact	Waterbody type	Impact
Straightening and deepening of rivers	Rivers	<ul style="list-style-type: none"> • Direct loss of habitat for animals and plants especially fish together with loss of wetlands. • Reduction in biodiversity value. • Increased flood risk by reducing storage of flood water within the system. • Reduction in resilience of system to pollution.
Abstractions and operation of reservoirs	Lakes and reservoirs	<ul style="list-style-type: none"> • Large variation in water levels which leads to a wide scour zone around the edge. Prevents the establishment of macrophytes and spawning of some types of fish.
Barriers to fish migration	Rivers, lakes	<ul style="list-style-type: none"> • Long-distance migration stopped for salmon, sea trout, eels and lamprey. Reduction in fish stock and potential fishery. • Limits short distance migration by other fish. Creates isolated populations which are less resilient to environmental change.
Barriers to sediment movement	Rivers	<ul style="list-style-type: none"> • Dams prevent movement of gravels downstream. Spawning areas for salmonids lost. • Ports and breakwaters divert sediment movement along the coast which increases vulnerability to erosion and therefore flooding.
Engineering structures within water environment	Rivers, lakes	<ul style="list-style-type: none"> • Structures use space for ecology depending upon the scale of the works and may prevent the development of normal ecology. • Affects the amenity value of water bodies.
Loss of flood plain	River flood plains	<ul style="list-style-type: none"> • Removes wetlands, fish nursery areas and natural buffers against diffuse pollution. • Increases flood risk by removing flood plain storage.
Loss of natural bankside vegetation	Rivers	<ul style="list-style-type: none"> • Leads to increased erosion, loss of habitat and reduction of leaf input to rivers (important source of food for insects). • Removes wetlands and natural buffers against diffuse pollution.

5.8.3 What action are we already taking?

At present, there are a variety of existing mechanisms for controlling or regulating activities which can cause morphological changes to our waters, with several departments and agencies being involved.

KEY LEGISLATION AND POLICY

Planning (Northern Ireland) Order 1991

Under this legislation planning permission is required for carrying out development of land. Articles 11 and 12 of this Order define 'development' as "the carrying out of building, engineering, mining or other operations in, on, over or under land, or the making of any material change in the use of any buildings or other land." Any land covered by water is included in the definition of land.

Fisheries Act (Northern Ireland) 1966

The Fisheries Act (NI) 1966 prevents the removal of any material from the bed of a river without the consent of the Fisheries Conservancy Board. Under this legislation the Department of Culture, Arts and Leisure (DCAL) may approve programmes and give grants for the development of waters for angling (i.e. river enhancement programmes). Part 4 of the Fisheries Act protects fisheries and their habitats making it an offence to obstruct the passage of fish and requires the construction of a fish pass where a weir is built or an existing weir is reinstated or altered. Section 54 of the Fisheries Act requires persons who wish to build dams and weirs or repair existing weirs in rivers to construct fish passes for the free passage of fish. All fish pass designs and specifications must be submitted to the DCAL for approval before a pass is constructed.

Foyle and Carlingford Fisheries (Northern Ireland) Order 2007 / Foyle and Carlingford Fisheries Act 2007

This legislation concerns the protection of the aquatic environment, specifically fisheries and is transboundary in nature. Under this legislation in the Foyle and Carlingford areas it is an offence to remove material from the bed of the freshwater portion of a river without the consent of the Foyle, Carlingford and Irish Lights Commission.

Drainage (Northern Ireland) Order 1973

Rivers Agency an agency within the Department of Agriculture and Rural Development (DARD) have a statutory obligation to maintain free flowing rivers under this legislation and have powers to carry out drainage schemes on any designated waterway. The Agency has general powers to undertake, construct and maintain drainage works (which includes defence) and also emergency works to both watercourses and sea defences.

Drainage schemes must now meet the requirements of the Drainage Environmental Impact Assessment regulations, by considering significant effects on the environment of the proposed works. Rivers Agency's remit is to undertake such maintenance works while minimising environmental damage and this is done through application of sensitive river maintenance guidelines as outlined in Rivers Agency's Watercourse Maintenance Manual. Work programmes are agreed with DCAL Inland Fisheries and the Northern Ireland Environment Agency (NIEA) and mitigation measures are agreed before commencement of the works. Some river enhancement works are also made as the work proceeds, where appropriate, under the provisions of the Water Order (NI) 1999.

DCAL works closely with Rivers Agency to provide advice and guidance, under the terms of a Service Level Agreement, to mitigate the impacts of drainage maintenance works on habitat. This requires that all drainage works must include mitigation and, where funding permits, fishery rehabilitation measures under the direction of DCAL Fisheries Technical Officers.

Anyone wishing to carry out culverting must apply for consent or approval to Rivers Agency under Schedule 6 of the Drainage (Northern Ireland) Order 1973 as amended. Rivers Agency consult with DCAL Fisheries Officers where a culvert proposal might impede fish movements or otherwise impact a fishery. Under the Planning Policy Statement 15 (Planning and Flood Risk) the Department of the Environment (DOE) will only permit the culverting or canalisation of a watercourse in exceptional circumstances. Examples of such circumstances include:

- where such works are necessary as part of a flood relief scheme;
- where the culverting of a short length of a watercourse is necessary to provide access to a development site or part thereof; or
- when it is demonstrated by the applicant that there is no practicable alternative to the culverting of the watercourse.

Water (NI) Order 1999

The transferred functions under this Order provide DCAL with the powers to carry out dredging works and canal schemes and to promote the recreational or navigational use of any waterway. DCAL also has powers of improvement and restoration for any waterway, and powers of maintenance for any waterway not designated for the purposes of the Drainage Order.

STRATEGIES, SCHEMES AND PROGRAMMES

Northern Ireland Atlantic Salmon Management Strategy

Work by DCAL under the Northern Ireland Atlantic Salmon Management Strategy and associated management plans will deliver improvements in the physical condition of waters. In partnership with the Loughs Agency a package of funding was secured to facilitate an extensive enhancement and management programme for Atlantic Salmon on three river catchments in Northern Ireland and Donegal, the Clanrye and Deelee River catchments in the Carlingford and Foyle regions and the River Main (in the Neagh Bann District). The work involved a partnership approach between a range of government agencies, non-departmental public bodies and angling associations. The majority of enhancement works were conducted between 2005-2007 and included a range of hard and soft engineering solutions such as the use of vortex weirs and groynes and use of soft engineering solutions such as spawning gravel addition, stockproof fencing, installation of cattle drinkers and tree planting. Preliminary monitoring has indicated a significant increase in salmonid densities at many of the rehabilitation sites.

Angling Development Programme 2002-2006

DCAL also ran an Angling Development Programme funded under the European Union Peace and Reconciliation Programme from 2002-2006. The programme was designed to develop angling and water based recreation projects. Funds were awarded to enhance angling facilities, develop inland waterway networks and provide visitor amenities. Part of the works that have been undertaken include morphological restoration works such as habitat improvement and improvement of fish passage. For example, funds were used to enhance degraded salmonid habitat along a 1000 metre stretch of the River Blackwater in 2004. This work utilised 'soft engineering' solutions such as fencing off the banks and using logs to stabilise the banks. Surveys that were undertaken after the work was completed showed that there was a general increase in juvenile salmon and trout numbers after the enhancement work.

The Loughs Agency generally undertake a large range of ongoing instream enhancement programmes with a view to rehabilitation of the aquatic environment.

Agri-environment improvement schemes

Agricultural land alongside rivers has often been cultivated through centuries of investment to protect it from flooding and to improve drainage. Constraining the space available to a river can harm the physical habitat, create flooding and silt problems for downstream landowners, properties and communities. It is important to achieve the correct balance between the interests of individual landowners and the overall benefits to society. In many cases it is sufficient to give rivers more space by fencing or by the creation of buffer strips and then allowing natural processes to allow the water environment to recover its natural diversity and structure. Because this type of restoration work is so closely related to the way land is managed there is a close link between the measures and mechanisms required to address diffuse agricultural pollution and those required to address the morphological impacts from agricultural production. Indeed, addressing the morphological impacts of agricultural activities typically will also help to reduce diffuse pollution impacts.

Some of the measures carried out under agri-environment improvement schemes such as the Countryside Management Scheme contribute to improving morphology impacts for example, by fencing off river banks to prevent cattle trampling the river. Provision of good practice information to farmers by the DARD Countryside Management Branch will also ensure that morphological impacts from agricultural activities are reduced. Rivers Agency has agreed with the Countryside Management Branch to leave a strip less than 2 metres wide or a wider strip greater than 5 metres to act as a buffer strip between cultivated land and rivers. The narrow strip allows machines to reach over fences to work on the river and the wider strip allows a machine to get onto the river bank to work.

GUIDANCE AND ADVICE

DARD Rivers Agency provide environmental support and advice on new flood defence schemes and maintenance works. This can involve the scoping of proposed works, completion of environmental surveys, consultation with conservation bodies and liaison with NIEA for works at designated conservation sites.

ENHANCEMENT AND RESTORATION SCHEME EXAMPLES

In the North Eastern River Basin District small scale river morphology enhancement works have been undertaken by Rivers Agency in recent years in partnership with other organisations. They include works at the Three Mile Water, Derriaghy River, Ballymurphy Stream, Belfast, the Bog Meadows Project on the Blackstaff River and the Quoile pondage.

The Iveagh Angling Club have carried out river enhancement work on the River Lagan, the work included installation of two fish passes and a significant number of spawning beds. The Three Mile Water Conservation and Angling Trust run a restoration project on the Three Mile Water and the Emler Angling Club carry out habitat improvement works on the Comber River and its tributaries.

5.8.4 What improvements will current measures achieve?

At present, there is a complicated patchwork of existing mechanisms for controlling or regulating activities which can cause morphological changes to our waters. There is no streamlined comprehensive system to control physical modifications.

River restoration work carried out by Rivers Agency, DCAL, Loughs Agency and angling clubs has improved the physical habitat of a number of our rivers. However there is a need for the development of a prioritised restoration work programme for water bodies that are impacted by morphological alterations and for a competent authority to oversee the work carried out by all the departments

5.8

5.8.5 What further actions can we take to deliver environmental improvements?

Over the first basin plan period we will develop further measures to address morphological impacts as our confidence in the classification process for morphology improves.

Further investigation

- a) This is the first year that NIEA has produced an initial morphology classification. Classification has been assessed using the Rapid Assessment Technique and the Lake MiMAS tool which have only been recently developed. Consequently, NIEA will carry out work to review the morphology classification results over the next year and complete further surveys on all water bodies to ensure that this new component of the classification scheme is fully assessed before the final plan is produced.

Review of legislation

- b) The DOE is undertaking a review of existing legislative controls to control physical modifications to surface waters. Further detail on the outcome of the review and any proposals arising from it will be made available in the final river basin plan in 2009.

Implementation of restoration measures

- c) There are a wide range of restoration measures that can be employed to address morphological impacts. Examples include:

- Re-meandering of straightened channels
- Re-construction of pools
- Substrate enhancement work
- Incorporation of river restoration & fisheries enhancement projects
- Removal of hard bank reinforcement/revetment, or replacement with soft engineering solution
- Re-opening of existing culverts
- Removal of impoundment and de-silting of impounded reach
- Adoption of operational protocols for impoundments
- Stabilisation of river banks
- Fencing programmes to exclude livestock
- Application of best practice forestry guidelines
- De-silting of affected river reaches
- Removal of barriers to fish migration
- Updating of existing fish passes and construction of new fish passes

Over the first basin plan period we will assess whether measures are technically feasible and cost effective to implement. We will then further develop and implement restoration measures on prioritised water bodies as our confidence in the classification process for morphology improves. However, if, for example, a river has a known morphological pressure on it but it is considerably polluted it is not beneficial to address the morphological pressure until the pollution issue has been resolved and thus the ecology improved. Therefore, in this first river basin management plan new measures will be considered for the river and lake water bodies that were downgraded from high to good status as a result of morphological impact.

Strategic appraisal barriers to fish

- d) A strategic appraisal of any significant barriers to fish (and indeed invertebrate) movement will be conducted to inform the development of a programme to address significant barriers. The programme would include, where appropriate, the installation of new fish passes or the upgrading of existing passes and the removal of blockages.

Summary of existing actions					
Pressure Type: FRESHWATER MORPHOLOGY					
Key Sectors: HISTORICAL ENGINEERING, URBAN DEVELOPMENT, PUBLIC WATER SUPPLY, HYDROPOWER, AGRICULTURE, FORESTRY					
Improvement Required	Actions	Responsible Organisations/ Sectors	Delivery mechanism and support	Support Provider/ Regulator	
Control modifications to surface waters	Requirements for planning permission	DOE	Planning (Northern Ireland) Order 1991	DOE	
	Control modifications to designated sites	NIEA	Conservation Natural Habitats, etc. Regulations (Northern Ireland) 1995	NIEA	
	Control culverting activities	Rivers Agency	Schedule 6 of the Drainage (Northern Ireland) Order 1973 as amended	Rivers Agency	
Control removal of substrate from rivers	Prevent the removal of material from river beds	DCAL	Fisheries Act (Northern Ireland) 1966	DCAL	
		Loughs Agency	Foyle and Carlingford Fisheries (Northern Ireland) Order 2007 / Foyle and Carlingford Fisheries Act 2007 (applies to the Foyle and Carlingford areas)	Loughs Agency	
Protection of fisheries and habitats	Construction of fish passes where weirs are built or reinstated	DCAL, Loughs Agency	Fisheries Act (Northern Ireland) 1966	DCAL, Loughs Agency	
	Atlantic Salmon habitat improvement works	DCAL, Loughs Agency	Atlantic Salmon Management Strategy for Northern Ireland /NASCO Resolutions and Agreements	DCAL, Loughs Agency	
Riparian vegetation	Encourage / promote use of Buffer strips	Landowners	Northern Ireland Rural Development Programme Countryside Management Scheme Guidance and advice	DARD	
	Encourage / promote fencing of water margins	Landowners	Northern Ireland Rural Development Programme Countryside Management Scheme Guidance and advice	DARD	

Pressure Type: MARINE MORPHOLOGY

5.9 Key Sectors: : PORTS & HARBOURS, AGGREGATE & FISHING / AQUACULTURE INDUSTRY

5.9.1 Introduction

There are many morphological pressures on the marine environment around Northern Ireland. Our ports play an important role in transporting goods in and out of the country. In 2006, approximately 25 million tonnes of goods were transported through our ports in addition to half a million tourist vehicles. In order to sustain viability and safety in our ports, essential operations like dredging and the engineering of port facilities must be carried out on a regular basis.

In addition to construction pressures within ports, the drive for renewable energy is rapidly extending into the marine environment. Northern Ireland's target is to produce 12% of electricity from renewable sources by 2012 and 40% by 2025 with at least 25% of this being generated by non-wind technologies. The first marine current turbine was licensed in Strangford Lough in December 2005 and became operational in 2008.

Other morphological pressures on the marine environment include the extraction of marine minerals for the construction industry. Historically, this has not been a major pressure around Northern Ireland, but as land-based sources become depleted, the marine environment may come under more pressure in the future. There is an extensive marine mineral extraction industry around the English coast.

Fishing and aquaculture activities can also have a morphological impact, and in particular invasive techniques such as bottom trawling, fisheries-related dredging and bottom-culture mussels. There are extensive aquaculture activities within our sea loughs and this industry is important for the Northern Ireland economy. At present there are 64 marine sites licensed for the cultivation of shellfish and 2 marine sites licensed for the cultivation of finfish.

The disposal of dredged material is also carried out within Northern Ireland waters. Although most disposal licences operate beyond the sea area covered by the Water Framework Directive (WFD) (i.e. greater than 1 nautical mile from the baseline for coastal waters), there is some licensing of dredged material disposal within sea loughs.

The WFD requires that Member States ensure that the physical condition of surface waters supports ecology. We have classified all transitional (estuarine) and coastal waters for morphology using the TraC MiMAS (Transitional and Coastal Morphological Impact Assessment) tool. Morphological quality elements only contribute to status classification for water bodies at high ecological status (i.e. if the water is at high status from all other parameters a morphological impact can cause it to be downgraded to good status). The tool classifies morphology by scoring it based on departure from naturalness.

Most of our estuaries, sea loughs and coastline have been changed morphologically as a result of aquaculture activity or the through the construction of ports and harbours and impoundments. Only 3 of our transitional and coastal water bodies are considered to be at high status for morphology and these are Rathlin, the North Coast and the Maidens. The remainder of our transitional and coastal waters, with the exception of those that have been designated as heavily modified, are at good status morphologically.

Heavily Modified Water Bodies

In some areas transitional and coastal waters have been altered to such a degree that attempting to return them to a natural condition would now be economically or technically unfeasible. Such water bodies have been designated as Heavily Modified Water Bodies (HMWBs), again using the TraC MiMAS tool. Our major ports (Belfast, Londonderry, Larne and Warrenpoint) have been developed and modified over many years. All of these lie within designated Heavily Modified Water Bodies. Instead of "good ecological status", the environmental objective for HMWBs is 'good ecological potential' (GEP), which has to be achieved by 2015. These designated water bodies will require mitigation measures that maximise their ecological potential, as opposed to 'restoring' the natural condition. The Northern Ireland Environment Agency (NIEA) is planning to hold a workshop(s) with relevant agencies and stakeholders in 2009 to define ecological potential of the designated HMWBs.

In addition to our major ports, 6 out of the 7 transitional waters have been designated as heavily modified, with only the Roe Estuary being considered a natural system. The Lagan Estuary and Quoile Pondage are designated due to the presence of impounding weirs / barrages. The Bann Estuary is designated due to the presence of the weir and the flow controls over the whole lower Bann system. Both the Newry Estuary and the Connswater are modified with walled structures over much of their length. The Foyle and Faughan have port modification, though NIEA is giving consideration to the splitting of this water body as the area upstream of Londonderry/Derry city is much more natural. More information on the process used to assess whether a water body was heavily modified can be found on the Quality of Our Water Environment section of the NIEA website.

5.9.2 What causes the environmental impact?

Morphological alterations have the potential to change the ecology of a water body. Land reclamation or the construction of sea defences and walls can result in the loss of important intertidal habitat. Dredging, the extraction of marine minerals and fishing activities can all cause physical disturbance to seabed communities or can result in increase in suspended solids, which in turn reduces light penetration in the water column, which can alter marine community structures. Bottom culture of mussels has the potential to displace the natural benthic communities in our sea loughs.

The impact of subsea structures with moving parts, like tidal turbines, is as yet largely unknown although rapid advances in this area are being made with the development of marine renewable energy technologies.

Weir structures and barrages which can be used for flood defence purposes in our transitional waters (e.g. the Lagan Weir and Quoile Pondage) have the potential to physically impede the passage of migratory fish. In addition, barrage structures in transitional waters can increase the degree of stratification in the water column and can cause problems with deoxygenation of the bottom saline layers, which are effectively trapped by the overlying freshwater. Where the underlying sediments are organically enriched, they scavenge oxygen from the water column in the degradation process and in extreme conditions can cause fish kills.

5.9.3 What action are we already taking?

There are already a number of controls on activities that affect the morphology of the seabed.

KEY LEGISLATION AND GUIDANCE

Part II, Food and Environment Protection Act, 1985 (FEPA)

Deposits in the sea are controlled by FEPA which is applicable throughout all UK waters. The Department of the Environment (DOE), through NIEA, is responsible for licensing within the Northern Ireland territorial waters. The area covered is from the mean high water spring tide mark out to 12 nautical miles from the baseline. The baseline comprises the mean low water mark on the open coast, and in a sea lough the baseline is represented by a number of bay closing lines across the mouth of the lough. Any deposit in the sea within this area, whether as a result of construction activity in a port, land reclamation, or the disposal of dredged material requires a licence under the Act. Although FEPA covers the disposal of dredged material, it does not cover the practice of dredging.

In determining whether to issue a licence, NIEA has a duty to have regard to the need to protect the marine environment, the living resources which it supports and human health and must prevent interference with legitimate uses of the sea. NIEA may also have regard to other matters which it considers relevant. In exercising its duties, NIEA, as licensing authority, implements a thorough consultation process with other parts of Government and public bodies with a statutory role in the management of the marine environment. In determining licence applications, NIEA can also require the applicant to examine practical alternatives to the proposed operation. Licence applications are also published to ensure that a wider group of stakeholders have the opportunity to comment on a proposal.

5.9

Marine Works (Environmental Impact Assessment Regulations 2007)

The Marine Works Regulations apply across the UK, and implement the need for an Environmental Impact Assessment for FEPA license applications which fall under Annex I of the Environmental Impact Assessment Directive, or under Annex II of the Directive where the project is likely, because of its size, nature or location, to have significant effects on the environment. The Regulations also implement the Public Participation Directive which requires the publicising of FEPA applications.

Harbour Works (Environmental Impact Assessment) Regulations 2003

Most harbour works fall under the Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 1999. Only those which fall under permitted development, or are outside the planning limit, attract the Harbour Works regulations. The Harbour Work Regulations implement the need for Environmental Impact Assessment for harbour works that fall under Annex I of the Environmental Impact Assessment Directive or under Annex II of the Directive where the project is likely, because of its size, nature or location, to have significant effects on the environment. The Department of Agriculture and Rural Development (DARD) is the appropriate Department regarding harbour works within any fishery harbour and the Department for Regional Development (DRD) covers all other harbours.

The Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Marine Dredging) (England and Northern Ireland) Regulations 2007

These Regulations introduced a new licensing system to cover the extraction of minerals, like sands and gravels from the marine environment by dredging. These Regulations incorporate the requirements of both the Environmental Impact Assessment and Habitats Directives. The Department implements the Regulations through NIEA and aims to ensure that the use of marine dredged sand and gravel remains consistent with the principles of sustainable development. NIEA determines licence applications through a consultation process with other government Departments and organisations with a statutory role, in addition to the wider stakeholder community.

Fisheries (Northern Ireland) Act 1966 as amended

Under the terms of the Fisheries Act (Northern Ireland) 1966 as amended, the DARD are responsible for the licensing of fish and shellfish farms in Northern Ireland.

Foyle and Carlingford Fisheries Bill

The Foyle, Carlingford and Irish Lights Commission are responsible for licensing and regulation of aquaculture and shellfisheries in the Loughs Foyle and Carlingford.

The Foyle and Carlingford Fisheries (Northern Ireland) Order 2007

The Loughs Agency operate a number of automated environmental monitoring systems in Foyle and Carlingford and also one approximately 4 miles off Inishowen head. These provide valuable information on water quality to the Marine Institute and NIEA in fulfilment of their various objectives.

The Inshore Fishing (Prohibition of Fishing and Fishing Methods) Regulations (NI), 1993 (amended in 2008)

The Inshore Fishing (Prohibition of Fishing and Fishing Methods) (Amendment) Regulations (Northern Ireland) 2008 came into operation in July 2008. The Regulations amend the Inshore Fishing (Prohibition of Fishing and Fishing Methods) Regulations (Northern Ireland) 1993 by extending the current ban on fishing by suction dredges in Strangford Lough and Dundrum Inner Bay to all Northern Ireland waters and by introducing a prohibition on dredging for sea fish and extending the prohibition on the use of seine and trawl nets in Belfast Lough westward to an imaginary straight line drawn from Carrickfergus Castle in County Antrim to Grey Point in County Down.

OSPAR

OSPAR is the international convention for the protection of the marine environment of the North East Atlantic. The UK is one of 15 signatories to the Convention. OSPAR produces many extremely useful guidelines which NIEA, along with the other UK regulators, use in marine licensing processes. These include:

- OSPAR Guidelines for the Management of Dredged Material; and
- OSPAR Guidance on a Common Approach for Dealing with Applications for the Construction and Operation of Offshore Wind Farms (replaced by agreement 2008-3)

Central Dredging Association (CEDA)

The Central Dredging Association is an independent, non-profit, non-governmental, professional society. It provides a forum for all those involved in activities related to dredging and promotes good dredging practice. CEDA provide good practice guidance and participate in the environmental debate at all levels. In partnership with the International Association of Dredging Companies (IADC), CEDA produced a series of guides "Environmental Aspects of Dredging". The series consists of guides covering the groundwork required before dredging work can be carried out advice on best practice, examples of beneficial use of dredged material and the environmental and socio-economic impact of dredging work.

5.9.4 What improvements will current measures achieve?

The current measures already provide methods for controlling some of the pressures outlined in the introduction. For example, only dredged material meeting the appropriate environmental quality standards (set in OSPAR Guidelines) will be approved for sea disposal. Alternative solutions have to be found for materials that are too contaminated for sea disposal, and may include bunding or capping of the contaminated material, use of the material in construction, or even bioremediation.

Mitigation measures are commonly used in marine licensing processes and these will be used to help define GEP. Typical mitigation measures when considering morphological change could include:

- The reinstatement of shoreline where land reclamation or construction has removed habitat;
- The timing of construction projects to ensure that this does not compromise the passage of migratory fish, or a seal pupping season; and
- The monitoring of the rate of dredged material disposal to ensure that suspended solids in the water column are kept at levels which will not compromise the ecology.

5.9.5 What further actions can we take to deliver environmental improvements?

NEW LEGISLATION AND GUIDANCE

UK Marine Bill

- a) The draft UK Marine Bill is being finalised by the Department of Environment Food and Rural Affairs (DEFRA) for introduction to Parliament before the end of 2008. This extends to Northern Ireland in a number of areas, including a new marine licensing regime. The changes that are proposed are intended to result in better, more consistent licensing decisions delivered more quickly and at less cost to all by a system that is proportionate and easier to understand and to use. They will integrate delivery across a range of sectors.

The Bill also introduces the concept of marine planning. This will clarify marine objectives and priorities for the future, and will assist decision-makers and users towards more efficient, sustainable use and protection of our marine resources. The first stage of this marine planning system will be the creation of a UK-wide marine policy statement to create a more integrated approach to marine management and setting both our short and longer-term objectives for sustainable use of the marine environment. It is then intended that the second stage will be the creation of a series of marine plans, which will implement the policy statement in specific areas, using information about spatial uses and needs in those areas.

5.9

Strategic Environmental Assessment

- b) Recognising the potential resource in tidal power around Northern Ireland, the Department of Enterprise Trade and Investment (DETI) is currently carrying forward a Strategic Environmental Assessment of the tidal energy reserves around Northern Ireland. This will provide a framework for decision making around marine licensing.

Development of a protocol for maintenance dredging

- c) In Great Britain the ports and harbour authorities have successfully worked with Government and Natural England to develop a protocol and guidance for maintenance dredging to ensure compliance with the Habitats and Birds Directive. Consideration will be given to the development of a Northern Ireland equivalent protocol which would also meet the requirements of the WFD.

Summary of existing actions					
Pressure Type: MARINE MORPHOLOGY					
Key Sectors: PORTS & HARBOURS, AGGREGATE & FISHING / AQUACULTURE INDUSTRY					
Improvement Required	Actions	Responsible Organisations/ Sectors	Delivery mechanism and support	Support Provider/ Regulator	
Protection of the aquatic marine environment	Regulation of all harbour works	Ports/harbours	Control of works within harbours under the Harbour Works (Environmental Impact Assessment) Regulations (Northern Ireland) 2003	DRD, DARD (fishery harbours)	
Better management of dredging activities within harbours	Adoption of industry or best practice standards	Ports	Existing Harbour Works Regulations	DRD, DARD	
Enhanced Management Practices	Regulation of all deposits of material to the coastal and marine environment	All sectors	Food and Environment Protection Act 1985	DOE	
	Control of marine aggregate extraction from seabed	Mining and Quarrying	The Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Marine Dredging) (England and Northern Ireland) Regulations, 2007	DOE	

Pressure Type: INVASIVE ALIEN SPECIES

5.10 Key Sector: ALL SECTORS

5.10.1 Introduction

Non-native or, as they are sometimes known, ‘alien’ species are animals and plants that have been introduced, either intentionally or unintentionally, outside their natural range. Many of these species live in harmony with our native species. However a few non-native species become what is known as ‘invasive’ as they thrive in our habitats and out-compete our native plants and animals. Non-native species can be introduced or transferred to an area by a variety of means. Invasive non-native aquatic plants and animals can be brought in through the ornamental plant and animal trade, through shipping and boat movements or via recreational water users. Invasive alien species are now widely recognised as the second biggest threat to biodiversity after habitat destruction.

Alien species were included in the freshwater classification results. However for freshwaters, coastal and transitional waterbodies invasive alien species can only cause a downgrade of high to good ecological status or worse. The presence of four marine invasive species, namely the Slipper Limpet (*Crepidula fornicata*), Smooth cord-grass (*Spartina anglica*), Wire weed (*Sargassum muticum*) and the Chinese mitten crab (*Eriocheir sinensis*) was assessed. Seven coastal waterbodies were downgraded from high status to good status based on the presence of non-native marine macrophytes.

There are several species which were identified in the ‘Invasive species in Ireland Report’ as being problematical in Ireland. For the purposes of the Water Framework Directive (WFD) it is only those species which are known to be present in Ireland and that are known to have a negative impact on our native aquatic ecology that are taken into consideration during the classification process. Table 5.10(a) below lists those species which under the WFD are considered to pose a significant threat in Ireland. The list does not include invasive alien species that have not been recorded in Ireland such as the Signal Crayfish, however the list will be updated as additional nuisance species arrive.

Table 5.10(a) Provisional Invasive Alien List for Ecoregion 17 (Ireland).

Species Type	Common Name	Species name	Presence in Northern Ireland
Aquatic Plants	Curly Waterweed	<i>Lagarosiphon major</i>	Present
	Nuttall's waterweed	<i>Elodea nuttallii</i>	Present
	Parrots Feather	<i>Myriophyllum aquaticum</i>	Has been found in Glastry Clay Pits
	New Zealand Pigmyweed (also know as Australian Swamp Stonecrop)	<i>Crassuala helmsii</i>	Present in: Lough Neagh, Lough Beg, Lough Island Reavy, Gosforth River, Strangford Lough, Crawfordsburn, Donaghadee, Castlewellan, Lady Dixon Park
	Water fern	<i>Azolla filiculoides</i>	Present in the Lagan Valley Regional Park, Clandeboye Lake, Lough Neagh and the River Bann
	Least duckweed	<i>Lemna minuta</i>	Present
	Fringed waterlily	<i>Nymphoides peltata</i>	Present
	Floating pennywort	<i>Hydrocotyle ranunculoides</i>	Present in 3 locations in NI (Glastry Clay Pits, Six Mile Water, Dunadry and in Sir Thomas and Lady Dixon Park Belfast)

Riparian (river bank) species	Giant hogweed	<i>Heracleum mantegazzianum</i>	Present
	Himalayan balsam	<i>Impatiens glandulifera</i>	Present
	Japanese knotweed	<i>Fallopia japonica</i>	Present
Invertebrates	Zebra mussel	<i>Dreissena polymorpha</i>	Present in Lough Neagh, Lough Erne and Carran Lough Derrygonnelly.
	Crustacean	<i>Crangonyx pseudogracilis</i>	Present
Fish	Chub	<i>Leuciscus cephalus</i>	Not present – only in Ireland
	Dace	<i>Leuciscus leuciscus</i>	Not present – only in Ireland
Fish parasite	Swim Bladder Nematode	<i>Anguillicola crassus</i>	Present
Marine Species	Ascidian species	<i>Didemnum spp.</i>	Present
	Common cord-grass	<i>Spartina anglica</i>	Present in Lough Foyle, Carlingford and Strangford Loughs
	Wire weed	<i>Sargassum muticum</i>	Present in Strangford and Carlingford Loughs
	Chinese Mitten Crab	<i>Eriocheir sinensis</i>	Not present – only in Ireland
	Pacific Oyster	<i>Crassostrea gigas</i>	Present in Strangford Lough
	Leathery Sea Squirt	<i>Styela clava</i>	Present in Larne Lough

(The list does not include invasive species that have not been recorded in the Ecoregion and the list will need to be updated if additional species arrive – List last updated 29th October 2008)

These species are known to have a direct impact on the ecology of the water environment, if they become fully established in an area. Some of these species are present in Northern Ireland and require some form of management (such as preventing further spread, monitoring to identify extent, eradication or removal from a water body). Some species are not amenable to effective control, once established. Hence early removal or eradication measures are appropriate. Others on the list are present elsewhere in Ireland but need to be actively prevented from spreading to Northern Ireland as, once established, they would be detrimental to the environment, and difficult and costly to control.

In the North Eastern River Basin District:

- Australian Swamp Stonecrop has been found in Strangford Lough, Crawfordsburn, Donaghadee, Castlewellan and Lady Dixon Park;
- Common Cord Grass and Wire Weed have been found in Strangford Lough;
- Water Fern has been found in the Lagan Valley Regional Park and Clondeboye Lake;
- Floating Pennywort is present in the Glastray Clay Pits near Ballyhalbert and Parrots Feather has been found here too.

5.10.2 What causes the environmental impact?

Invasive alien species impact on native species through competition for food, space or habitats, through predation, by altering habitat or by introducing pathogens or parasites. Indirect impacts to the wider environment may also occur from invasive alien riparian species for example, excessive growth of these species can result in increased shading. Winter die back of these invasive alien species can also result in river bank instability and erosion which can lead to increased sedimentation in rivers and consequent smothering of juvenile fish or pearl mussels. Examples of impacts arising from a number of invasive alien species that are currently present in Northern Ireland are provided in Table 5.10(b).

Table 5.10(b) Examples of the impacts of invasive alien species present in Northern Ireland.

Species	Water body type	Impacts
Japanese Knotweed (<i>Fallopia japonica</i>)	Rivers	<ul style="list-style-type: none"> • Competition with native flora; results in monoculture of Japanese Knotweed along river banks • Undermining of infrastructure • In winter Japanese Knotweed dies back, exposing the soil which is washed into rivers and causes bank erosion
Himalayan Balsam (<i>Impatiens glandulifera</i>)	Rivers	<ul style="list-style-type: none"> • Compete with native flora which results in a monoculture of Himalayan Balsam along riverbanks • In winter the plant dies back leaving bare banks susceptible to increased erosion and increased sedimentation of the river which can impact on fish spawning grounds, and species designated under Annex II of the Habitats Directive such as the Freshwater Pearl Mussel.
Giant Hogweed (<i>Heracleum mantegazzianum</i>)	Rivers	<ul style="list-style-type: none"> • Pose a health hazard to humans as skin contact with the sap of the plant causes irritation • Exclude native herbaceous plants which can result in riverbank stability • In winter Giant Hogweed dies back, exposing the soil which is washed into rivers and causes bank erosion.
Zebra Mussel (<i>Dreissena polymorpha</i>)	Lakes	<ul style="list-style-type: none"> • Smothering of native unionid mussel • Increased macrophyte growth due to increased light penetration which impedes fishing and boat navigation • Decrease in phytoplankton and zooplankton abundance • Mask impact of nutrient status which may result in toxic algae blooms • Cause changes in fish populations • Damage boat engines, block water abstraction intakes and foul jetties.
Wireweed (<i>Sargassum muticum</i>)	Coasts and estuaries	<ul style="list-style-type: none"> • Competition with native flora • Smother Eel grass beds that are important feeding areas for wading birds in Special Protection Areas. • Reduce light penetration available to under story species. • Prevent oxygen transfer between air and water when present in dense stands. • Dense stands can impede navigation in marinas. • Can cause anoxia when the population declines.

5.10.3 What action are we already taking?

Northern Ireland has a number of international obligations to address invasive species issues, principally through the Convention on Biological Diversity, International Plant Protection Convention, the Habitats Directive and now the WFD.

KEY LEGISLATION AND STRATEGIES

The Wildlife Order (NI) 1985 (under review)

This legislation aims to protect wild animals, birds, plants and their habitats. It is therefore an offence to kill, injure, disturb, take or sell wild animals. The Order contains measures for preventing the establishment of species not native to Northern Ireland which may be detrimental to native wildlife. It is an offence under Article 15 of the Wildlife Order to "release or cause to escape into the wild" any animal (this would include birds and fish) that is not ordinarily resident in or is not a regular visitor to Northern Ireland in a wild state (i.e. species, which according to scientific records, do not naturally occur in Northern Ireland). It is also an offence to release any animal included in Part 1 of Schedule 9 of the Wildlife Order in order to prevent their further spread. Part II of schedule 9 specifically lists plants which it is an offence to intentionally introduce into the wild; this covers non-native plants such as the Giant Hogweed and Japanese Knotweed.

A review of the Wildlife Order has been completed and a consultation document setting out the Department of the Environment's proposals for updating and amending the Wildlife Order 1985 went out to public consultation in February 2008. Consultation closed in June 2008. Amendment of this order will make significant changes to Article 15 and the schedule 9 lists. Further details on these amendments can be found in the section 'What further actions can we take to deliver environmental improvements' below.

The Fisheries Act (NI) 1966

Section 13 of this Act is specifically relevant to the control of non-native fish species. Under this section of the Act if it is decided that the introduction of a particular species of fish would be detrimental to a fishery, an order can be made prohibiting the introduction of live fish or eggs of that species. Enforcement of the legislation is carried out by the Fisheries Conservancy Board now part of the Department of Culture, Arts and Leisure (DCAL), except in the Foyle and Carlingford catchments where the Loughs Agency of the Foyle, Carlingford and Irish Lights Commission is responsible. The current order is the Prohibition of Introduction of Fish Order.

The Prohibition of Introduction of Fish Order (NI) 1979

This Order prohibits the introduction of specified kinds of fish into any inland waters of Northern Ireland (excluding the Londonderry Area and the Newry Area). Any fish being introduced into waters in Northern Ireland which are prohibited under the Prohibition of Introduction of Fish Order require a permit issued by the Department of Agriculture and Rural Development (DARD) under Section 13 of the Fisheries Act 1966.

Molluscan Shellfish (Control of Deposit) Order (Northern Ireland) 1972 Order

This Order prohibits the introduction of any molluscan shellfish into any designated waters which have been taken from shellfish beds outside the designated waters. Any shellfish being introduced into any waters in Northern Ireland which are prohibited by the Molluscan Shellfish Order require a permit issued by the DARD under Section 13 of the Fisheries Act 1966.

The **Control of Pesticides (Amendment) Regulations (Northern Ireland) 1997** and the **Plant Protection Products Regulations 2005** control the use of herbicides to control invasive plants in or near water.

Zebra Mussel Management Strategy for Northern Ireland 2004-2010

The Northern Ireland Environment Agency (NIEA) has developed a management strategy for controlling the spread of zebra mussels in Northern Ireland. The overall aim of the management strategy is to minimise the spread of zebra mussels in Northern Ireland through raising awareness, developing policy and legislation, monitoring and research and developing contingency plans for immediate action in the event of further zebra mussel spread. There is currently no effective means of controlling existing populations.

A Zebra Mussel Control Group, dedicated to raising awareness among water users with the aim of preventing the further spread of zebra mussels, was set up in 2000 and has representatives from NIEA, DARD, Northern Ireland Water, DCAL, Waterways Ireland and the National Parks and Wildlife Service. Representatives from NIEA and the Environmental Protection Agency in Ireland also contribute to the UK alien species group through the UK Technical Advisory Group.

In 2007 a 'Zebra Mussel Awareness Contract' was run. Through this contract various stakeholder workshops took place throughout Northern Ireland increasing knowledge about the zebra mussel and reinforcing messages about preventing its spread to further lakes. In 2008 NIEA developed and produced zebra mussel and aquatic weed signs for placement around the most vulnerable waterbodies identified in the Zebra Mussel Management Strategy. These signs are in the process of being distributed.

Review of invasive species in Ireland

An 'Invasive species in Ireland' report was prepared for NIEA and the National Parks and Wildlife Service in Ireland in 2006. The aim of the report was to review the impact of existing and potential future alien species on native biodiversity in Ireland and to recommend actions to Government in both jurisdictions that will address the requirements of the Convention on Biological Diversity on alien species and improve their capacity to avoid or limit the ecological impact of alien species. The authors recommended ten key actions that will reduce the risks of invasions, help control and manage new and established invasive populations, monitor impacts, raise public awareness, improve legislation and address international obligations.

Management protocols

Rivers Agency has developed a number of protocols for dealing with Giant Hogweed, Himalayan Balsam and Japanese Knotweed for their operatives who carry out works in watercourses. These protocols have been included in Rivers Agency's Environmentally Sensitive River Maintenance guidelines for their contractors.

Local project example

In the North Eastern River Basin District the Floating Pennywort was first recorded at the Glastry Clay Pitts, in 2002. It is also known to occur in Sir Thomas and Lady Dixon Park, Belfast. Eradication work has commenced at both of these sites. The National Trust, NIEA and the Rivers Agency began a major removal exercise at Glastry Clay Pitts in November 2007. However this process will take several years to complete.

5.10.4 What improvements will current measures achieve?

The Wildlife Order is the primary mechanism to control the introduction of non-native species into Northern Ireland through prohibition of the introduction of specific species into the country. The review of the Wildlife Order and consequent proposed amendments (see section 'What further actions can we take to deliver environmental improvements?' below for more detail) will ensure that the DOE has more powers to control the spread of invasive alien species.

The review of invasive species in Ireland has provided information on the impact of current invasive non-native species and provided recommendations for control of species present in Ireland and strategies to prevent the introduction of further species. However the most effective measures to control invasive alien species are through early detection and direct control actions before they become fully established in specific locations. Further work is required to develop codes of practice for particular sectors and improve education and awareness about preventing the introduction of non-native species.

5.10.5 What further actions can we take to deliver environmental improvements?

- a) **Amendments to the Wildlife Order (NI) 1985**
Schedule 9 of the Wildlife Order included species that are established in the wild which do not occur naturally in Northern Ireland. It is proposed to include species that may not yet be present in Northern Ireland but, were they to become established, they would cause considerable risk to biodiversity. It is also necessary to ensure this schedule is kept up to date with lists of species. Amendments to Schedule 9 of the Order will also provide a discretionary general power for the invasive non-native species and provide

associated powers of entry; give the DOE power to produce Codes of Practice about invasive non-native species and allow the DOE to approve guidance issued by others for the purpose of providing people with recommendations, advice and information regarding the control and elimination of non-native animals and plants.

b) Maritime Ballast Water Convention

Alien species can be transferred in ships ballast water that is released when ships take on cargo in a port. The ballast water can contain larvae of a variety of species that can become invasive when released into a non-native environment. Currently the Maritime and Coastguard Agency can only advise ships to exchange ballast water in open sea, there are currently no binding requirements to enforce on vessels. However the UK is intending to begin the process of ratifying the Maritime Ballast Water Convention as soon as the technology is available to meet the stringent discharge water quality standards set by the Convention. Once this is ratified the Maritime and Coastguard Agency / International Maritime Organisation will have full powers to control ballast water release.

c) Invasive species Ireland project

NIEA in conjunction with the National Parks and Wildlife Service (NPWS) in Ireland have let a 3 year contract to a partnership between EnviroCentre and Quercus in May 2006 to implement the recommendations of the Invasive Species in Ireland report. The contract aims to develop risk assessments, and contingency and management plans for species that are established or are likely to become established. It will also consider ways to engage relevant stakeholders, for example the development of sectoral codes of practice, and education and awareness programmes. This work is on-going and a website has been created to support this work and promote greater understanding of the issues involved and can be found at <http://www.invasivespeciesireland.com>.

The project has developed best practice management guidance for Japanese knotweed, Giant Hogweed and the Himalayan balsam. Management plans have also been developed for the *Didemnum* species (sea squirt) and the Floating Pennywort.

A number of codes of practice will be developed by the project; consultation papers are currently available for:

- Recreational Water Users - Code of Practice
- Marina Operators - Code of Practice

A number of educational and awareness leaflets have been prepared and are available to download from <http://www.invasivespeciesireland.com/downloads/>:

- How to manage Giant Hogweed at home
- How to manage Japanese Knotweed at home
- Guidelines for boat owners
- *Didemnum* report a sighting leaflet

As part of the 'Invasive Species in Ireland Project' stakeholder engagement is seen as an essential aspect to preventing the introduction and further spread of invasive species:

- An Annual All-Ireland Invasive Species Forum is held. This forum first met in 2007 in Belfast and the second in Dublin in 2008.
- Four specialist technical working groups have been set up comprising of experts for Freshwater, Marine, Terrestrial and Education and Awareness.

In terms of preventing the introduction of species to Northern Ireland that are not currently present a non-native crayfish exclusion strategy and contingency plan has been developed.

d) Grant aid

The NIEA Natural Heritage Grant Aid Programme provides grant aid, at various times of the year, for local environmental projects. Subject to funds grant aid may be available for local invasive alien species projects. Details are available at <http://www.ni-environment.gov.uk/landscape/grant.htm>.

Summary of existing actions					
Pressure Type: INVASIVE ALIEN SPECIES					
Key Sectors: ALL SECTORS					
Improvement Required	Measures	Responsible Organisations/ Sectors	Delivery mechanism and support	Support Provider/ Regulator	
Education and Awareness	Develop specialist technical Groups	NIEA, National Parks and Wildlife Service (NPWS)	Invasive Species Technical Working Groups	NIEA, NPWS	
	Annual Forum	NIEA, NPWS	Annual Invasive Species in Ireland Forum	NIEA NPWS	
	Provision of educational materials and advice	NIEA, NPWS	Provision of a dedicated website at www.invasivespeciesireland.com Production of educational and awareness materials	NIEA, NPWS	
Local Action	Involvement of local stakeholders	All	Provision of a dedicated website at www.invasivespeciesireland.com	NIEA NPWS	
	Provide aid to enable local invasive species eradication measures	NIEA	Develop Management Plans for High Risk Species and wide spread species	NIEA NIEA	
	Alien Watch Reported sightings	NIEA - NPWS	Provision of support through the Natural Heritage Grant Aid Programme Partnership projects Provision of a report sightings facility at www.invasivespeciesireland.com	Various NIEA, NPWS	
Prevention	Work with high risk sectors	NIEA NPWS	Develop Codes of Practice for High Risk Sectors	NIEA NPWS	

Pressure Type: ALL

5.11 Key Sector: FISHERIES

5.11.1 Introduction

Fisheries as a sector is impacted by all pressure types listed. Many fish species in inland and transitional (estuarine) waters support commercial and recreational fisheries. The commercial fisheries for salmon, trout, eels and pollan have declined in recent years and although angling remains a major participation sport in Northern Ireland, catches are becoming more variable. Species most sensitive to impacts on their habitats, such as salmon and char are currently under pressure whilst a major decline in eel recruitment to the coast is a real concern.

Estuaries are important nursery and over-wintering habitats for fish that inhabit adjoining coastal waters as well as migration routes. Species include smelt, Allis and Twaite shad, amongst others. The sea loughs also provide economically valuable areas for shellfisheries such as mussel and native oysters.

5.11.2 What causes the environmental impact?

A range of inter-related factors that affect fish spawning grounds, rearing areas, food supplies and migration routes often combine to prevent populations from maintaining their productive capacity. Poor water quality, inadequate or modified flows, and morphological impacts that impede fish movements and degrade physical in-river habitats are particularly damaging, whilst predation and competition from invasive species can be locally significant. In the sea loughs poor water quality and other factors such as invasive species can affect the productive capacity of transitional fish and shellfish.

5.11.3 What action are we already taking?

KEY LEGISLATION

Salmon and inland fisheries in Northern Ireland are regulated by legislative provisions made under the Fisheries Act (NI) 1966, as amended, and the Foyle Fisheries Act 1952, as amended which provide for the making of regulations and byelaws, annually as required, that specify:

- a licensing regime
- closed seasons
- bag limits,
- carcass tagging schemes

Furthermore, there are provisions in the primary legislation regarding illegal capture (poaching), the protection of juvenile salmon, eggs and spawning areas and the free passage of migratory fish.

Fisheries Act Northern Ireland 1966

Part 4 of the Act protects fish and habitats. Under this legislation it is an offence to :-

- Use or possess deleterious matter for the capture, destruction or injury of fish.
- Pollute a watercourse.
- Take, sell, purchase, possess, obstruct the passage, injure or disturb the spawn or fry of salmon, trout or eels or injure or disturb spawning beds where the spawn or fry of salmon, trout or eels exist.
- Remove any material from the bed of a river without the consent of the Fisheries Conservancy Board.²
- Disturb spawning salmon or take unseasonable salmon.
- Possess immature salmon for sale, or take undersized salmon.
- Obstruct the passage of fish or fail to protect fish where water is abstracted and requires the construction of a fish pass where a weir is built or an existing weir is reinstated or altered.

² Following the decision under the Review of Public Administration (RPA) in 2006 to abolish the Fisheries Conservancy Board NI, draft legislative provisions to give effect to this and to transfer the functions to DCAL are in preparation.

The Department of Culture, Arts and Leisure (DCAL) is responsible, under the provisions of the Fisheries Act (NI) 1966 as amended (the Fisheries Act) for the salmon and inland fisheries of Northern Ireland. Enforcement is carried out by the Fisheries Conservancy Board (FCB) with the exception of the Foyle and Carlingford catchments. The Loughs Agency of the Foyle, Carlingford and Irish Lights Commission (FCILC) is responsible for enforcing the provisions in the Foyle and Carlingford catchments.

Section 54 of the Fisheries Act requires persons who wish to build dams and weirs or repair existing weirs in rivers to construct fish passes for the free passage of fish. All fish pass designs and specifications must be submitted to DCAL for approval before a pass is constructed.

Sections 58 and 59 of the Fisheries Act impose certain closure periods where water is being abstracted from a river or lake to facilitate the passage of fish and require grids and gratings to be placed at water abstractions and return points.

The Fisheries Act also allows DCAL to issue exemption certificates from these requirements. The exemptions are used to introduce modern fishery protection measures. In 2007 a review of exemption permits issued under Sections 54, 58 and 59 of the Fisheries Act was conducted to ensure that the most appropriate fishery protection measures were included in the permit conditions. DCAL refreshed guidelines in this regard during 2007.

DCAL has powers under the Fisheries Act to approve an application by anyone who wishes to improve a derelict water for angling either for their own use or for public angling. The applicant must submit proof that the owner of the fishing rights cannot be found and provide a scheme for the development of the fishery. The Department having established that no fishery owner can be identified or that no person has substantial objections may approve the scheme for a period up to 15 years.

Foyle and Carlingford N Ireland Fisheries Order (2007) / Foyle and Carlingford Fisheries Act (2007)

This legislation concerns the protection of the aquatic environment, specifically fisheries and is cross-border in nature. Provisions include making it an offence to:

- Permit any deleterious matter to enter any river
- Fail to leave open a channel of sufficient width and depth to facilitate the passage of salmon.
- Remove material from the bed of the freshwater portion of a river without the consent of the FCILC.

The legislation also extends the FCILC's existing fisheries regulatory powers (salmon and inland fisheries) to cover the regulation of oysters, mussels, sea bass and tope within the Foyle and Carlingford Areas.

FISHERY AND HABITAT MANAGEMENT

NASCO Resolutions and Agreements

DCAL pursues a strategic approach to attempt to address the decline in Atlantic Salmon. The Atlantic Salmon Management Strategy for Northern Ireland has been developed to meet the objectives of the North Atlantic Salmon Conservation Organisation (NASCO), an intergovernmental body established by treaty. The core concept is to establish spawning targets at a river and regional level to ensure that in most rivers in most years sufficient adult salmon are spawning to maximise output of smolts from freshwater assessments.

Salmon Management Plan

A Salmon Management Group, which manages the Salmon Management Plan meets regularly to review the Plan and Conservation Limits (CLs). The group also manages the collection of management information and reviews existing regulations and where appropriate makes recommendations for modification or the introduction of new controls based on the interpretation of the data. The data is compiled from habitat surveys, fish counter information, annual electric fishing surveys and a tagging scheme which provides the data on exploitation. The information is held on a Geographical Information System (GIS) database which is maintained and expanded on an ongoing basis. The GIS and counter databases provide the mechanism to monitor compliance against CLs and trigger management actions to address impacts on the stocks.

Coarse fish and pike management

The Fisheries (Amendment) Byelaws (Northern Ireland) 2008 (SR 2008 No. 318) came into operation on 24th July 2008. The Byelaws restrict the number of pike which can be taken whilst angling to one per day.

The Fisheries (Conservation of Coarse Fish) Byelaws (Northern Ireland) 2008 (SR 2008 No. 319) came into operation on 24th July 2008. Anglers can now only catch and retain four coarse fish in one day and these fish must be 25 centimetres or less. The Byelaws also require that a person shall not have in his possession more than four rod-caught coarse fish to use as bait when fishing for pike.

European Eel Regulation

The European Eel Regulation (EC) No 1100/2007 aims to establish measures for the recovery of the European eel stock. The Regulation requires the establishment of Eel Management Plans for each eel river basin, of which there are three in Northern Ireland, which will demonstrate that at least 40% of the biomass of adult eels from each river basin relative to the best estimate of the potential escapement in the absence of human activities affecting the fishing area or stock are escaping to spawn.

Work is on-going in conjunction with other UK departments, the Department of Communications, Energy and Natural Resources in Ireland and the commercial eel industry to meet the requirements of this Regulation. Essentially the Department is seeking to arrive at a balance between permitting a level of commercial fishing to continue and ensuring that there are adequate measures in place to contribute to conservation of the species and thus allow for both a sustainable eel stock and a sustainable industry in the future. Accordingly, the Department continued to operate conservation oriented management policies during 2007 through the regulation of commercial eel fisheries.

ADVICE AND GUIDANCE

DCAL Fisheries Officers

DCAL Fisheries Officers 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.

Advice is provided to the range of authorities who control and regulate activities that might impact on salmon, eels and freshwater fish and to the two statutory fishery conservation and protection authorities. This includes providing input to the development of environmental policies and regulations generally across government that have the potential to improve fisheries.

Angling Clubs and other fishery owners and operators are supported in improving fisheries through the provision of advice and guidance and by the issuing of permits under Section 14 of the Fisheries Act (NI) 1966 to capture, culture and stock fish.

DCAL provides advice and assistance to NIEA who administer complementary powers under water abstraction and impoundment regulations.

DARD Rivers Agency

Technical advice, guidance and support is provided to the Department of Agriculture and Rural Development (DARD) Rivers Agency to ensure protection of fisheries from possible damage arising from drainage maintenance programmes. This is a key relationship in ensuring the productive capacity of wild fish stocks is maintained. Opportunities to restore or enhance fish habitats are taken forward through this cooperative approach. This builds on arrangements in place since the early 1990's.

Loughs Agency

Loughs Agency staff and Fishery Officers provide similar services in the Foyle and Carlingford areas but also include the marine environment. Loughs Agency also operate a visitor centre (RiverWatch) and web site (www.loughs-agency.org). The centre attracts in excess of 10,000 visitors annually and a number of out reach programmes are undertaken such as 'Salmon in the Classroom' and 'Adopt a Stream' which target schools within the Foyle and Carlingford areas.

The Loughs Agency also produces annually 'Catchment Status Reports' which sets out the available information for the catchments with a series of recommendations for improvements to generate stakeholder involvement in decision making.

As part of this stakeholder involvement Loughs Agency has an Advisory Forum, which is made up of representatives from a wide and diverse background. Focus Groups convene to discuss particular topics. There are currently four of these in operation:

- Salmon and Inland Fisheries
- Aquaculture and Shellfisheries
- Marine Tourism
- Environment

RESEARCH AND DEVELOPMENT

The Agri-Food and Biosciences Institute (AFBI) undertake research into salmon and freshwater fisheries which is funded by DCAL. This research provides the scientific basis for conservation and management of the resource.

VOLUNTARY ACTIONS

Many angling clubs are introducing voluntary regulations. These include catch and release and voluntary bag limits.

LOCAL PROJECT EXAMPLE

In the North Eastern River Basin District the River Lagan Salmon Reintroduction project has taken the salmon population from a period of 200 years of extinction to the beginnings of a self sustaining stock. Wild salmon are now breeding at a number of sites. The level of stocking and intervention is kept to a minimum to maximise the potential for natural regeneration.

5.11.4 What further actions can we take to deliver environmental improvements?

Under the Atlantic Salmon Management Strategy for Northern Ireland to meet the objectives of NASCO Resolutions and Agreements the following actions are proposed:

Commercial Fishing Regulations

- a) Further restrictions on the small number of licensed commercial salmon fishermen in Northern Ireland shall be considered in rolling out the Salmon Management Strategy. Regulations to prohibit the sale of rod caught salmon shall be progressed to clarify the boundaries between commercial and recreational fishing by removing the opportunity for anglers to sell their catch.

Angling Regulations

- b) Introduction of angling regulations to support salmon Catchment Management Plans (CMPs) in Fisheries Conservancy Board areas and catchment status reports in Loughs Agency areas. Measures may include catch and release, use of barbless hooks, early closures and shortened season.

Protection and restoration of salmon habitats

- c) To develop further conservation and management targets and CMPs for specific rivers. CMPs will aim to provide a scientific evaluation of each salmon population and its habitats at catchment or sub catchment level including a conservation limit, an evaluation of quantity and quality of habitat units, identification of impacts and threats, and prioritisation of management actions in consultation with stakeholders.
- d) To complete DNA based study in 2009 to determine genetic structure of salmon populations at catchment/sub catchment to produce a "genetic baseline" of Irish Salmon populations.
- e) Introduce real time management strategies and replicate Catchment Status Reports for the Roe and Faughan catchment and for the rest of the tributaries within the Foyle and Carlingford 2008-2013.

The following actions are also being given consideration:

European Fisheries Fund (EFF) Grants

- f) European Fisheries Funding is being sought to implement eel management plans to establish measures for the recovery of the stock of European eel.

Advice, education and training

- g) Through liaison with Rivers Agency, advice and guidance will continue to be provided, under the terms of a Service Level Agreement in order to mitigate the impacts of drainage maintenance works on habitat by requiring that all drainage works must include mitigation and, where funding permits, fishery rehabilitation measures under the direction of DCAL Fisheries Technical Officers.

Summary of existing actions					
Pressure Type: ALL					
Key Sectors: FISHERIES CONSERVATION					
Improvement Required	Actions	Responsible Organisations/ Sectors	Delivery mechanism and support	Support Provider/ Regulator	
Protection of fisheries and habitats	Protection of fish and assured free passage	All	Fisheries Act N Ireland 1966	DCAL/FCB/LA	
	Protection of the aquatic environment, specifically fisheries and is cross-border in nature	All	Foyle and Carlingford N Ireland Fisheries Order (2007) / Foyle and Carlingford Fisheries Act (2007)	LA	
Protection and restoration of Salmon habitats	Tagging schemes fish counting/ juvenile stock assessment habitat improvement works	Fisheries/ Conservation	Atlantic Salmon Management Strategy for Northern Ireland /NASCO Resolutions and Agreements	DCAL/FCB/LA	
		Fisheries/ Conservation	Salmon Management Plan	DCAL/FCB/LA	
Protection and maintenance of eel populations	Regulation of commercial eel fisheries	Fisheries/ Conservation	National Eel management Plan for 3 eel river basins	DCAL/LA	
Protection and maintenance of coarse fish and pike populations	Coarse fish and pike management	Fisheries/ Conservation	The Fisheries (Amendment) Byelaws (Northern Ireland) The Fisheries (Conservation of Coarse Fish) Byelaws (Northern Ireland)	DCAL/FCB/LA	
Improved Fishery management	Providing 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.	Fisheries/ Conservation	Angling development programme	DCAL/FCB/LA	
Protection of fisheries and habitats	Advice, education and guidance through visitor centre, out reach programmes and school based learning.	All	Advice, education and guidance	LA	

6. Climate Change

The water environment is particularly vulnerable to the effects of climate change. For this reason, the European Commission has identified water management as a priority area for taking into account the impact of climate change. Temperature increases and seasonal rainfall variations, already detected within the UK and Ireland, are likely to affect the existing pressures and impacts identified in *WFD Article 5 Characterisation Summary Report*. Climate change may therefore make it more difficult to achieve WFD objectives.

Observed trends in climate change indicators show 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 pointed to evidence of:

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

The report *Preparing for Climate Change in Northern Ireland*, published by Department of the Environment and the Scotland and Northern Ireland Forum for Environmental Research (2007) reviewed the potential impact of climate change in Northern Ireland and made recommendations for adaptation.

The assessments in the above report were based on the current set of UK climate change scenarios, published under the UK Climate Impacts Programme (UKCIP02). This provides a common starting point for assessing climate change vulnerability, impacts and adaptation activities across the UK. The next generation of scenarios (UKCIP08) is due for release in early 2009. This will update UKCIP02 and will provide improved spatial and temporal resolution. Importantly for WFD implementation, it has been recognised that there is a need to provide projections at a more local scale (based on a 25km² grid). UKCIP09 will also include more Northern Ireland-specific scenarios, including precipitation for river basin areas, which will be of value in developing regional and river basin district-specific trends and predictions.

In summary, current projections of future climate change suggest that we can expect existing 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 coastal storm surges. It is recognised that these trends will need to be factored into the WFD implementation process. The report includes initial assessment of threats to water management and resources in Northern Ireland, and points out that the WFD is one of the instruments which will be utilised in adapting and responding to climate change pressures.

Precipitation patterns are changing with increased autumn and winter rainfall, and higher rainfall intensity leading to increased flood risk. Sea level rises in conjunction with a potential increase in storminess will lead to greater coastal flood risk and erosion. Unless appropriate adaptation strategies are adopted, accelerating climate change may damage the physical, biological and chemical processes that underpin achievement of WFD objectives. In summary:

- changes in rainfall patterns, temperature, and sea level due to climate change will have significant impacts on the water environment and therefore on the achievement of WFD objectives and management activities;
- climate change is different from the other issues addressed within the River Basin Management Plans in that it may impact all aspects of the management of the water environment;
- understanding these impacts is key to protecting the water environment and ensuring that measures take account of all potential impacts of climate change, both positive and negative.

6.1 The environmental implications of climate change in Northern Ireland

Climate change has a wide variety of implications for the environment: they are summarised in Table 5. Rising water temperatures and changes in precipitation patterns are of particular importance to surface water ecosystems. Such changes are likely to affect how ecosystems function, especially in combination with changes in water chemistry. For example, warmer standing waters receiving greater nutrient run-off as a result of higher intensity rainfall events could exacerbate algal blooms and eutrophication. Significant changes in average temperature, precipitation and soil moisture are likely to affect water demand in most sectors, especially agriculture, forestry and public supply. Irrigation water needs are likely to increase in vulnerable areas.

Groundwater supplies are less susceptible than surface water to short-term climate variability; they are influenced more by long-term trends. However, the reduced reliability of surface water flows in summer may lead to greater pressure on groundwater sources; levels may fall along the east coast during the summer. The lowering of groundwater levels will have knock-on consequences for river flows and the possibility of saline intrusion to aquifers. The surface water temperature will fluctuate more rapidly with reduced volumes of water causing direct impacts on fish populations for example through spawning temperatures, and indirect consequences by exacerbating the effects of pollution.

This section will be developed further for the final Plan following the release of the new UKCIP climate change scenarios in the spring of 2009.

Table 5 - Summary of the implications of climate change for the water environment

Pressure type	Potential implications of climate change
<p>Diffuse & point source pollution</p>	<ul style="list-style-type: none"> • 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.
<p>Abstraction and flow regulation</p>	<ul style="list-style-type: none"> • increases in autumn and winter rainfall will increase resources for water supply and hydropower generation. Conversely, lower summer rainfall may lead to reductions in resource 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 on abstractions.

<p>Morphology</p>	<ul style="list-style-type: none"> • 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 water courses • 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.
<p>Alien Species</p>	<ul style="list-style-type: none"> • 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 biofuels • increased riparian and coastal erosion may adversely affect key native species.

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

Table 6 lists generic actions required to address the impacts of climate change on the water environment. These actions will help ensure that we protect our waters from deterioration due to climate change and that we take into account climate change factors both in terms of mitigation and adaptation when developing and implementing measures to improve the water environment.

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

Action Required	Mechanism	Key responsible organisations/ sectors
Take account of changes in flow regimes	<ul style="list-style-type: none"> - Ensure that licences take account of projected new low-flow regimes - Ensure that flood management plans are adequate for projected new higher-flow regimes - Assess impact of new rainfall patterns on combined storm overflow inputs to water bodies. 	<p>Northern Ireland Environment Agency</p> <p>Rivers Agency</p> <p>Northern Ireland Environment Agency /Northern Ireland Water</p>
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	<p>Assess existing data for long term trends</p> <p>Assess factors which influence whether pollutant concentration are likely to increase or decrease as a result of increased run-off.</p>	Northern Ireland Environment Agency



*Key documents relating to the expected implications of climate change for the water environment are available in the **Supporting Documents** section of the website.*

Adaptation strategies

A number of organisations have parts to play a part in the implementation of this River Basin Plan. It will be important to ensure that they all understand the risks and appropriate responses to climate change, and where relevant, incorporate them in their own climate change adaptation strategies. To assist with this process, a Northern Ireland Climate Change Impacts Partnership has been set up by the Department of the Environment and was formally launched under independent chairmanship on 25 November 2008. The aim of this Partnership 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.

7. Implementation of the North Eastern River Basin Management Plan

River basin planning, as envisaged in the Directive, is a new process which requires the active involvement of a wide range of organisations. In order to ensure the successful delivery of the final Plan it is of key importance that an implementation plan is developed, maintained and monitored. The implementation plan will be used to monitor and report on progress against the agreed objectives and measures.

Working together

Across Northern Ireland, the UK and Ireland, partner organisations help to provide the means by which actions are delivered on the ground. As part of the consultation process the Northern Ireland WFD Stakeholder Forum, Catchment Stakeholder Groups and any other organisation or representative who wishes to feed into the development of the final River Basin Management Plans will have an opportunity to identify current and potential future support mechanisms. Such mechanisms could address specific local issues and will make an important direct contribution to improving water bodies and ensuring that the water environment does not deteriorate. This information will be incorporated into the final River Basin Management Plan for the North Eastern River Basin District. Key examples might include:

- research into best management practice for diffuse pollution
- campaigns for the efficient use of water
- partnership habitat restoration projects
- awareness raising for invasive non-native species.

The river basin management planning process also provides an important opportunity to identify, prioritise and develop new measures to improve the way we protect and restore the water environment. We will continue to work with our stakeholders to identify new measures that we could develop through partnership initiatives.

Integration of plans and programmes

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. They have been grouped into the following topics:

- Land use and spatial plans
- Agriculture
- Water supply and treatment
- Waste management
- Natural heritage conservation plans
- Forestry
- Fisheries
- Coastal
- Flooding
- Climate change



*A register of the plans and programmes on local initiatives and projects for the North Eastern River Basin District can be found on the **Programme of Measures** section of the website.*

The relationship between river basin management plans and other water protection plans and programmes is two-way. Each must influence the others objectives. For example, this coordinated approach could mean prioritising investment (under the Northern Ireland Water Capital Works 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 contribute to helping 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 others that are successfully contributing to improving and restoring our waters. We want to gather information on all the activities being carried out to enhance and protect our rivers, lakes and coastal waters, fens, bogs and designated conservation areas. You can help by completing online forms - *Projects Aiming to Increase Aquatic Resources* - for your project or initiative.



Sailing in Strangford

ALG

8. Public consultation: give us your views

The proposals in the draft North Eastern River Basin Management Plan may affect you, your business or your environment. You can help us create an effective and achievable River Basin Management Plan by responding to this consultation.

In particular, we want your comments or suggestions about our proposals to improve the water environment and the measures we have proposed to achieve these aims.

We welcome your comments or suggestions on the consultation questions listed below.

Consultation Questions

1. Do you agree with the objectives and level of improvement set for Northern Ireland's water environment?
2. Have we identified the most significant pressures affecting the water environment?
3. Have we identified all the important existing measures that are being used to address these issues? Please identify any important existing measures that we have missed.
4. Can you identify new or existing measures or initiatives, at a regional or local level that you or your organisation can help deliver?
5. What suggestions do you have to improve the linkages this plan has with other relevant plans and programmes?
6. Do you have any suggestions to further develop and enhance arrangements for all interested parties to work together on the implementation of the plan?

We will use your comments and suggestions to help us revise our proposals and we will publish a response document on our website to show how we will do that. We will then publish the first River Basin Management Plan for the North Eastern River Basin District in December 2009.

How you can respond to this consultation

We encourage you to participate in this consultation, which runs from **22 December 2008 until 22 June 2009**. Please respond online at www.ni-environment.gov.uk/wfd or send your comments to:

- email riverbasinplanning@doeni.gov.uk
- post Jo Campbell
North Eastern River Basin District
Northern Ireland Environment Agency
Water Management Unit
17 Antrim Road, Lisburn
BT28 3AL
- phone (028) 9262 3100

Where to obtain further copies of the Consultation Paper

You can request a copy by telephone (028 9262 3100, by text phone (028 9054 0642), by fax (028 9267 6054 or in writing to the address above). It can also be accessed on-line at www.ni-environment.gov.uk/wfd.

If you require a copy of the consultation paper in an alternative format, it can be made available on request in large print, disk, Braille or audiocassette. The document may be available on request in minority ethnic languages to those who are not proficient in English.

Impact Assessments

A screening for Equality Impact Assessment has been undertaken and it is not considered that the proposals will not impact on any of the nine categories.

A partial Regulatory Impact Assessment will be prepared for the final River Basin Management Plans.

The Department considers that there are no Rural Proofing issues and that its proposals are fully compliant with the European Convention on Human Rights.

Freedom of Information Act 2000 – Confidentiality of Consultations

The Department will publish a summary of responses on its website following completion of the consultation process. Your response, and all other responses to the consultation, may be disclosed on request. The Department can only refuse to disclose information in exceptional circumstances. Before you submit your response please read the paragraphs below on the confidentiality of consultations, they will give you guidance on the legal position about any information given by you in response to this consultation.

The Freedom of Information Act gives the public a right of access to any information held by a public authority, namely, the Department in this case. This right of access to information includes information provided in response to a consultation. The Department cannot automatically consider as confidential information supplied to it in response to a consultation. However, it does have the responsibility to decide whether any information provided by you in response to this consultation, including information about your identity, should be made public or be treated as confidential.

This means that information provided by you in response to the consultation is unlikely to be treated as confidential, except in very particular circumstances. The Lord Chancellor's Code of Practice on the Freedom of Information Act provides that:

- the Department should only accept information from third parties in confidence if it is necessary to obtain that information in connection with the exercise of any of the Department's functions and it would not otherwise be provided;

- the Department should not agree to hold information received from third parties “in confidence” which is not confidential in nature;
- acceptance by the Department of confidentiality provisions must be for good reasons, capable of being justified to the Information Commissioner.

For further information about confidentiality of responses please contact the Information Commissioner’s Office (or see website at: <http://www.informationcommissioner.gov.uk>). For further information about this particular consultation please contact the address on page 116.

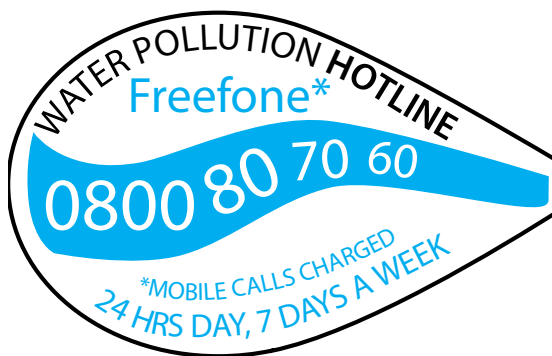
9. Acknowledgements

Photographers

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RT - Robert Thompson

Maps

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North Eastern River Basin District

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

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