

# Ballybay Waste Water Treatment Works

## EPA Waste Water Discharge Licence Application

### ARTICLE 16 COMPLIANCE REQUIREMENTS

#### Monaghan County Council

EPA Document Ref: D0207-01

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#### REGULATION 16 COMPLIANCE REQUIREMENTS

1. Please provide the name of the agglomeration to which the Waste Water Discharge Licence Application relates. Please also amend, if necessary, the name of the agglomeration on the Waste Water Licensing Web based data tool.

*Agglomeration Name: Ballybay and Environs*

*The name of the agglomeration on the Waste Water Licensing Web based data tool has been amended.*

2. Update the statement in the non technical summary that 'no significant effects have been identified' based on the assimilative capacity calculations, monitoring of water quality downstream of the primary discharge and previous studies such as the National Urban Waste Water Study.

*An updated non-technical summary is attached in Appendix 1.*

3. Provide an update on the funding for the proposed upgrade and provide a copy of the 'Preliminary Report' and any responses from the DoEHLG, in relation to the report.

*The Water Services Investment Programme 2007-2009 indentifies the scheme as commencing in 2008. However, under the current economic climate, construction is unlikely to commence before 2015. At that time, tenderers will be sought, following selection; construction will be completed over a 2 year construction period (approximate).*

*The Preliminary Report is currently at draft stage. The report is currently receiving final edits and is to be submitted to Monaghan County Council for final approval. Upon final approval by MCC, it will be submitted to An Bord Pleanala.*

4. Provide an explanation for the dramatic increase in ortho-phosphorus downstream of the final discharge point compared with the figure upstream, and identify measures to reduce the impact of the waste water treatment plant discharge.

*Currently there is no phosphorous removal at the Ballybay WwTW. Therefore, the increase in ortho-phosphorus downstream of the final discharge point in the Dromore River can be, in part, attributed to the final effluent discharge into the river.*

*However, it has been recommended in the Preliminary Report that an anoxic and anaerobic zone be provided within the existing aeration tanks to provide for biological phosphorus and nitrogen reduction. This can be done by means of baffle walls within the existing tank with submersible mixers provided within each zone.*

*A chemical dosing facility for phosphorus removal should also be provided as a back-up to ensure that the full level of phosphorus removal can be achieved at all times.*

*As stated previously, the Water Services Investment Programme 2007-2009 identifies the scheme as commencing in 2008. However, under the current economic climate, construction is unlikely to commence before 2015. At that time, tenderers will be sought, following selection; construction will be completed over a 2 year construction period (approximate).*

- 5. Clarify the source of the dichloromethane figure presented in Table D.1(i)(c), primary discharge, and Table D.1(i)(b), upstream and downstream of the discharge, assess compliance with the Water Quality (Dangerous Substances) Regulations 2001 and identify measures undertaken to address the elevated concentration identified.**

*The dichloromethane figures presented in Table D.1(i)(c), and F.1(i)(b) are incorrect. On investigation it was discovered that there had been an error on behalf of the laboratory in question.*

*The figures have been amended on the web based tool and now comply with the Water Quality (Dangerous Substances) Regulations 2001.*

*The confirmation email from the laboratory and the corrected results are attached in Appendix 2.*

- 6. Clarify the variation in flows presented in Table D.1(i)(a), Summary of Design Parameters (Attachment C.1), Attachment D.1 and the assimilative capacity calculations.**

*The correct flows are as follows:*

<b>Parameter</b>	<b>Value</b>
<i>Population equivalent</i>	<i>3,135</i>
<i>Flow per person per day:</i>	<i>225.0</i>
<i>Daily flow (m<sup>3</sup>/day):</i>	<i>705.38</i>
<i>Daily flow (m<sup>3</sup>/s):</i>	<i>0.00816</i>
<i>Dry weather flow (l/s)</i>	<i>8.16</i>

*The above table represents the current population of the town and the corresponding design flows to the works.*

*Table D.1(i)(a) has been changed on the web based licensing tool to reflect the above corrected figures.*

- 7. Clarify the 'frequency of discharge (days/annum)' as presented in Table E.1(ii).**

*Effluent is discharged to Lough Major from the WwTW on a continuous basis. Therefore, the frequency is 24 hours per day, 365 days per year.*

**8. Clarify that the storm water overflows are SW2, SW3 and SW4 and amend Table E.1(ii) and section C.1.1. Storm Water Overflows, as appropriate;**

*On the web based licensing tool, the Storm Water Overflow references are automatically generated. Therefore, Table E.1 (ii) cannot be amended. The storm water overflows in section C1.1 should now read as follows;*

*The storm water overflows are as follows;*

- SW3; Castleblayney Road CSO*
- SW4; Corrybrannan Bridge CSO*
- SW5; WwTW Inlet Pumping Station*

*Please note that due to the limitations of the web tool, there is no SW2 and therefore, there are only 3No. Stormwater Overflows in Ballybay. Drawing D.1-20384-DL-BY-13 has been amended and is attached in Appendix 3.*

**9. Assess the design criteria of the storm water overflows. Demonstrate (providing available evidence) whether all storm water overflows meet the design criteria established in 'Procedures and Criteria for Storm Water Overflows', published by the Dept. of the Environment, 1995. Clarify whether there are screens on all of the overflows and identify any SWOs that may be impacting on surface water quality. Where a storm water overflow does not comply with these guidelines, as identified for SW-4 in the existing Table E.1(ii), give details of the plans, for improvement. Identify measures to address the 'low pumping rate' at the WWTP inlet pumping station.**

***C.1.1 Storm Water Overflows***

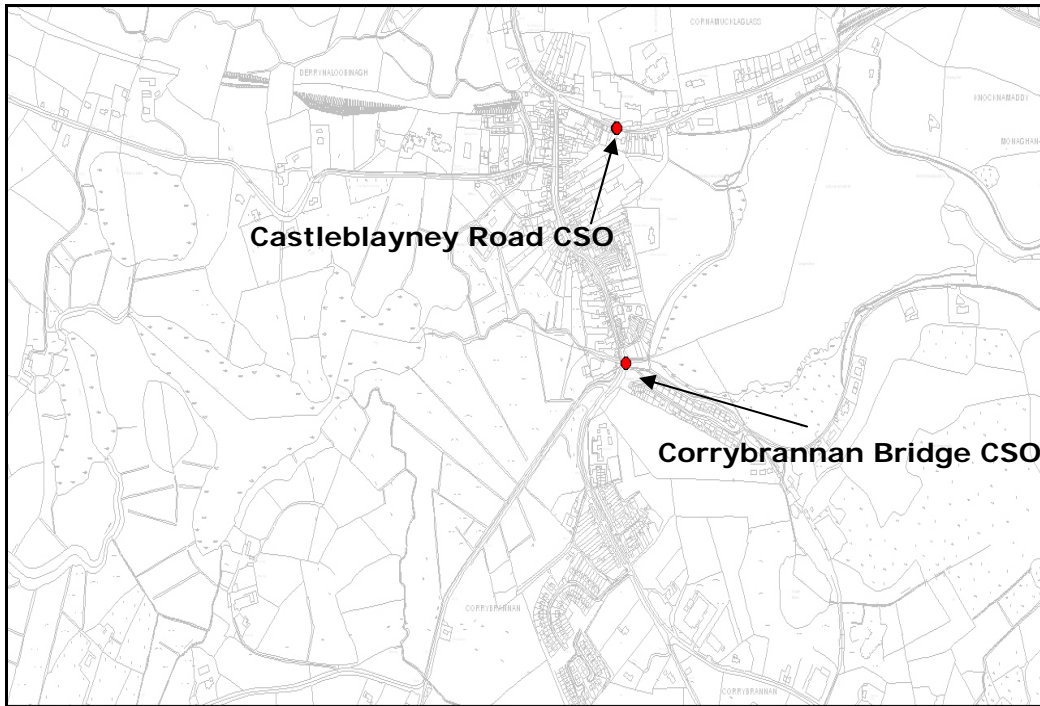
*There have been 3 No. storm overflows identified. The frequency of overflows has been estimated based on the information available on site. It is considered that the overflows are within the number which would be recommended by "Procedures and Criteria in Relation to Storm Water Overflows". A hydraulic model is currently being prepared for the catchment. The model is at draft stage. Please refer to drawing Attachment B5, drawing 05.*

*For each storm water overflow within the waste water works the following information shall be submitted:*

- An assessment to determine compliance with the criteria for storm water overflows, as set out in the DoEHLG 'Procedures and Criteria in Relation to Storm Water Overflows', 1995 and any other guidance as may be specified by the Agency, and*
- Identify whether any of the storm water overflows are to be decommissioned, and identify a date by which these overflows will cease, if applicable.*

***Description***

*There are two overflows from the foul/combined system, two of which discharge either directly or via the separate surface water collection networks, to Lough Major. The locations of the two overflows within the Ballybay catchment are shown in Figure 1 and they are summarised individually below.*



**Figure 1 – Overflow Locations within Ballybay**

**Castleblayney Road CSO Ref: SW02**

Location: Lough Major

National Grid Reference: E272255, N320504

Description: This overflow is located on a 375mm diameter concrete combined sewer on the Castleblayney Road. Excess flow discharges to a nearby separate storm water pipe via a screened low level weir and 600 mm diameter overflow pipe. These excess flows are ultimately discharged to Lough Major via the surface water network.

Compliance with the Urban Waste Water Directive 91/271/EEC:

Formula A, as detailed in the Urban Wastewater Treatment Directive 91/271/EEC, relates to storm overflows within the sewerage network. There is one storm overflow within the sewerage network as detailed above.

- P = design domestic population = 507 PE
- E = design industrial effluent flow = 60.48 m<sup>3</sup>/day
- DWF = Design dry weather flow = 889.88 m<sup>3</sup>/day

**Formula A = DWF + 1.36P + 2E**  
 = (889.88 m<sup>3</sup>/day) + (1.36x507) + (2x60.48 m<sup>3</sup>/day)  
 = 1,700.36 m<sup>3</sup>/day (19.68 l/s)

Conclusion

The capacity of the out going 450mm pipeline, at a roughness value of 1.5, is 124.234l/s. As this is greater than that calculated for Formula A above, Castleblayney Road CSO is in compliance with the Urban Wastewater Treatment Directive; Procedures and Criteria in relation to Storm Water Overflows.

**Corrybrannan Bridge CSO; Ref: SW03**

Location: Dromore River

National Grid Reference: E271947, N320148

*Description: This overflow is located on a 375mm diameter concrete combined sewer at the Corrybrannon Bridge to the south of Ballybay. Excess flow discharges to the adjacent Dromore River via a low level screened weir and a 375mm diameter overflow pipe.*

*Compliance with the Urban Waste Water Directive 91/271/EEC:*

*Formula A, as detailed in the Urban Wastewater Treatment Directive 91/271/EEC, relates to storm overflows within the sewerage network. There is one storm overflow within the sewerage network as detailed above.*

*P = design domestic population = 735 PE  
E = design industrial effluent flow = 121.82 m<sup>3</sup>/day  
DWF = Design dry weather flow = 889.88 m<sup>3</sup>/day*

***Formula A = DWF + 1.36P + 2E***

$$\begin{aligned} &= (889.88 \text{ m}^3/\text{day}) + (1.36 \times 735) + (2 \times 121.82 \text{ m}^3/\text{day}) \\ &= 2,133.13 \text{ m}^3/\text{day} \text{ (24.69l/s)} \end{aligned}$$

*Conclusion*

*The capacity of the out going 300mm pipeline, at a roughness value of 1.5, is 72.142l/s. As this is greater than that calculated for Formula A above, Corrybrannon Bridge CSO is in compliance with the Urban Wastewater Treatment Directive; Procedures and Criteria in relation to Storm Water Overflows.*

***NOTE***

- The design domestic population and the design industrial effluent flow are obtained using data from the network model. By selecting the appropriate CSO, all contributing flows and populations from all sub-catchments can be obtained.*
- The DWF is the predicted dry weather flow calculated for the population equivalent in 2015 (i.e. the life span of the Wastewater Discharge Licence).*

***Where a storm water overflow does not comply with these guidelines, as identified for SW-4 in the existing Table E.1(ii), give details of the plans, for improvement. Identify measures to address the 'low pumping rate' at the WWTP inlet pumping station***

*Currently at the Ballybay WwTW, there is no stormwater treatment for flows greater than 3DWF. Currently, one of the existing aeration tanks is used periodically as a storm tank to prevent premature discharge of untreated effluent. The preliminary report recommends a stormwater tank with 2 hours capacity for overflows at peak flows (8 DWF) is required. A new storm tank with cleaning facilities will be provided. The required tank capacity will be the peak hourly flow minus the peak flow to full treatment for two hours, i.e.  $(8 - 3) \times 18.2 \text{ (DWF (l/s))} \times 3.6 \times 2 = 655\text{m}^3$ .*

*The dilution factor to the Dromore River = Average DWF/95%ile Flow  
= 1.0357/0.6905  
= 15.01*

*In accordance with the Urban Wastewater Treatment Directive (91/271/EEC); Procedures and Criteria in relation to Storm Water Overflows, no storm water storage is needed as the dilution factor is >8. However, the inclusion of a stormwater tank in the forthcoming Upgrade works should alleviate overflows from SW5.*

*From an environmental perspective, the overflows spill to water courses that have insufficient assimilative capacity to cater for such untreated wastewater discharges and are likely to be deteriorating the water quality of the rivers and lakes downstream of Ballybay. Therefore, it has been recommended in the Preliminary Report that the need for these overflows is eliminated and that the overflows are removed from the collection network.*

**10. Storm water overflow, SW4, on Drawing No. 10 appears to discharge to a 'ditch' clarify the receiving water (name type etc.) and the scale of such receiving water.**

*The treated effluent from the works discharges to the River Dromore. This river flows into a lake and marshy area. The receiving water for SW4 (now identified as SW5) is this marshy area. It must be noted that this overflow is rarely activated and, according to the caretaker, has not been activated in the last 12 months.*

**11. Clarify the use of 'grass plots' as identified in Attachment C.1, if such plots are used assess the impact of their use.**

*Grass plots are present but are not used at Ballybay WwTW. At the works, there is no stormwater treatment for flows greater than 3DWF. Currently, one of the existing aeration tanks is used periodically as a storm tank to prevent premature discharge of untreated effluent. The preliminary report recommends a stormwater tank, to cater for excess flows, to be installed. It must be noted that SW5 does not normally activate and the caretaker has stated that it has not over flown in the last 12 months at least.*

**12. Provide a copy of the hydraulic model for the catchment as referred to in the application.**

*The modelling report is part of the Preliminary Report. As stated previously, the Preliminary Report will be submitted to the EPA once approved by Monaghan County Council.*

**13. Based on the assimilative calculations presented the appropriate emission limit values for BOD and suspended solids should be 16mg/l and 20mg/l respectively. Identify what measures are to be taken to achieve at least these figures and within what timeframe the identified measures will be completed.**

*The preliminary report states that the Upgraded Ballybay WwTW will have the following effluent standards;*

<b>Parameter</b>	<b>Effluent Load (kg/d)</b>	<b>Effluent Concentration (mg/L)</b>
<i>BOD</i>	<i>16.43</i>	<i>10</i>
<i>Suspended Solids</i>	<i>19.7</i>	<i>12</i>
<i>Orthophosphate (P)</i>	<i>1.64</i>	<i>1.0</i>
<i>Ammonia (N)</i>	<i>16.43</i>	<i>10</i>

*The upgrade works will also allow the more straight discharge standards currently required, as set out in Section 5, to be achieved. Facilities to be provided under Phase 1 include the following:*

- A new storm tank with cleaning facilities should be provided. The required tank capacity will be the peak hourly flow minus the peak flow to full treatment for two hours
- It is recommended that an anoxic and anaerobic zone be provided within the existing aeration tanks to provide for biological phosphorus and nitrogen reduction.
- A chemical dosing facility for phosphorus removal should also be provided as a back-up to ensure that the full level of phosphorus removal can be achieved at all times.
- A sand filter for the reduction of BOD and suspended solids following secondary treatment is recommended. A proprietary sand filter unit will provide a reliable level of treatment of the effluent prior to discharge to the receiving waters.

As stated previously, the Water Services Investment Programme 2007-2009 identifies the scheme as commencing in 2008. However, under the current economic climate, construction is unlikely to commence before 2015. At that time, tenderers will be sought, following selection; construction will be completed over a 2 year construction period (approximate).

**14. Provide a copy of the: Water Quality Management Plan identified in the application.**

The North Western Draft River Basin Management Plan is attached in Appendix 5.

**15. The application states that ‘the impact of the discharge can be assimilated in to the river’, however, the assimilative capacity calculations presented in the application identify that the emission limit value for BOD and suspended solids must be more than those specified in the EPA (Urban Waste Water Treatment) Regulations, please clarify.**

Yes, the impact of the discharge can be assimilated in to the river if the following effluent standards are achieved;

<b>Parameter</b>	<b>Effluent Load (kg/d)</b>	<b>Effluent Concentration (mg/L)</b>
BOD	16.43	10
Suspended Solids	19.7	12
Orthophosphate (P)	1.64	1.0
Ammonia (N)	16.43	10

These standards are to be implemented for the Upgrade works.

However, the current effluent is predominantly within the current effluent standards for the plant. Please see appendix 4 for the latest effluent results from Ballybay WwTW.

**16. Clarify if leachate is imported from the Scotch Corner Landfill, is applicable provide details of the quantity imported, quality of the effluent and management of effluent fee to the plant.**

Leachate is not imported from the Scotch Corner Landfill to the Ballybay Waste Water Treatment Works.

# APPENDIX 1

## REVISED NON-TECHNICAL SUMMARY

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## NON-TECHNICAL SUMMARY

### 1. The waste water works and the activities carried out

#### 1.1 Introduction

Ballybay is a small market town in the centre of County Monaghan and is situated on the shores of Lough Major. The town is located 21 km south of Monaghan Town and 120 km North West of Dublin. The current residential population of the town was estimated as 3,135. Today Ballybay serves as a retail and service centre to the agricultural community in the surrounding hinterland. The urban area lies in a relatively flat area surrounded by drumlins, rivers and interglacial lakes.

Employment locally is provided in a food processing plant and a manufacturing industry adjoining the town and in the retail and service sector within the town. Commercial facilities are located predominantly around the centre of town. Institutional facilities in Ballybay include three primary schools and one secondary school.

The drainage catchment in Ballybay includes the main urban area on the banks of Lough Major and extends outwards to service ribbon development along roads leading into the town (with the exception of the R162 to the south). The total area of the drainage catchment is approximately 95 ha.

The WWTP is located to the south west of the town, at Meetinghouse Lane. The WWTP currently occupies an area of approximately 0.4 hectares and designed to cater for 7,238P.E. Ballybay WWTP was built and commissioned in 1983 to provide preliminary and secondary treatment for waste water prior to discharge to the River Dromore. The WWTP operates as an extended aeration plant, preceded by screening and grit removal. Sludge treatment at the WWTP comprises thickening and dewatering. The dewatered sludge is stored on site prior to disposal. Treated effluent from Ballybay Waste Water Treatment Plant (WWTP) discharges to the River Dromore via a single outfall. The river flows into a lake and marshy area approximately 0.5 km downstream of the WWTP outfall. The influent and effluent quality at Ballybay WWTP is monitored by 24 hour flow proportional sampling.

The waste water treatment plant is managed on a part-time basis by a technician and a caretaker. There is no SCADA system and no remote monitoring of the plant in place.

## 1.2 Summary of Wastewater Treatment Plant Units

Treatment Stage	Element	Description (dimensions, capacities etc)	No of Units
Preliminary	Inlet Pumping Station	2No submersible duty pumps (each rated 30L/s)	2
	Screen	2No storm pumps in separate well Mechanical course screen (20mm aperture)	1
	Grit removal	Vortex Grit Trap	1
	Flow monitor	Venturi flume at the plant inlet and outlet	1
	Storm water Treatment	Currently directed to one of the Aeration Basins	1
Primary	N/A	N/A	N/A
Secondary	Extended Aeration	Rectangular Aeration Tanks (total capacity = 2,460m <sup>3</sup> )	2
	Settlement Tank	Rectangular Settlement Tanks (Surface area = 215m <sup>2</sup> )	2
Tertiary	N/A	N/A	N/A
Ancillary	Phosphorus Removal	Chemical dosing for phosphorous removal	1
Sludge Treatment/Disposal	Thickening	Picket Fence Thickener, achieves 2.5% dry solids (capacity = 306m <sup>3</sup> )	1
	Dewatering	Single belt press estimated @ 90kg ds/hr, achieves 9.5% ds	
Outfall	Pipe	10m long open ended outfall to Dromore River	1
Power Generation	N/A	N/A	N/A

## 1.3 Description of Waste water treatment process

### Inlet Works and Preliminary Treatment

The inlet flow is pumped up to the inlet works passing through a flume with V-Notch weirplate for flow measurement and then flows to a mechanical bar screen. The screenings are directed to a macerator chamber for maceration and returned to the system for treatment. Grit is automatically removed using a Jones and Attwood Pista grit trap. The grit is air lifted to a grit holding chamber and manually removed from there and disposed of to the Scotch Corner landfill. The inlet flow is sampled by a Contronic Flow Proportional Inlet Sampler. The screen and grit are controlled automatically by level probes.

### Secondary Treatment

Following preliminary treatment waste water gravitates to the secondary treatment system. Secondary treatment is provided by an activated sludge treatment system comprising of;

- Two rectangular aeration tanks designed for BOD removal and nitrification
- Two rectangular secondary settlement tanks and a sludge circulation system.

Each aeration tanks has a total capacity of approximately 2,460 m<sup>3</sup>, and is fitted with two vertical shaft surface aerators rated at 14.4 kW each. Flow from the aeration tanks gravitates to two rectangular horizontal flow settlement tanks fitted with continuous chain driven scraper mechanisms. Settled sludge gravitates to the nearby pumping station, while scum is removed automatically from the tank surface. A common set of submersible pumps (duty/standby) is used to alternately pump the activated sludge to the aeration tanks or to a picket fence thickener.

Treated effluent which overflows from the secondary settlement tanks gravitates to an on site chamber from where it discharges to the River Dromore, via an open ended outfall.

The treated effluent is measured in a venturi flume at the plant outlet. Twenty-four hour composite samples and grab samples are also routinely taken at this location.

### Sludge Treatment

Excess sludge is continually being produced and is removed at regular intervals by pumping to a picket fence thickening tank. Polyelectrolyte is dosed into this line. The sludge is allowed to settle in the thickener and supernatant is drawn off which returns to the sludge return sump for further treatment.

Settled sludge is periodically drawn off from the PFT and pumped into the flocculation chamber. The polyelectrolyte is dosed into the line prior to the chamber.

The flocculated sludge overflows the chamber onto a single belt press and is pressed to a solid sludge cake. The dewatered sludge is stored in a covered skip prior to disposal.

## **2.0 The sources of emissions from the waste water works**

### **Primary Discharge (PSW1) – Effluent Outfall**

Treated effluent from Ballybay Waste Water Treatment Plant (WWTP) discharges to the River Dromore via a single outfall. The river flows into a lake and marshy area approximately 0.5 km downstream of the WWTP outfall. The discharge pipe is an open discharge 530mm diameter pipe.

Refer to Drawing 10, Attachment C2.

### **Storm Water Overflows (SW2) – Castleblayney Road CSO**

The Castleblayney Rd combined sewer overflow is located outside No 14 Castleblayney Rd. The catchment upstream of the overflow consists of the Castleblayney Rd (including the Whyleys Hill and Folly Court pumping stations), and further properties behind Main St, including Church Place and the livestock mart.

The overflow consists of a single broad-crested concrete wall weir set at an approximate height of 300 mm above the invert of the incoming 300mm sewer. Excess storm flows go over the weir and through a coarse screen into a 600mm storm sewer, which eventually discharges into Lough Major.

Refer to Drawing 11, Attachment C2.

### **Storm Water Overflows (SW3) – Corrybrannan Bridge CSO**

The Corrybrannan Bridge combined sewer overflow is on the north bank of the Dromore River where it crosses under Corrybrannan Bridge. The catchment upstream of the overflow consists of the Carrickmacross Rd and Loch Mor estate.

The overflow consists of a single sided weir set at a height of 200 mm above the invert of the incoming 375mm sewer. Excess storm flows go over the weir and directly into the Dromore River.

Refer to Drawing 12, Attachment C2.

### **Storm Water Overflows (SW4) – WWTP Inlet Pumping Station (storm wet well)**

Flows in excess of 5DWF overflow to an adjacent storm wet well. Flows from here are pumped directly to the Dromore river.

Refer to Drawing 10, Attachment C2.

### **Existing Sewerage Network Overview**

Ballybay catchment is drained by a combination of gravity sewers and five pumping stations to the wastewater treatment plant, with final effluent discharging into the Dromore River. The network is largely combined and only recent developments have separate foul and storm systems.

## **3.0 The nature and quantities of emissions from the waste water works into the receiving aqueous environment**

The existing plant has a design capacity of 7,238 pe and a design effluent quality (to the primary discharge point) as follows;

Parameter	Concentration
BOD <sub>5</sub> (mg/L)	25
Total Suspended Solids (mg/L)	35
COD (mg/L)	125
Total Nitrogen (mg/L N)	20
Total Phosphorus (mg/L P)	2.0

The Ballybay Wastewater Treatment Works complies with the requirements of the Urban Waste Water Directive. No significant effects have been identified.

Section 4.4.1 of the Department of the Environment, Heritage and Local Government, National Urban Waste Water Study, Ballybay Catchment Report states that:

*“Routine monitoring data has shown that the WWTP has consistently discharged treated effluent in compliance with the discharge standards specified in the Urban Waste Water Treatment Regulations, 2001 (i.e. < 25 mg/l BOD, < 35 mg/l suspended solids and 2 mg/l Total Phosphorus concentration). Treated effluent samples in 2001 had average concentrations of 12 mg/l BOD, less than 9 mg/l suspended solids and less than 1.0 mg/l Ortho-Phosphate.*

*Historically there has been a significant increase in the concentrations of nitrates in the final effluent being discharged, reaching as high as 61 mg/l reported in March 2001. This is attributed to the treatment of imported leachate from Scotch Corner landfill. Since February 2002 80% of the leachate from Scotch Corner landfill has been treated at Monaghan WWTP and this has led to a reduction in nitrate concentrations being discharged in the treated effluent from Ballybay WWTP.”*

#### **4.0 Identification of significant effects of the emissions on the environment**

The only significant emission from the wastewater treatment plant is the effluent to the Lough Major. The effect of this has been examined in terms of the waste assimilative capacity of the Dromore River in terms of BOD<sub>5</sub>, suspended solids, phosphorus, ammonia and oxidised nitrogen. In general the current effluent limits are not within the waste assimilative capacity of the river, please see attachment F1 for further information. However, an effluent limit of BOD of 16mg/l and phosphorous level of 1.0mg/l is currently being achieved. These levels are less than the waste assimilative capacity of the river.

Section 4.4.3 (Meeting the Standards) of the Department of the Environment, Heritage and Local Government, National Urban Waste Water Study, Ballybay Catchment Report states that:

*“Ballybay WWTP currently provides an adequate level of waste water treatment for compliance with the Urban Waste Water Treatment Regulations (S.I. No. 254 of 2001), i.e. secondary treatment for discharges to freshwaters from between 2,000 and 10,000 pe by 31st December 2005. The Dromore River is not designated sensitive under the UWWTR and the provision of nutrient reduction is not a legislative requirement under these regulations.”*

## 5.0 The proposed technology and other techniques for preventing or reducing emissions/pollution from the waste water works

The wastewater treatment plant in Ballybay was commissioned in 1983. As stated in the national Urban Waste Water study catchment report for Ballybay, it is considered to be providing a suitable level of treatment to prevent pollution of Lough Major.

However, as outlined in the draft Preliminary report submitted Monaghan County Council the following measures are proposed to further reduce and prevent emissions/pollution from the works (refer to drawing 03, Attachment B2):

- **Stormwater Tank** - a stormwater tank with 2 hours capacity for overflows at peak flows (8 DWF)
- **Inlet Works** - complete replacement of all mechanical and electrical equipment and instrumentation
- **Secondary Treatment** - A complete replacement of all mechanical and electrical equipment and instrumentation
- **Aeration Tanks** - the existing surface aerators in the aeration tanks to be replaced with a diffused air aeration system
- **Settlement Tanks** - the scraper bridges and scum removal equipment to be completely replaced
- **Sludge Return / Sludge Waste** - complete replacement of the mechanical, electrical and instrumentation equipment including replacement of actuated valves.
- **Nutrient Reduction** - anoxic and anaerobic zone be provided within the existing aeration tanks to provide for biological phosphorus and nitrogen reduction.
- A chemical dosing facility for phosphorus removal should also be provided as a back-up to ensure that the full level of phosphorus removal can be achieved at all times.
- **Tertiary BOD/Suspended Solids Reduction** - A sand filter for the reduction of BOD and suspended solids following secondary treatment to

provide a reliable level of treatment of the effluent prior to discharge to the receiving waters.

- **Sludge Treatment** - A separate sludge acceptance / leachate acceptance facility for any imports of sludge and/or Leachate.
- A new sludge dewatering building with a centrifuge and ancillary equipment is recommended.
- Administration and control building refurbishment
- Provision of air blower room (within existing sludge building)
- Odour control plant
- Upgrade existing site paths and roads
- Upgrade existing walkways, handrailing and decking
- Upgrade existing site cable ducts and pipework
- New main and sludge dewatering control panels
- New telemetry and SCADA system

#### **6.0 Measures planned to monitor emissions into the environment**

The inlet flow is sampled by a Contronic Flow Proportional Inlet Sampler.

The screen and grit are controlled automatically by level probes.

The treated effluent flow is measured in a Venturi flume at the plant outlet.

Twenty-four hour composite samples and grab samples are also routinely taken at this location.

Flowmeters are provided at the wastewater treatment plant to monitor the process and the emissions to the environment. The flowmeters provided are as follows:

- Flow monitoring using level sensor in inlet flume chamber
- Flowmeter for the sludge return flow.
- Flowmeter and recording equipment for flow from Effluent Pumping Station.

The following process instrumentation is also provided to monitor the process and to ensure there is no overflows of pumping stations and the activated sludge system is working effectively: -

- (i) Dissolved oxygen monitoring in each aeration tank.
- (ii) Ultrasonic level measurement in all pump sumps

Monaghan County Council currently carry out monthly monitoring of the final effluent from the wastewater treatment plant in addition to ongoing monitoring carried out in Dromore river and Lough Major to monitor the water quality.

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## APPENDIX 2

### Laboratory Confirmation Results and Corrected Results;

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**Pauline McAree**

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**From:** Donna Heslin [dheslin@euroenv.ie]  
**Sent:** 29 April 2009 14:28  
**To:** gmccarthy@monaghancoco.ie; Pauline McAree  
**Subject:** Supplementary certs 0810/038 & 0810/039 batches  
**Attachments:** Monaghan Co Co supplementary 29.04.09.pdf

Hi Pauline,

Following your query re the positive Dichloromethane (DCM) results for samples 0810/038/01-11 & 0810/039/01-08, we investigated the results in our GC lab.

We had a DCM contamination issue and blank samples were analysed with each batch of Volatile organic compounds so that it can be subtracted from the samples, in order to reflect the true DCM concentration of the samples.

On review, it was observed that for both of the above batches, the blank DCM concentration had not been subtracted from the sample results. This was an oversight on our part and apologies for the inconvenience caused.

Please find supplementary certs attached with the amended DCM results.

Any queries, please contact me.

Regards  
Donna

Donna Heslin  
Laboratory Manager  
EURO environmental services  
35 Boyne Business Park  
Drogheda  
Co Louth  
Ireland

Phone: 041 9845440 (ext 2)  
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<b>Customer</b>	Gearoid McCarthy Monaghan Co. Co. County Offices The Glen Co Monaghan	<b>Lab Report Ref. No.</b>	0810/039/01S
<b>Customer PO</b>	400092317	<b>Date of Receipt</b>	18/06/2008
<b>Customer Ref</b>	Ballybay Inflow	<b>Date Testing Commenced</b>	18/06/2008
		<b>Received or Collected</b>	Collected by Euro
		<b>Condition on Receipt</b>	Acceptable
		<b>Date of Report</b>	29/04/2009
		<b>Sample Type</b>	Trade Effluent

## CERTIFICATE OF ANALYSIS - Supplementary

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Ammonia	114	Colorimetry	29.87	mg/L as N	UKAS
Arsenic	177	ICPMS	1	ug/L	
Atrazine	191	HPLC	4.6	ug/L	
Barium	177	ICPMS	18	ug/L	
BOD	113	Electrometry	220	mg/L	
Boron	177	ICPMS	302	ug/L	
Cadmium	177	ICPMS	<0.09	ug/L	
Chromium	177	ICPMS	2	ug/L	
COD	107	Colorimetry	439	mg/L	UKAS
Conductivity	112	Electrometry	761	µscm <sup>-1</sup> @25C	UKAS
Copper	177	ICPMS	26	ug/L	
Cyanide	138	Colorimetry	10	ug/L	
Dichloromethane	154	GCMS	<1	ug/L	
Fluoride	115	Colorimetry	0.68	mg/L	
Lead	177	ICPMS	4	ug/L	
Mercury	178	ICPMS	<0.2	ug/L	
Nickel	177	ICPMS	4	ug/L	
Nitrate	103	Colorimetry	<0.09	mg/L as N	
Nitrite	118	Colorimetry	0.016	mg/L as N	
Nitrogen (Total Kjeldahl)	104	Digestion/ Distillation/ Titrim	38.64	mg/L as N	
Nitrogen (Total Oxidised)	151	Colorimetry	0.03	mg/L as N	
Nitrogen (Total)	0	Calculation	38.67	mg/L as N	
pH	110	Electrometry	7.2	pH Units	UKAS
Phenols (Total)	223	GCMS	<0.10	ug/L	
Phosphate (Ortho)	117	Colorimetry	4.143	mg/L as P	UKAS

Signed : Donna Heslin

Date : 29/04/09

**Donna Heslin - Laboratory Manager**

Acc. : Accredited Parameters by ISO 17025:2005

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<b>Customer</b>	Gearoid McCarthy Monaghan Co. Co. County Offices The Glen Co Monaghan	<b>Lab Report Ref. No.</b>	0810/039/01S
<b>Customer PO</b>	400092317	<b>Date of Receipt</b>	18/06/2008
<b>Customer Ref</b>	Ballybay Inflow	<b>Date Testing Commenced</b>	18/06/2008
		<b>Received or Collected</b>	Collected by Euro
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		<b>Date of Report</b>	29/04/2009
		<b>Sample Type</b>	Trade Effluent

## CERTIFICATE OF ANALYSIS - Supplementary

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Phosphate (Total)	166	Digestion/ Colorimetry	6.563	mg/L as P	UKAS
Selenium	177	ICPMS	1	ug/L	
Simazine	191	HPLC	<0.01	ug/L	
Solids (Total Suspended)	106	Filtration/ Drying @ 104C	203	mg/L	
Sulphate	119	Colorimetry	72.90	mg/L as SO4	UKAS
Temperature	715	DO Meter	13.9	degrees C	
Toluene	179	GCMS	<1	ug/L	
Tributyltin*	0	GCMS	<0.02	ug/L as Sn	
Xylene	179	GCMS	<1	ug/L	
Zinc	177	ICPMS	32.3	ug/L	

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Signed : Donna Heslin  
**Donna Heslin - Laboratory Manager**

Date : 29/04/09

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<b>Customer PO</b>	400092317	<b>Date of Receipt</b>	18/06/2008
<b>Customer Ref</b>	Ballybay Outflow	<b>Date Testing Commenced</b>	18/06/2008
		<b>Received or Collected</b>	Collected by Euro
		<b>Condition on Receipt</b>	Acceptable
		<b>Date of Report</b>	29/04/2009
		<b>Sample Type</b>	Trade Effluent

## CERTIFICATE OF ANALYSIS - Supplementary

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Ammonia	114	Colorimetry	1.45	mg/L as N	UKAS
Arsenic	177	ICPMS	1	ug/L	
Atrazine	191	HPLC	<0.01	ug/L	
Barium	177	ICPMS	8	ug/L	
BOD	113	Electrometry	7	mg/L	
Boron	177	ICPMS	190	ug/L	
Cadmium	177	ICPMS	<0.09	ug/L	
Chromium	177	ICPMS	1	ug/L	
COD	107	Colorimetry	42	mg/L	UKAS
Conductivity	112	Electrometry	653	µscm <sup>-1</sup> @25C	UKAS
Copper	177	ICPMS	5	ug/L	
Cyanide	138	Colorimetry	<5	ug/L	
Dichloromethane	154	GCMS	<1	ug/L	
Fluoride	115	Colorimetry	0.43	mg/L	
Lead	177	ICPMS	3	ug/L	
Mercury	178	ICPMS	<0.2	ug/L	
Nickel	177	ICPMS	2	ug/L	
Nitrate	103	Colorimetry	0.10	mg/L as N	
Nitrite	118	Colorimetry	0.034	mg/L as N	
Nitrogen (Total Kjeldahl)	104	Digestion/ Distillation/ Titrim	3.36	mg/L as N	
Nitrogen (Total Oxidised)	151	Colorimetry	0.13	mg/L as N	
Nitrogen (Total)	0	Calculation	3.49	mg/L as N	
pH	110	Electrometry	7.4	pH Units	UKAS
Phenols (Total)	223	GCMS	<0.10	ug/L	
Phosphate (Ortho)	117	Colorimetry	0.869	mg/L as P	UKAS

Signed : Donna Heslin

Date : 29/04/09

**Donna Heslin - Laboratory Manager**

Acc. : Accredited Parameters by ISO 17025:2005

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<b>Customer PO</b>	400092317	<b>Date of Receipt</b>	18/06/2008
<b>Customer Ref</b>	Ballybay Outflow	<b>Date Testing Commenced</b>	18/06/2008
		<b>Received or Collected</b>	Collected by Euro
		<b>Condition on Receipt</b>	Acceptable
		<b>Date of Report</b>	29/04/2009
		<b>Sample Type</b>	Trade Effluent

## CERTIFICATE OF ANALYSIS - Supplementary

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Phosphate (Total)	166	Digestion/ Colorimetry	1.101	mg/L as P	UKAS
Selenium	177	ICPMS	1	ug/L	
Simazine	191	HPLC	<0.01	ug/L	
Solids (Total Suspended)	106	Filtration/ Drying @ 104C	5	mg/L	
Sulphate	119	Colorimetry	73.73	mg/L as SO4	UKAS
Temperature	715	DO Meter	14.2	degrees C	
Toluene	179	GCMS	<1	ug/L	
Tributyltin*	0	GCMS	<0.02	ug/L as Sn	
Xylene	179	GCMS	<1	ug/L	
Zinc	177	ICPMS	18.6	ug/L	

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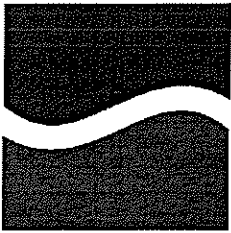
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		<b>Date of Report</b>	29/04/2009
		<b>Sample Type</b>	Trade Effluent

## CERTIFICATE OF ANALYSIS - Supplementary

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Ammonia	114	Colorimetry	0.13	mg/L as N	UKAS
Arsenic	177	ICPMS	1	ug/L	
Atrazine	191	HPLC	<0.01	ug/L	
Barium	177	ICPMS	36	ug/L	
BOD	113	Electrometry	6	mg/L	
Boron	177	ICPMS	150	ug/L	
Cadmium	177	ICPMS	<0.09	ug/L	
Chromium	177	ICPMS	1	ug/L	
COD	107	Colorimetry	37	mg/L	UKAS
Conductivity	112	Electrometry	391	ism -1@25C	UKAS
Copper	177	ICPMS	6	ug/L	
Cyanide	138	Colorimetry	8	ug/L	
Dichloromethane	154	GCMS	<1	ug/L	
Fluoride	115	Colorimetry	0.18	mg/L	
Lead	177	ICPMS	4	ug/L	
Mercury	178	ICPMS	<0.2	ug/L	
Nickel	177	ICPMS	3	ug/L	
Nitrate	103	Colorimetry	<0.09	mg/L as N	
Nitrite	118	Colorimetry	0.011	mg/L as N	
Nitrogen (Total Kjeldahl)	104	Digestion/ Distillation/ Titrim	<1.00	mg/L as N	
Nitrogen (Total Oxidised)	151	Colorimetry	<0.03	mg/L as N	
Nitrogen (Total)	0	Calculation	<1.00	mg/L as N	
pH	110	Electrometry	7.4	pH Units	UKAS
Phenols (Total)	223	GCMS	<0.10	ug/L	
Phosphate (Ortho)	117	Colorimetry	0.040	mg/L as P	UKAS

Signed : Donna Heslin

Date : 29/04/09

**Donna Heslin - Laboratory Manager**

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<b>Customer Ref</b>	Ballybay Upstream	<b>Date Testing Commenced</b>	18/06/2008
		<b>Received or Collected</b>	Collected by Euro
		<b>Condition on Receipt</b>	Acceptable
		<b>Date of Report</b>	29/04/2009
		<b>Sample Type</b>	Trade Effluent

## CERTIFICATE OF ANALYSIS - Supplementary

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Phosphate (Total)	166	Digestion/ Colorimetry	0.234	mg/L as P	UKAS
Selenium	177	ICPMS	2	ug/L	
Simazine	191	HPLC	<0.01	ug/L	
Solids (Total Suspended)	106	Filtration/ Drying @ 104C	44	mg/L	
Sulphate	119	Colorimetry	18.20	mg/L as SO4	UKAS
Temperature	715	DO Meter	13.7	degrees C	
Toluene	179	GCMS	<1	ug/L	
Tributyltin*	0	GCMS	<0.02	ug/L as Sn	
Xylene	179	GCMS	<1	ug/L	
Zinc	177	ICPMS	19.2	ug/L	

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**Donna Heslin - Laboratory Manager**

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<b>Customer Ref</b>	Ballybay Downstream	<b>Date Testing Commenced</b>	18/06/2008
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		<b>Condition on Receipt</b>	Acceptable
		<b>Date of Report</b>	29/04/2009
		<b>Sample Type</b>	Trade Effluent

## CERTIFICATE OF ANALYSIS - Supplementary

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Ammonia	114	Colorimetry	0.47	mg/L as N	UKAS
Arsenic	177	ICPMS	1	ug/L	
Atrazine	191	HPLC	<0.01	ug/L	
Barium	177	ICPMS	32	ug/L	
BOD	113	Electrometry	3	mg/L	
Boron	177	ICPMS	129	ug/L	
Cadmium	177	ICPMS	<0.09	ug/L	
Chromium	177	ICPMS	2	ug/L	
COD	107	Colorimetry	29	mg/L	UKAS
Conductivity	112	Electrometry	457	µscm <sup>-1</sup> @25C	UKAS
Copper	177	ICPMS	6	ug/L	
Cyanide	138	Colorimetry	<5	ug/L	
Dichloromethane	154	GCMS	<1	ug/L	
Fluoride	115	Colorimetry	0.27	mg/L	
Lead	177	ICPMS	2	ug/L	
Mercury	178	ICPMS	<0.2	ug/L	
Nickel	177	ICPMS	3	ug/L	
Nitrate	103	Colorimetry	<0.09	mg/L as N	
Nitrite	118	Colorimetry	0.041	mg/L as N	
Nitrogen (Total Kjeldahl)	104	Digestion/ Distillation/ Titrim	<1.00	mg/L as N	
Nitrogen (Total Oxidised)	151	Colorimetry	0.08	mg/L as N	
Nitrogen (Total)	0	Calculation	<1.00	mg/L as N	
pH	110	Electrometry	7.5	pH Units	UKAS
Phenols (Total)	223	GCMS	<0.10	ug/L	
Phosphate (Ortho)	117	Colorimetry	0.239	mg/L as P	UKAS

Signed : Donna Heslin

Date : 29/04/09

**Donna Heslin - Laboratory Manager**

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		<b>Date of Report</b>	29/04/2009
		<b>Sample Type</b>	Trade Effluent

## CERTIFICATE OF ANALYSIS - Supplementary

Test Parameter	SOP	Analytical Technique	Result	Units	Acc.
Phosphate (Total)	166	Digestion/ Colorimetry	0.390	mg/L as P	UKAS
Selenium	177	ICPMS	2	ug/L	
Simazine	191	HPLC	<0.01	ug/L	
Solids (Total Suspended)	106	Filtration/ Drying @ 104C	10	mg/L	
Sulphate	119	Colorimetry	34.12	mg/L as SO4	UKAS
Temperature	715	DO Meter	13.6	degrees C	
Toluene	179	GCMS	<1	ug/L	
Tributyltin*	0	GCMS	<0.02	ug/L as Sn	
Xylene	179	GCMS	<1	ug/L	
Zinc	177	ICPMS	10.7	ug/L	

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**Donna Heslin - Laboratory Manager**

Date : 29/04/09

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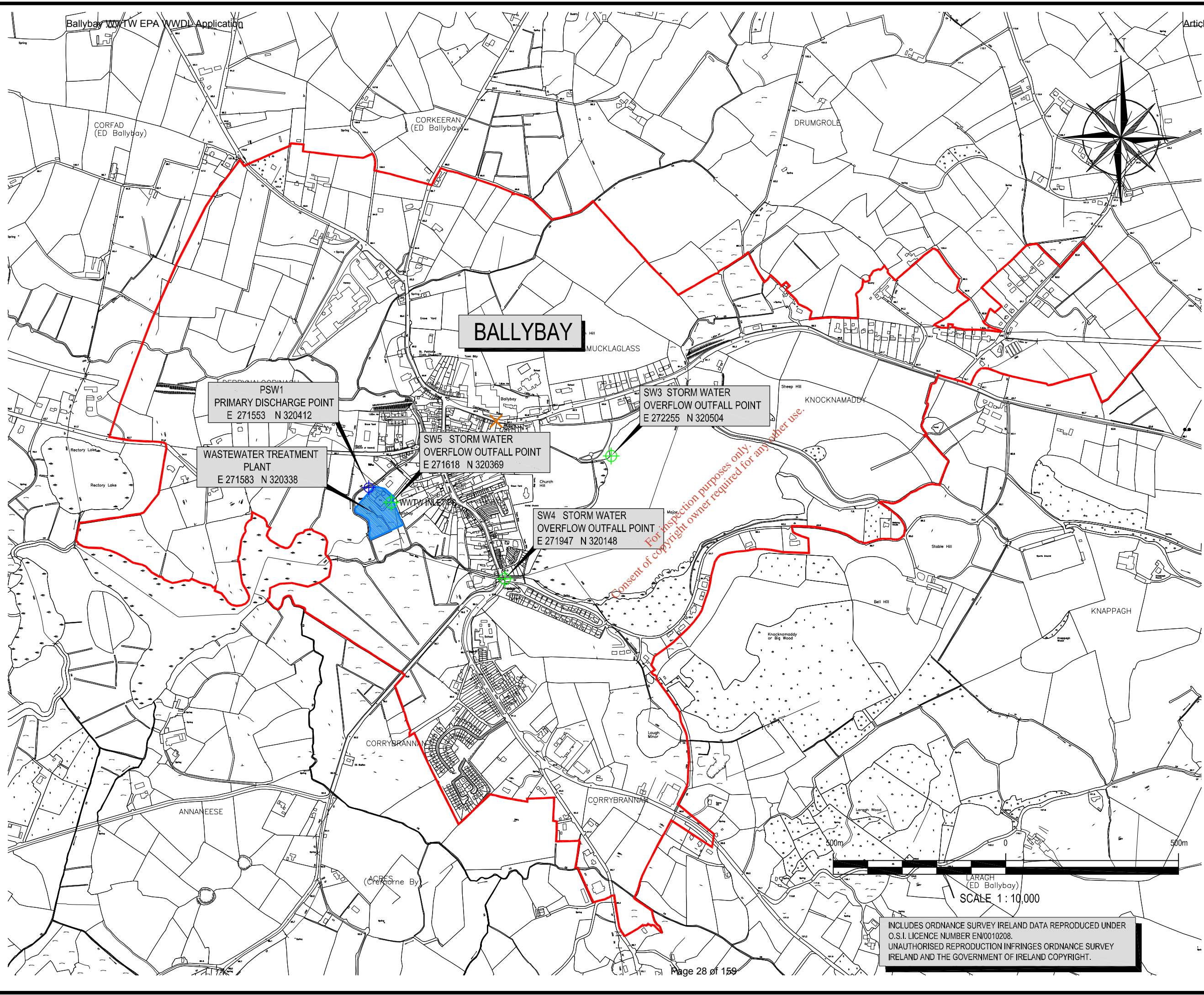
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### **APPENDIX 3**

## **Revised Stormwater Overflow Location Drawing; *D.1-20384-DL-BY-15***

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V:\Drawings\20384\Drawings\EPA-Discharge Licences\Ballybay\1-20384-DL-BY-15.dwg, 01/07/2009 15:52:19



Article 16 Compliance Requirements

**LEGEND**

- AGGLOMERATION AREA
- WASTEWATER TREATMENT PLANT
- ⊕ PSW1 PRIMARY DISCHARGE POINT
- ⊕ SW STORM WATER OVERFLOW OUTFALL POINT
- ✕ CSO STORM WATER OVERFLOW POINT

REV	DATE	DESCRIPTION	D	C	A

**DISCHARGE LICENCE**

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**Nicholas O'Dwyer**  
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**CLIENT**  
Monaghan County Council  
Comhairle Chontae Mhuineacháin  
Council Offices,  
The Glen, Monaghan.  
Tel : (047) 30500 Fax : (047) 82739

**PROJECT**  
WASTE WATER LICENCE APPLICATION  
FOR BALLYBAY  
SEWERAGE SCHEME

**TITLE**  
BALLYBAY WWTW  
DISCHARGES TO  
SURFACE WATERS

SCALES	DRAWN	CHECKED	APPROVED
1:10,000 @ A3	D.Rimdzkus	P.McAree	F.Lane
	DATE	DATE	DATE
	01.07.2009	01.07.2009	01.07.2009
<b>CAD REFERENCE</b>	<b>SECTION</b>	<b>DRAWING No.</b>	<b>REV</b>
D_1-20384-DL-BY-15	D.1	15	-

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## **APPENDIX 4**

### **Effluent Results**

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**BALLYBAY WASTE WATER TREATMENT WORKS - EFFLUENT MONITORING RESULTS**

Effluent	Date of Sampling	Sample Type (C or G)	BOD mg/l	COD mg/l	TSS mg/l	Total P mg/l P	Ortho P mg/l P	Total N mg/l N	NH3-N mg/l N	TON mg/l N	TKN mg/l N
Effluent	24/01/2007	C	8	37	14	0.18	0.54		0.17	3.48	
Effluent	20/02/2007	C	7	49	9	0.27	0.83		0.17	2.32	
Effluent	28/03/2007	C	7	2	13	0.10	0.31		0.60	26.52	
Effluent	26/04/2007	C	7	70	8	0.15	0.46		0.35	9.60	
Effluent	21/05/2007	C	12	48	12	0.22	0.67		0.50	11.20	
Effluent	24/07/2007	C	< 3	25	< <3	0.10	0.31	12.13		8.13	4.00
Effluent	22/08/2007	C	< 2	33	12	0.44	1.34	5.61		0.61	5.00
Effluent	24/10/2007	C	< 2	48	8	0.24	0.72	2.21		1.09	1.12
Effluent	22/11/2007	C	< 2	66	18	0.58	1.78	9.75		5.83	3.92
Effluent	29/01/2008	C	2	32	4	0.27	0.82	1.79		0.67	1.12
Effluent	20/02/2008	C	< 2	36	4	0.27	0.83	9.54		5.62	3.92
Effluent	27/03/2008	C	< 2	28	< 3	0.98	3.01	7.56		2.52	5.04
Effluent	30/04/2008	C	8	36	11.2	1.90	5.83	10.00	0.60		24.12
Effluent	28/05/2008	C	23	105	12.6	0.15	0.46	1.90	0.18		6.03
Effluent	15/07/2008	C	12	48	8.8	0.08	0.25	1.90	0.12		
Effluent	28/08/2008	C	10	34	13	0.24	0.74	10.60	0.19		
		<b>Average</b>	<b>6.79</b>	<b>43.56</b>	<b>10.04</b>	<b>0.38</b>	<b>1.18</b>	<b>6.64</b>	<b>0.32</b>	<b>6.47</b>	<b>6.03</b>

# APPENDIX 5

## Water Quality Management Plan

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# North Western Draft River Basin Management Plan



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## Public consultation: give us your views

The proposals in the draft North Western 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?

**This consultation runs from 22 December 2008 until 22 June 2009.**

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 Western River Basin District in December 2009.

### How you can respond to this consultation

We encourage you to participate in this consultation. Please respond online at [www.ni-environment.gov.uk/wfd](http://www.ni-environment.gov.uk/wfd) or send your comments to:

- email [riverbasinplanning@doeni.gov.uk](mailto:riverbasinplanning@doeni.gov.uk)
- post Jo Campbell  
North Western River Basin District  
Northern Ireland Environment Agency  
Water Management Unit  
17 Antrim Road, Lisburn. BT28 3AL
- phone 028 92 623100

## Foreword

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

**River basin planning** takes an integrated approach to the protection, improvement and sustainable use of the water environment, from source to sea. It aims to provide a clean, healthy environment and deliver considerable benefits for all the people of Northern Ireland, in the 21st century. We all depend on our water environment, whether it be as the source of our drinking water, for recreational purposes, for agriculture or as business users. It is in all our interests that we collectively take on the responsibility for its care.

We are already making progress on improving our water environment. However, there is still much that remains to be done against a backdrop of increasing pressure that is due to a changing climate and ongoing development. We also have to overcome the legacy of under-investment in our sewerage system and address some of the impacts of historical land use practices.

A wide range of organisations have come together for the first time to produce a plan that looks at all aspects of water management. This draft Plan has been produced for consultation. Your responses will help to provide the framework for coordinating and integrating the management of the water environment in the North Western River Basin District.

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Roy Ramsay (Dr)  
**Chief Executive**

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## Executive Summary

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

Last year we published a consultation report on the significant water management issues in the North Western River Basin District; we would like to thank all of those who responded. The feedback we received on that consultation has influenced this draft River Basin Management Plan.

The draft Plan has been developed with input from a wide range of statutory agencies, non government organisations, private individuals and companies working together. The plan says where the water environment needs to be protected or improved, the timeframe to make these improvements and how that can be achieved. Feedback received on the consultation on the draft Plan will help in the preparation of the final Plan by December 2009.

The draft Plan has three components:

- this document provides a summary of the draft River Basin Management Plan for the Northern Ireland portion of the North Western International River Basin District. It describes the current condition of the water environment, our objectives for improving it and the measures that we will use to deliver these improvements;
- our website [www.ni-environment.gov.uk/wfd](http://www.ni-environment.gov.uk/wfd) has an interactive map that provides access to information on local water bodies of interest. The website also provides details of the technical work and methodologies used in developing the draft River Basin Management Plan;
- *Managing Our Shared Waters – Working Together – The North Western International River Basin District* is a document outlining the cooperation arrangements between the two jurisdictions, north and south, involved in implementing this Directive in our shared waters.

The water environment is of key importance across a wide spectrum, whether it be as a source of drinking water, recreational use or for use by industry and agriculture. The need for water protection and dealing with water pollution has been recognised for many years and there are a number of European Directives dating back to the 1970s that afford special protection to identified areas by virtue of their importance for nature conservation, economically important species of fish and shellfish, bathing and drinking water supply.

However the Water Framework Directive requires us to assess the water environment in a more holistic manner and consider impacts that go beyond water pollution and look at the impacts of water abstraction and impoundment, physical modifications due to engineering activities and invasive non-native species. It also requires us to ensure that the existing measures and new measures being taken to deal with these impacts are both integrated and coordinated across river basins.

New monitoring programmes and classification systems have been developed and applied for the first time to assess the impacts on the whole water environment, including rivers, lakes, transitional (estuarine) and coastal waters and groundwaters. The initial results for the North Western River Basin District indicate that 39% of the surfacewaters (rivers, lakes, transitional and coastal waters) are classified as good or better and 100% of groundwaters are classified as good.

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

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

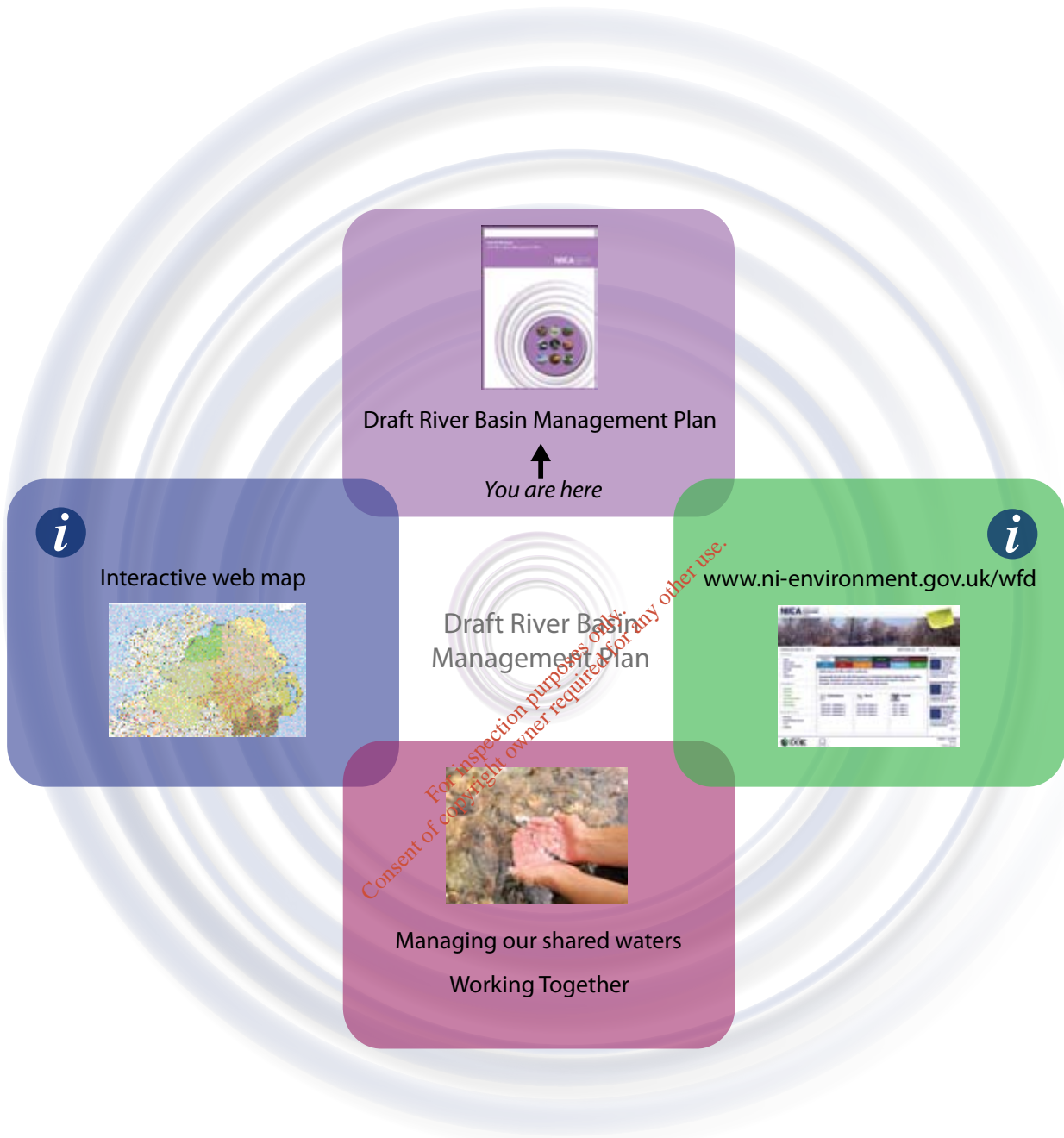
This draft plan sets what are considered to be realistic objectives for the next three river basin planning cycles to 2015, 2021 and 2027.

A programme of measures to deliver these objectives has been drawn together working with a wide range of statutory agencies, non-government organisations, private individuals and companies. The programme takes into account the raft of existing regulatory, economic and voluntary measures as well as identifying new measures that will or could be put in place.

The assessment undertaken for this draft plan indicates that implementation of the programme would result in 85% of the surface waters achieving at least good status by 2015 and 100% of the groundwaters achieving good status by 2015. This would be an overall improvement of 46% for surfacewaters.

Between the draft and final plans work will continue on refining the classification assessments; subsequent review and revision of objectives; ongoing analysis of measures and their effectiveness; development of implementation plans and approaches; and consideration of the consultation responses.

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



We are seeking comments and suggestions about this draft Plan by 22 June 2009.  
The feedback on this draft Plan will help us produce the final Plan by December 2009.



## 1. Introduction

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

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

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

WFD is implemented through river basin planning, which introduces a six-yearly cycle of planning, action and review. Every six years a **river basin management plan** will be produced for each river basin district. In common with the rest of Europe we are currently developing the plan for the period from 2009 to 2015.

The process provides interested parties with opportunities for greater involvement in preparing River Basin Management Plans, and this document is produced as part of that process.

### 1.1 The legal and institutional framework

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

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



*Further details on the competent authorities are available in the **Supporting Documents** section of the website.*

## 1.2 The administrative and technical framework

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

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

The responsible bodies, north and south, are coordinating their water management actions, through a North - South Working Group on Water Quality. This group is supported by the North - South Technical Advisory Group. A project, NS SHARE ([www.nsshare.com](http://www.nsshare.com)), funded under the INTERREG IIIA programme, was set up to enhance the coordination of implementation of the Directive.

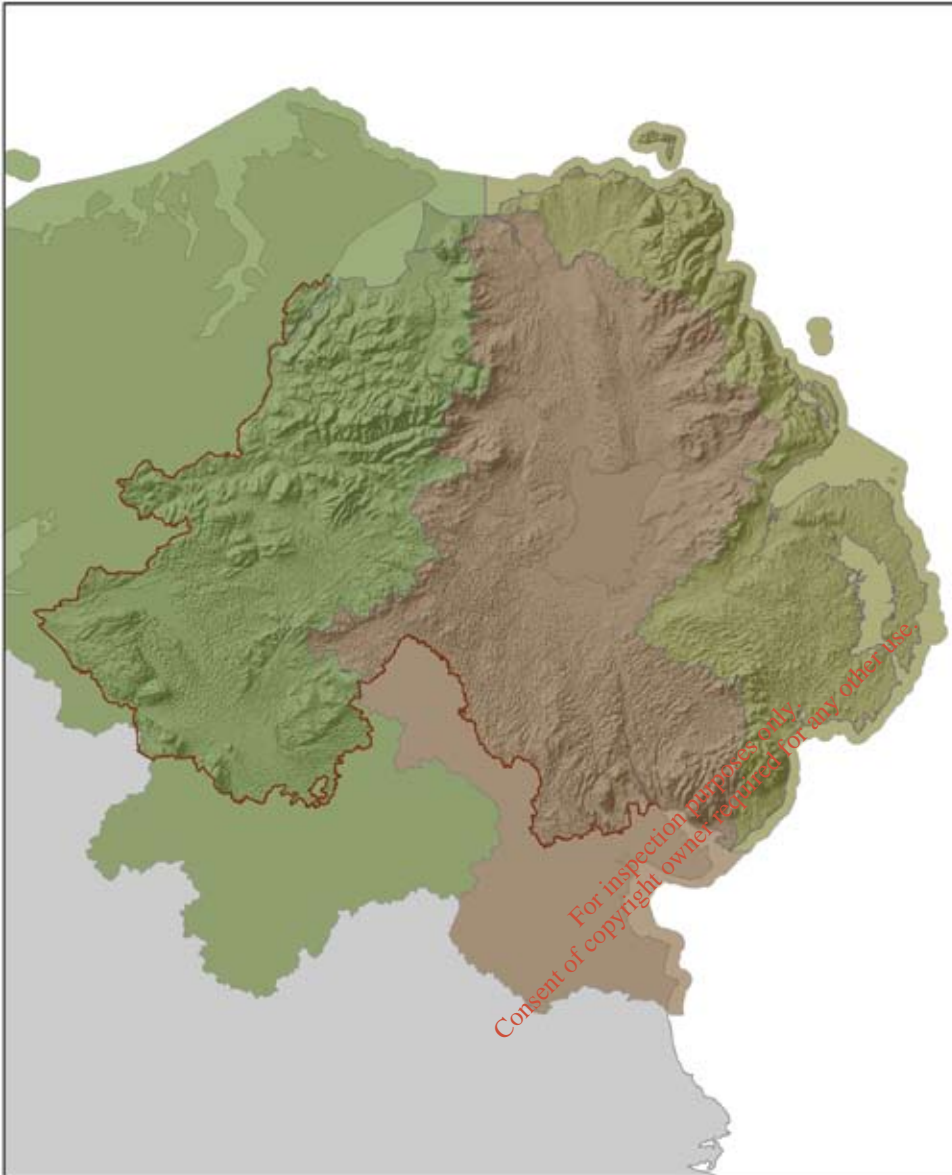
Within the UK, government has set up a number of technical working groups to ensure that the Directive is implemented as consistently as is appropriate within the devolved administrations across the UK. The UK Technical Advisory Group ([www.wfduk.org](http://www.wfduk.org)) is a partnership of the UK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

## 1.3 The draft River Basin Management Plan

The North Western River Basin Management Plan has three components:

- this document is a summary of the draft Plan, which provides an overview of the assessment and proposals for the Northern Ireland portion of the North Western International River Basin District;
- our website [www.ni-environment.gov.uk/wfd](http://www.ni-environment.gov.uk/wfd) has an interactive web map that provides access to information on monitoring, classification, objectives and measures for each river, lake, transitional and coastal water body and groundwater body. The website also provides details of the technical work, methodologies and supporting information used in developing the draft River Basin Management Plan;
- *Managing Our Shared Waters – Working Together – The North Western International River Basin District*, which outlines the cooperation arrangements between the two jurisdictions, north and south, involved in implementing this Directive in our shared waters. It sets out the agreed mechanisms of coordination for implementation of the draft Plan, including objective-setting and programmes of measures. It contains summary data and information for the whole of the North Western International River District.

<sup>1</sup> Where the term "Ireland" is used this is a reference to the Republic of Ireland





You can look at your local water body and read details of technical work and methodologies at [www.ni-environment.gov.uk/wfd](http://www.ni-environment.gov.uk/wfd)

### 1.4 What's in this document

Section 2 of this document provides a brief description of the North Western River Basin District.

Section 3 sets out the current status of our water environment.

Section 4 covers our objectives for improving that environment. For most waters, the improvement is scheduled to be made by 2015, but some improvements will not be made until 2021 or 2027. This longer-term view is important, as it will set the context for the subsequent plans, which will be developed every six years.

Section 5 describes the measures that will be taken to improve all aspects of the water environment and to protect it from deterioration. It takes account of the main pressures identified during the 2007/08 consultation process *Water Matters 'Have your say!' – North Western International River Basin District*. In proposing measures to deal with the pressures, it looks at the sectors contributing to those pressures and identifies the measures that are required to protect and improve the affected water bodies.

Section 6 sets out expected the implications of climate change for the water environment.

Section 7 summarises what will be achieved by the new measures that are proposed. It sets out what will be required to ensure the successful implementation of the plan and its integration with other plans and programmes in Northern Ireland.

Section 8 is a short invitation to participate in the river basin planning process by giving your views.

### 1.5 Assessing the impacts of this plan

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

The draft Plan represents the integration of many existing measures such as the Nitrates Action Programme, Abstraction & Impoundment Licensing and Northern Ireland Water's Capital Works Programme. The costs and benefits of these measures were assessed prior to their introduction, and funding has either already been assigned to them through the current Programme for Government, or will be bid for through the normal Budget process for 2011-2014. An impact assessment identifying the cost and benefits and implications of implementing the additional measures required will be prepared for the final River Basin Management Plan, following the six month consultation on the draft Plans.



More information on strategic environmental assessment report and appropriate assessment is available in the **River Basin Planning** section of the website.

In addition, all proposed public plans and programmes, including the draft River Basin Management Plan, are subject to a strategic environmental assessment under the Strategic Environmental Assessment Directive. This identifies and assesses the wider environmental impacts of plans or programmes. A strategic environmental assessment report, which assesses this Plan and the new measures being proposed, has also been produced for consultation.

In accordance with requirements of the Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 and amending regulations (which transpose the EC Habitats Directive) an appropriate assessment of the implications for Natura 2000 sites has also been carried out and will be finalised for the final Plan in December 2009.

'Natura 2000' sites are a network of protected sites throughout the European Union, which consist of Special Areas of Conservation (SACs) designated in accordance with the Habitats Directive, and Special Protection Areas (SPAs) that are designated in accordance with the requirements of the Birds Directive (Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds).

NIEA and other government departments and agencies have a statutory obligation when carrying out their functions to have regard to the Habitats Directive as required under the Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (as amended). A number of the existing measures set out in Section 5 are subject to this requirement.

## 1.6 Education

Northern Ireland Environment Agency operates an active Schools Education Programme, covering the revised Northern Ireland Curriculum and Education for Sustainable Development (more information on our Schools Education Programme is on our homepage [www.ni-environment.gov.uk](http://www.ni-environment.gov.uk)). During 2009 we will work to integrate the final Plan into our existing Schools Education Programme; in particular providing information on local water bodies as themed Educational Resources, to use at our sites and in the classroom.



NIEA Educators at Roe Valley Country Park



The **Public Participation** section of the website outlines the steps taken to ensure that the draft Plan has been developed through consultation and engagement with interested parties.

### 1.7 Participation in the process

We hope that this draft River Basin Plan will provide you with the information you need to help and support us in improving the water environment in the North Western District.

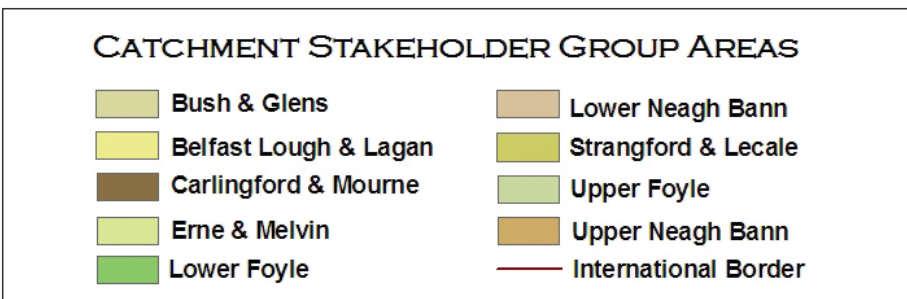
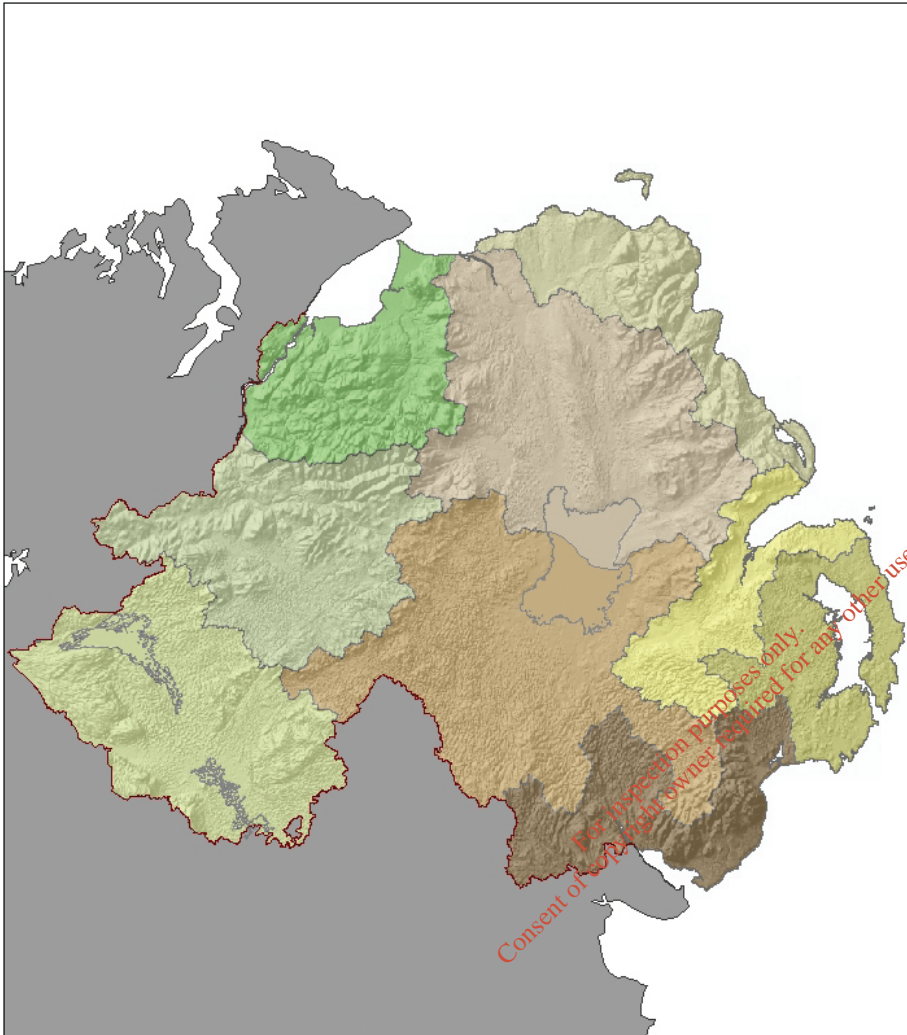
The river basin planning process seeks to involve everyone who is interested in, or may be affected by, the water environment and the way it is managed. The production of the draft Plan has been coordinated by the Northern Ireland Environment Agency but has involved a wide a range of organisations that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

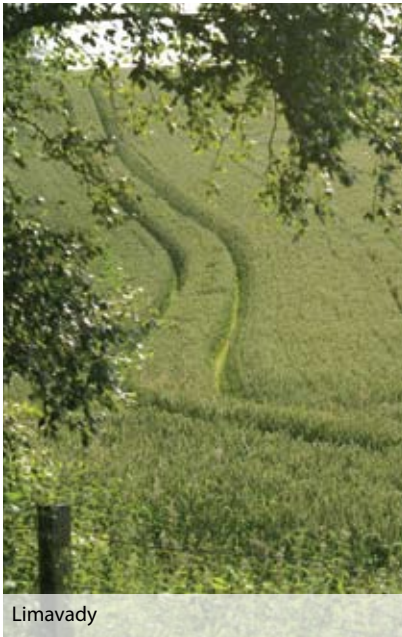
Northern Ireland has a layered approach to consultation and public involvement, based on a Northern Ireland WFD Stakeholder Forum, which is linked to a network of nine Catchment Stakeholder Groups. The Groups include representatives from agriculture, businesses, planning authorities, environmental organisations and other water users. They provide a forum for anyone interested in local water issues to raise their concerns with, and have them addressed by, both statutory agencies and non-governmental organisations at a local level. The North Western River Basin District includes the Lower Foyle, Upper Foyle and Erne and Melvin Catchment Stakeholder Groups (Map 2).

You can continue to participate in the river basin planning process on-line or by responding to this consultation using the details given in Section 8.

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**Map 2: Northern Ireland Catchment Stakeholder Group Areas**





Limavady

## 2. About the North Western River Basin District

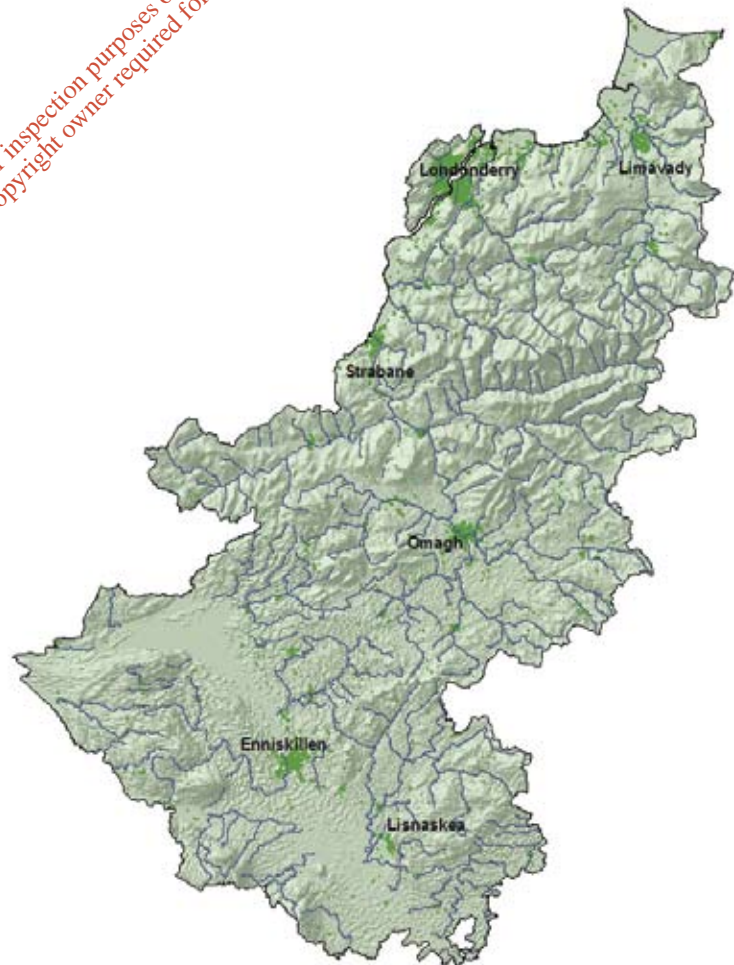
The North Western River Basin District (Map 3) covers around 4,900km<sup>2</sup>. It takes in large parts of County Fermanagh, County Londonderry and County Tyrone.

The district is very mountainous, with the Sperrins in the east, and this nature contributes to the low average population density in the District. Most of the main urban areas — Londonderry/Derry, Enniskillen, Omagh and Strabane — are located beside rivers. In rural areas, many people live in small villages or single dwellings. The growing population increases pressure on the systems that deliver drinking water and treat wastewater.

Agriculture is an important activity, particularly in the fertile soils of the Foyle and Erne basins which support beef, dairy, sheep and pig farming as well as crop cultivation. In the mountainous areas there are many coniferous forest plantations with some sheep and cattle grazing.

### Map 3: North Western River Basin District

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## 2.1 Surface waters

The principal **river systems** are the Foyle, with its tributaries the Mourne, Derg, Strule and Finn Rivers, and the River Erne which drains the uplands of Cavan, Fermanagh and Monaghan.

There are many **lakes** throughout the area including Upper and Lower Lough Erne, Lough Melvin and Lough MacNeaen.

Our **transitional and coastal waters** extend from the limits of the transitional waters inland out to one nautical mile from baseline. For open coast, that baseline is the low water mark, while for sea loughs the baseline is a series of closing lines across the entrances to the loughs. Lough Foyle is the main coastal water in the North Western District.

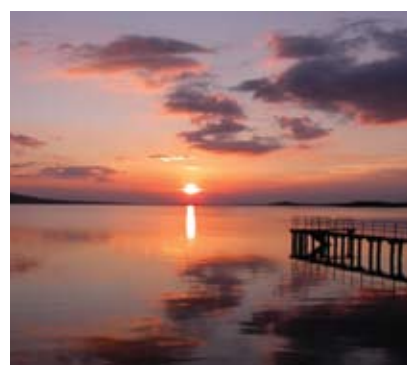
## 2.2 Groundwater

Although, the importance of **groundwater** as a public supply source has diminished, there is still abstraction from a number of bedrock aquifers in the south of the District. However, groundwater is an important source for industrial, agricultural and domestic use and abstraction occurs throughout the North Western areas from both sand/gravel aquifers and the bedrock aquifers. These aquifers still represent an important strategic resource that requires management and protection.

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River Roe



Lough Melvin



Groundwater

GSNI



A register of Protected Areas is available on the **Protected Areas** section of the website.



Stakeholders can read more about their local water environment in the following management areas; Roe, Faughan, Burn Dennet and Foyle, Derg and Mourne, Strule, Lower Lough Erne, Upper Lough Erne, and Arney and Swanlinbar on the **River Basin Planning** section of the website.



Key documents relating to the economic value of our water environment are available in the **Supporting Documents** section of the website.



Monawilkin

MH

### 2.3 Protected areas

The District supports important habitats and wildlife, including areas identified as requiring special protection under existing national or European legislation. These areas need action to protect their surface water or groundwater, or to conserve habitats or species that directly depend on these waters. There are more than 170 river reaches designated for salmonid species. The area also supports 27 water dependent Special Areas of Conservation and 4 water dependent Special Protection Areas.

### 2.4 Heavily modified water bodies

The WFD recognises that some water bodies will have changed to such a degree that they can no longer be restored to their original condition without compromising their current use. For example, some waters have been deepened to allow for navigation; others have flood defences or have been dammed to provide a source of drinking water. They are called **heavily modified water bodies** and within the North Western River Basin District we have 15 of them: 11 rivers, 3 lakes and 1 transitional water. The rivers include reaches of the Erne, Strule, Mourne, Skeoge and Faughan systems. The lakes include Lough Erne and Castleume. The transitional waters are the Foyle and Faughan estuaries.

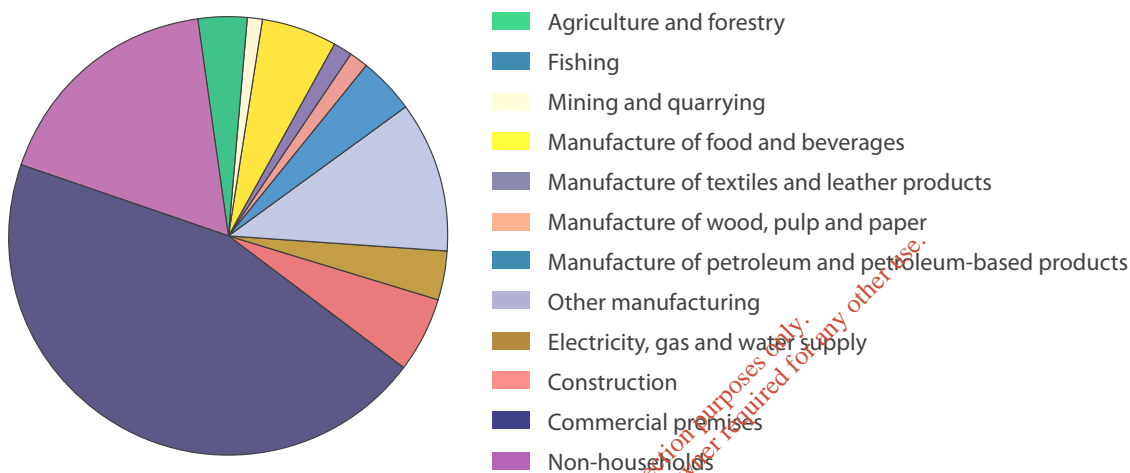
### 2.5 The economic value of our water environment

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

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

### Gross Value Added by sector in Northern Ireland

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



**Figure 1 Gross Value Added by sector in Northern Ireland**

Source: 2005 Article 5 Economic Analysis Summary Report, Entec 2004 and National Statistics Office.

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

It is planned to update the information in the 2005 Article 5 Economic Analysis Summary Report in time for the publication of the final River Basin Plan in December 2009.



Monitoring information is available in the **Supporting Documents** section of the website. The locations of monitoring stations can be viewed geographically on the **website**.



Marine Monitoring



Lake Monitoring



The UK Technical Advisory Group guidance, and accounts of how it has been used to classify surface, ground and heavily modified water bodies in the North Western District, can be read in the **Quality of Our Water Environment** section of the website.

### 3. Assessing the quality of our water environment

In 2005, we published on-line designations of water bodies and risk assessments for various pollutants and other pressures. Our understanding of the state of Northern Ireland's water environment has developed as we have adapted to the requirements of the WFD. That is partly because of the information we have gained from our monitoring network; it is also because, in the past, we looked mainly at chemical pollution, whereas the WFD requires us to look at both ecological and chemical quality, as well as all the pressures that can affect them.

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

#### 3.1 Classifying the status of water bodies

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

In classifying surface waters and groundwater, we followed the guidance of the UK Technical Advisory Group. It recommended what should be included in classification and how data — including data on ecological and chemical quality — are combined and presented. The classification standards used are consistent across the UK and Northern Ireland Environment Agency has been working with Ireland and other Member States to try to ensure Northern Ireland classification schemes are comparable with those of Europe.

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

### 3.2 Surface water classification

The ecological quality of surface waters reflects:

- biological quality elements (invertebrates, plants and fish);
- general chemical and physicochemical quality elements (toxic substances - referred to as priority substances and priority hazardous substances - nutrients, dissolved oxygen, temperature and pH);
- hydromorphological quality elements (water flow and physical modifications).

The draft Plan shows what quality elements have been included and explains why others have been omitted and what further information can be provided for the final plan.

Slightly different rating systems were used for rivers, lakes and transitional and coastal waters; that was to take account of factors like the ecological differences between free-flowing and standing waters.

For each water body, the ecological quality elements were rated individually. Chemical quality was determined by the levels of certain hazardous and dangerous chemicals. The ecological and chemical results were combined to give an overall status in one of five classes: **high**, blue **good**, green **moderate**, yellow **poor**, orange or **bad**, red. If a water body is classified a high or good status then it has a healthy ecology, which deviates only slightly from natural conditions; is an important natural heritage asset and can support a wide range of uses such as recreation, fishing and drinking water supply. If a water body is classified as moderate, poor or bad then the ecology is adversely affected and the range of uses that can be supported is reduced.

The initial classification results, prior to consideration of heavily modified water body designation, indicate 39% of waters in the North Western District are at good or better. The remaining 59 % of water bodies are classified as less than good with the remaining 2% yet to be assessed. The results are illustrated in Figures 2, 3 and Table 1.

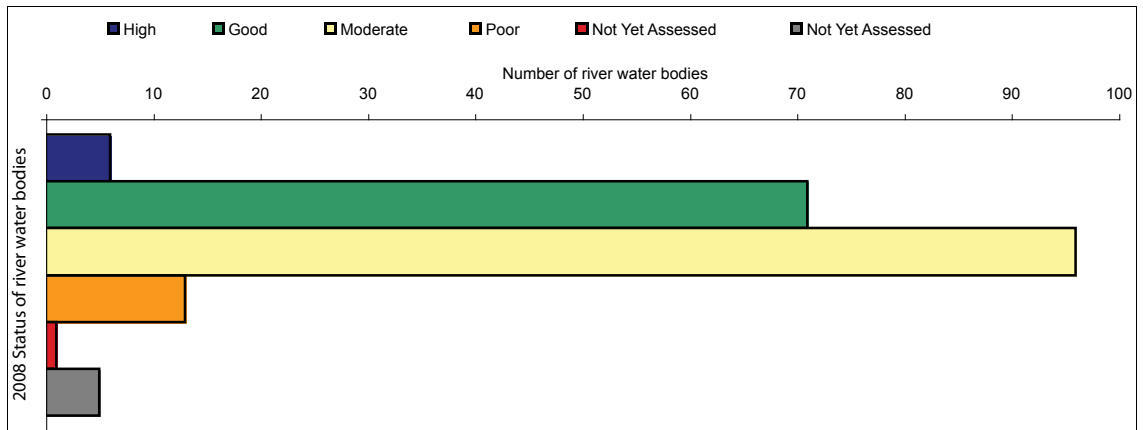


Figure 2: Overall Status for River Water Bodies in the North Western River Basin District – 2008

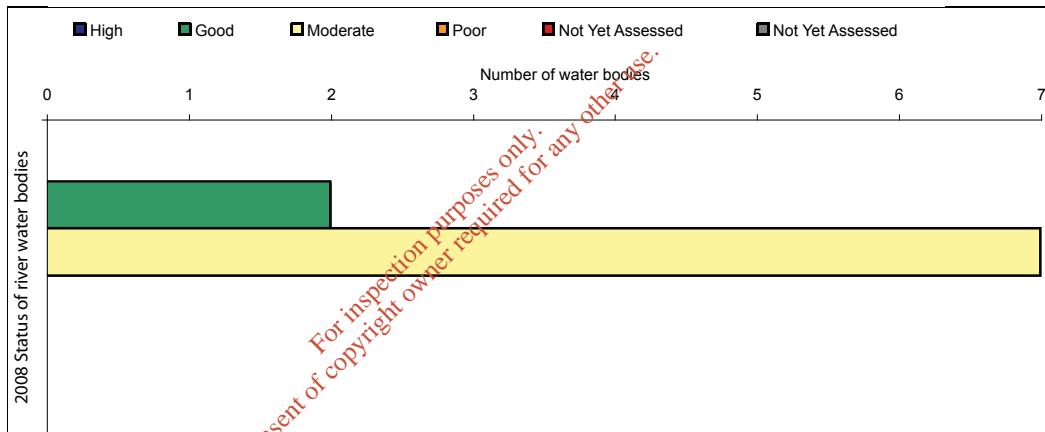


Figure 3: Overall Status for Lake Water Bodies in the North Western Basin District – 2008

Table 1: Overall Status for Coastal and Transitional Water Bodies in the North Western Basin River District – 2008

	Unit: Number of water bodies	
	Coastal	Transitional
<b>High</b>	0	0
<b>Good</b>	0	0
<b>Moderate</b>	1	2
<b>Poor</b>	0	0
<b>Bad</b>	0	0
<b>Not Yet Assessed</b>	0	0

### 3.3 Groundwater classification

We assessed groundwater bodies by looking at the main land-use pressures that we thought might be affecting them: they included chemical (diffuse and point sources) and quantitative (water abstraction and quarry dewatering) pressures. Using the monitoring data from 2000 to 2006, we considered:

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

Groundwater bodies are assigned to either good status or poor status, for chemical quality and water quantity. Results for the North Western District are illustrated in Figure 4.

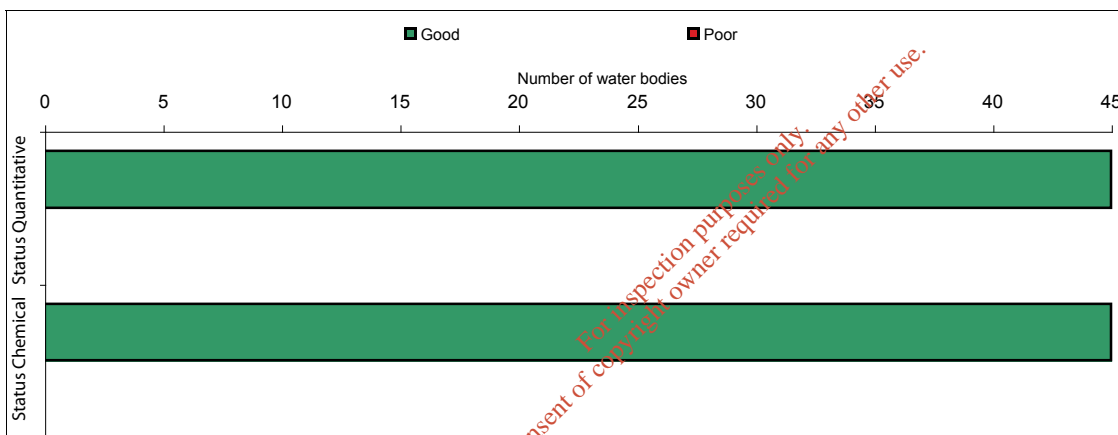


Figure 4: Quantitative and Chemical Status for Ground Water Bodies in the North Western Basin District – 2008

### 3.4 Heavily modified water bodies

There are only two classes for the status of heavily modified water bodies:

- good ecological potential or better;
- moderate ecological potential or worse.

If a water body is classified as of good ecological potential or better, existing mitigation measures will ensure that the hydrology and morphology are maintained in as good a condition as is possible without compromising the use. Where a water body is classified as of moderate ecological potential or worse, the existing mitigation measures do not maintain hydrology or morphology in as good a condition as possible.



Further information on your local water environment is available in the **Quality of Our Water Environment** section of the website. The quality of individual water bodies can be viewed on the **interactive web map**.

The assessment of ecological potential is new for Northern Ireland. We began by assessing all water bodies using the standard classification for surface waters; that gave us a good understanding of the quality elements of each water body. Then, to help us decide which class each heavily modified water body belonged to, we hosted a series of workshops with expert participants from organisations including Waterways Ireland, Rivers Agency, Northern Ireland Water and Loughs Agency. These workshops addressed river and lake water bodies. A review for heavily modified coastal and transitional water bodies will be completed in 2009. We will work with stakeholders to review the classification results prior to the final Plan at the end of 2009, with the aim of reducing uncertainties.

The initial classification results for heavily modified water bodies indicate that 20% of heavily modified waters in the North Western River Basin District are at good ecological potential or better. The remaining 80% of heavily modified water bodies are classified as moderate ecological potential or worse. The results are illustrated in Figures 5 and 6.

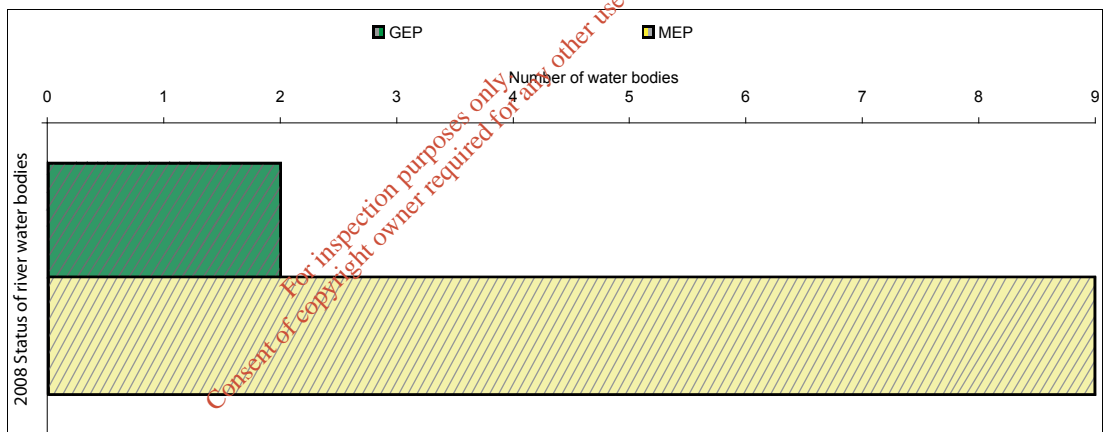


Figure 5: Overall Status for Heavily Modified River Water Bodies in the North Western River Basin District – 2008

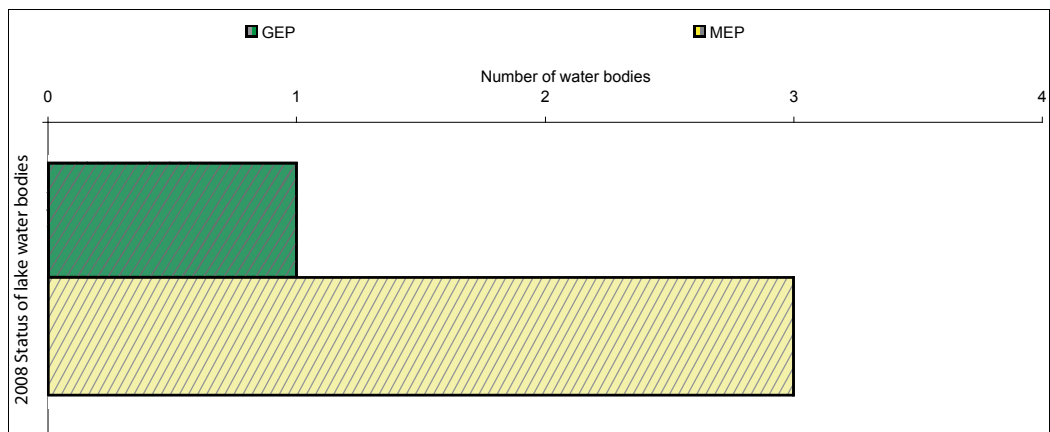


Figure 6: Overall Status for Heavily Modified Lake Water Bodies in the North Western River Basin District – 2008



### 3.5 Condition of our protected areas

Most protected areas relate to areas identified for protection under other legislation and have their own monitoring and assessment requirements to determine their condition. Bringing the management of the water environment of these areas into the framework of the river basin planning process will help us streamline our monitoring and assessment work and integrate their protection into the wider management of the river basin and is a requirement of the WFD. Table 2 lists the type and number of protected areas within the North Western River Basin District.

Table 2: Summary of the condition of our protected areas in the North Western River Basin District

Protected Area Type	Number of Areas	
<p><b>Waters used for the abstraction of drinking water (drinking water protected areas)</b> This is a new category of protected area which replaces the system of drinking water protection previously provided by the Surface Water Abstraction Directive (75/440/EEC) and will also incorporate groundwaters.</p>	61	
<p><b>Areas designated to protect economically significant aquatic species</b> These are protected areas established under earlier European directives aimed at protecting shellfish (79/923/EEC) and freshwater fish (78/659/EEC).</p>	180	
<i>Compliance with Freshwater Fish Directive</i>	Pass	Fail
Rivers	1492km (89%)	189km (11%)
Lakes	149km <sup>2</sup> (100%)	
<i>Compliance with Shellfish Waters Directive</i>	Number of areas (percentage)	
Mandatory Standards	1 (50%)	
Guideline Standards	1 (50%)	
<p><b>Recreational Waters (bathing waters)</b> These are bathing waters designated under the Bathing Water Directive (76/160/EEC).</p>	3	



Whopper Swan JD



Fen Violet RA



Otter

<i>Compliance with Bathing Waters Directive</i>	Number of bathing waters (percentage)
Excellent Standard	1 (33%)
Good Standard	2 (67%)
Poor Standard	0 (0%)
<b>Nutrient Sensitive Areas</b> Areas designated as sensitive under the Urban Waste Water Treatment Directive (91/271/EEC). A total territory approach has been adopted in Northern Ireland for the Nitrates Directive (91/676/EEC).	5
<b>Areas designated for the protection of habitats or species (Natura 2000 sites)</b> These are areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection. These are designated under the Birds Directive (79/409/EEC) and the Habitats Directive (92/43/EEC).	31
<i>Compliance with Habitats Directive</i>	Number of areas
Favourable	1
Unfavourable	23
Not Yet Assessed	3
<i>Compliance with Birds Directive</i>	Number of areas
Favourable	1
Unfavourable	2
Not Yet Assessed	1

A summary of the current situation with the compliance of these sites with their associated standards and objectives is provided below, where appropriate.

### Drinking water protected areas

Drinking Water Protected Areas have been identified within which public and private abstractions from surface and groundwaters must be protected. This supersedes the obligations of the Surface Water Abstraction Directive. Northern Ireland Environment Agency will work with Northern Ireland Water to assess risks to protected areas serving large public water supplies.

## Protected Areas for economically important species

### Freshwater Fish

Areas designated under the EC Freshwater Fish Directive (78/659/EEC) for the protection and improvement of freshwaters to support fish life imposes standards for the protection of game (salmon and trout) and coarse fisheries. Under the Directive (78/659/EEC), some 1681 km of rivers and canals and 149 km<sup>2</sup> standing waters (lakes and reservoirs) greater than 50 hectares in area have been designated in the North Western River Basin District, as either salmonid (suitable for game fish) or cyprinid (suitable for coarse fish).

The Designated waters are required to comply with imperative quality standards and endeavour to respect the guide standards. Compliance is assessed annually using monitoring results for the calendar year and summarised in Table 2.

### Shellfish Waters

Shellfish waters are designated as 'shellfish growing waters' under the Shellfish Waters Directive (79/923/EEC) in order to ensure a suitable environment for shellfish growth.

Mandatory and guideline standards are laid down in the Directive and monitoring is carried out at various frequencies depending upon the parameter being assessed. The assessment has been made against the WFD standards where available. In the North Western River Basin District 2 areas have been designated as Protected Areas. The summary compliance figures for 2006 are given Table 2.

The Department of Environment Northern Ireland is currently undertaking a review of the areas designated under the Shellfish Waters Directive and a consultation document has been published on proposed additional designations. This consultation process closes on 6th February 2009.

### Recreational water protected areas (bathing waters)

Bathing Waters are areas protected for use as recreational bathing and must meet mandatory and guide standards for microbacteriological quality in order to protect human health. Compliance with the guideline standard is represented by excellent quality and waters that comply with the mandatory standard by good quality. Those bathing waters that fail to comply with the mandatory standard are recorded as poor and this constitutes a failure of the Bathing Water Directive. In the North Western River Basin District there are 3 identified bathing waters. Compliance figures for 2008 are given in Table 2. The failures are all due to not meeting standards for faecal coliforms.





Further information is provided in the **Protected Areas** section of the website.

### Nutrient sensitive Protected Areas

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

A total territory approach has been adopted in Northern Ireland under the Nitrates Directive. In the North Western River Basin District 5 areas have been designated as sensitive under the Urban Waste Water Treatment Directive.

### Natura 2000 sites

Natura 2000 sites are a network of European sites designated for species or habitats of international conservation importance. These are designated as Special Protection Areas (under the birds Directive (79/409/EEC) and Special Areas of Conservation under the Habitats Directive (92/43/EEC) and are assessed by the Northern Ireland Environment Agency as to whether they are in favourable condition or unfavourable. In the North Western River Basin District 4 Special Protection Areas and 27 Special Areas of Conservation have been designated.

Those areas that are in unfavourable condition require further assessment as to whether the cause is known to be a consequence of pressures on the water environment or the cause is uncertain but may be related to water environment pressures. It is envisaged that this analysis will be completed by 2009 for the final Plan.

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## 4. What we plan to achieve by 2015 and beyond

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

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

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

### 4.1 Our starting point

We based our draft objectives on the draft classification results for 2008 that are based on the environmental standards developed through the UK Technical Advisory Group. The draft classification results for the North Western River Basin District show that 79 out of 204 natural surface waters (39%) and all 45 groundwater bodies are already achieving the standards required for good status or higher. These waters will be managed to ensure that we continue to protect them from any deterioration.

In the North Western River Basin District, 120 out of 204 of our surface water bodies (59%) are below good status. That limits the uses to which they can be put for social and economic development. Objectives have therefore been set to improve the quality of these waters over the life time of the plan. Sometimes deterioration in water quality has a single major cause but often many different factors are interlinked and require detailed investigation. However, we are confident that, through the implementation of the Plan, enhancements will be carried out and further improvements towards good status will be possible. Such improvements will benefit the natural environment and our quality of life as well as supporting other water uses that will encourage economic development and recreational use.

A small number of river water bodies have not yet been assessed; work is continuing to assess them. However, interim environmental objectives have been set for those water bodies based on the assumption that, unless there is clear evidence of impact, it is considered that they should achieve good status by 2015. Objectives for these water bodies will be reviewed for the final Plan.

## 4.2 Alternative Objectives

The WFD recognises that achieving good status for surface water bodies may not be possible within the first cycle for the following reasons:

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

In such cases, as long as the water body is not allowed to deteriorate, the necessary improvements can extend over several planning cycles. Where possible, we have extended deadlines (to 2021 or 2027) rather than setting less stringent objectives (see below), as all objectives will be reviewed in each subsequent planning cycle.

There are other exceptions where alternative objectives can be set. This includes the establishment of the less stringent objective referred to as 'good ecological potential' where a water body is designated as heavily modified. A description of good ecological potential has been provided in Section 3.

## 4.3 How we set the draft Plan's objectives

We have tried to be both ambitious and realistic in setting environmental objectives. To determine the expected level of improvement we applied the principle that each water body should be improved by at least one class in each six-year river basin planning cycle. In summary:

- where a water body was classified as moderate in 2008, the objective for 2015 should be good status;
- where a water body was classified as poor in 2008, the objective for 2015 should be moderate status, reaching good status by 2021;
- some water bodies were classified as bad in 2008. We did not think that raising them just to poor by 2015 was sufficient. If feasible, the objective was moderate status by 2015, reaching good status by 2021. If not feasible, the objective was good status by 2027.

Our objectives are also influenced by measures that are certain to be implemented in the next three years, which is the period covered by the current Programme for Government.

## 4.4 Checking the objectives

The next stage was to subject the draft objectives to expert review within the Northern Ireland Environment Agency through a series of workshops. The review took into account the monitoring information available as well as known impacts and improvements occurring in each water body.

The review was used to refine the objectives and establish whether good status could be achieved by 2015 or if an alternative objective applied. In some situations, there may be a need for further investigation, to gain a

better understanding of how to tackle problems and to examine different options for cost-effective solutions or approaches.

#### 4.5 Our draft environmental objectives

##### What will we achieve by 2015 and beyond?

We believe that we will be able to achieve good status, or better, in 173 out of 204 of our surface water bodies (85%) and all (45) of our groundwaters (100%) by 2015.

We have identified 31 surface water bodies where it will be more feasible and cost-effective to implement actions over a longer period of time.

We believe that, by 2021, taking into account further improvements in managing and protecting our waterways, we will achieve the objectives set out for each water body in Figures 7 to 11, and Table 3.

We also believe that, by 2027, all water bodies will be meeting good status.



Information on the environmental objectives for individual local water bodies in the North Western can be viewed on the **Interactive Web Map**.

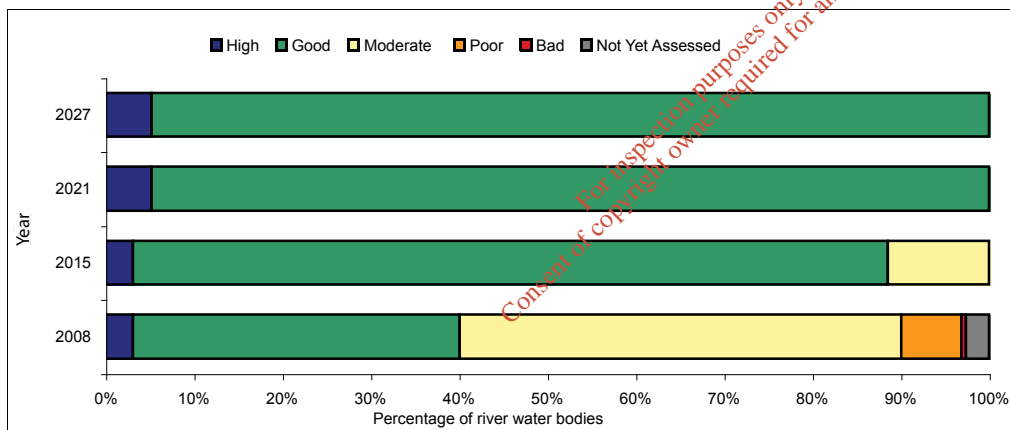


Figure 7: Current Status and Proposed Objectives for River Water Bodies in the North Western River Basin District 2008-2027

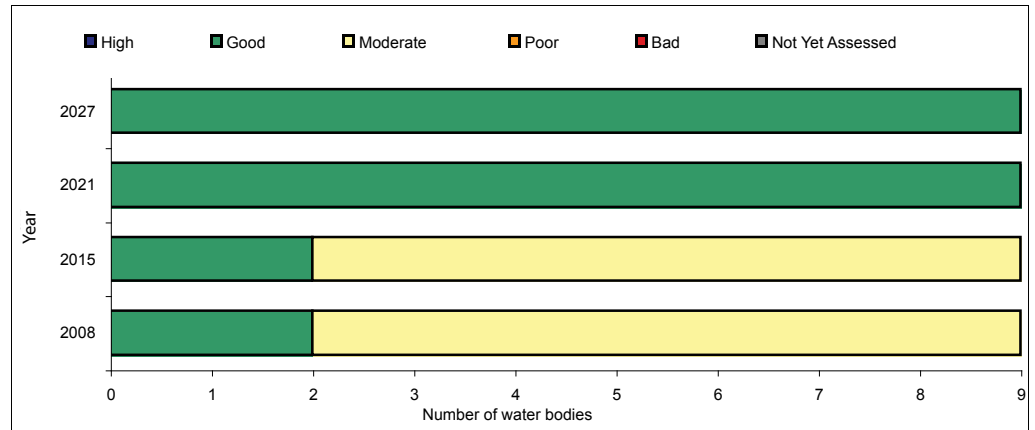


Figure 8: Current Status and Proposed Objectives for Lake Water Bodies in the North Western River Basin District 2008-2027

Table 3: Current Status and Proposed Objectives for Coastal Water Bodies in the North Western River Basin District 2008-2027

	Unit: Number of water bodies			
	2008	2015	2021	2027
<b>High</b>	0	0	0	0
<b>Good</b>	0	0	1	1
<b>Moderate</b>	1	1	0	0
<b>Poor</b>	0	0	0	0
<b>Bad</b>	0	0	0	0
<b>Not Yet Assessed</b>	0	0	0	0

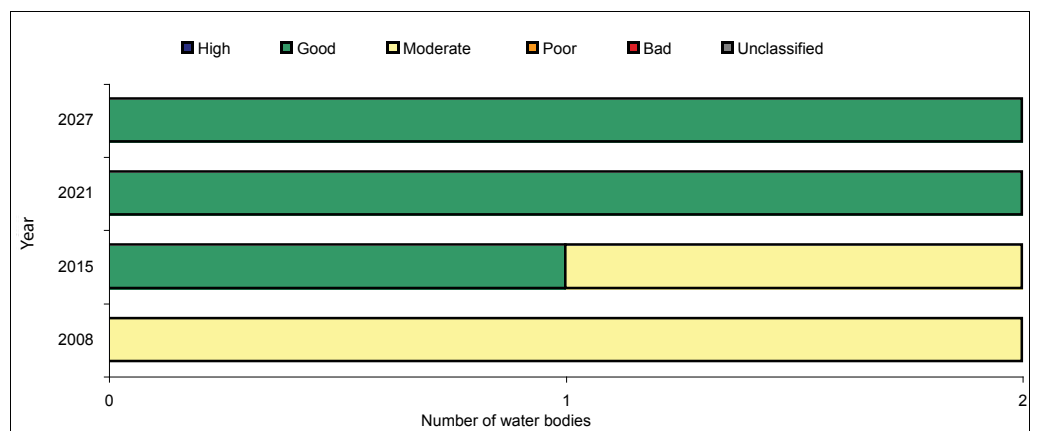


Figure 9: Current Status and Proposed Objectives for Transitional Water Bodies in the North Western River Basin District 2008-2027



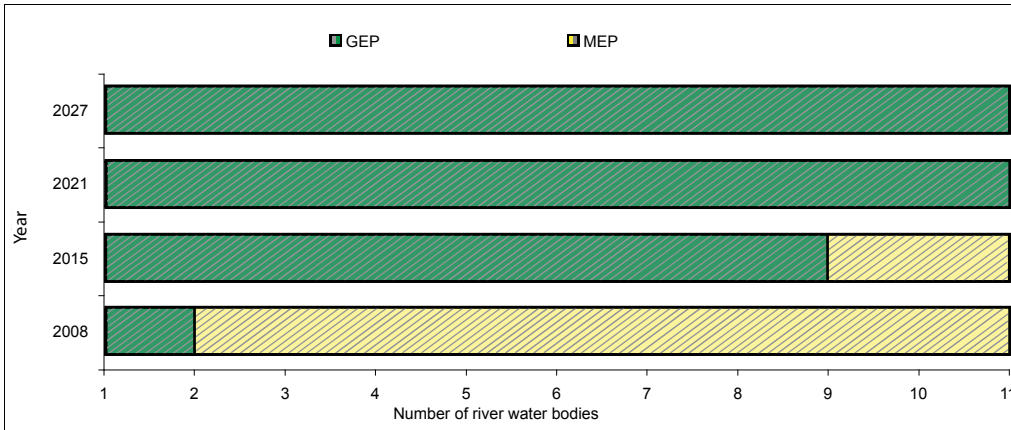


Figure 10: Current Status and Proposed Objectives for Heavily Modified River Water Bodies in the North Western River Basin District 2008-2027

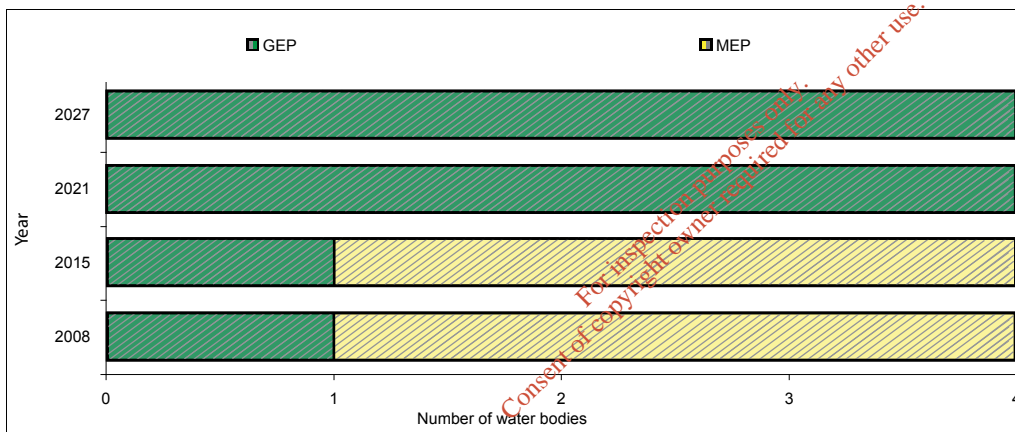


Figure 11: Current Status and Proposed Objectives for Heavily Modified Lake Water Bodies in the North Western River Basin District 2008-2027



*Further information on protected areas and their objectives/standards is provided in the **Protected Areas** section of the website.*

#### **4.6 Objectives for protected areas**

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

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## 5. The programme of measures we will use to achieve environmental objectives

Our environmental objectives set out what we want to achieve; the next step is to work out how we're going to do that. Developing a programme of measures to ensure the environmental objectives are met is central to the river basin planning process. A **measure** includes:

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

There are two types of measures:

- **no-deterioration measures** are intended to prevent deterioration in water body status;
- **improvement measures** are intended to improve the status of water bodies or the condition of protected areas.

### No-deterioration measures

These measures are often on-going actions to ensure existing water uses are appropriately managed and that the water environment remains at good status. No deterioration measures may be achieved by perhaps observing best practice or implementing existing licence conditions. It is these, often unnoticed, actions that are carried out by land and water managers and represent a significant contribution to ensuring the quality and quantity of the water environment by:

- preventing a water body from deteriorating from its current status, including mitigating the impacts of new pressures;
- preventing any deterioration in the condition of protected areas.

Where there is a potential new impact, such as a housing development, no-deterioration measures can often counteract possible negative pressures, for example by increasing the treatment capacity of a wastewater treatment works

### Improvement measures

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



Silage Cutting



Bannagher Reservoir

MH



Lough Erne

MH

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## Existing and new measures

The measures already available, including regulatory mechanisms and public funding, contribute significantly to preventing deterioration and to improving the condition of the water environment. Some of these measures are associated with other European directives (e.g. the Urban Waste Water Treatment Directive) but also contribute to achieving the Water Framework Directive objectives. These measures have been identified in this draft Plan.

Where existing measures will not deliver the required level of protection or scale of improvement, new measures have been identified. These new measures include actions undertaken by Northern Ireland Environment Agency together with a wide range of Government Departments, agencies and other organisations.

## Programme of Measures – A Summary

River basin planning requires us to consider all types of pressures affecting the water environment. We have developed a programme that addresses the key pressures and sets out:

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

We can achieve the greatest gain by concentrating our efforts on those issues that pose the greatest threat to our water environment. The significant water management issues report, *Water Matters 'Have Your Say' – North Western International River Basin District*, highlighted the key pressures in this river basin district. These issues have previously been agreed with our stakeholders to be the most significant. In summary the pressure types are:

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



Zebra Mussels

We have identified key sectors for each pressure type as summarised below:

Significant Water Management Issues - Pressures	River Basin Management Plan - Pressures	Key sectors
<ul style="list-style-type: none"> <li>Wastewater and industrial discharges</li> <li>Landfills, quarries, mines and contaminated land</li> <li>Agriculture</li> <li>Wastewater from unsewered properties</li> <li>Forestry</li> <li>Usage and discharge of dangerous substances</li> <li>Physical modifications</li> <li>Abstractions</li> <li>Local issues (invasive alien species)</li> </ul>	Abstraction and flow regulation	5.1 Water supply Hydropower Flood Control
	Diffuse and point source pollution	5.2 Agriculture 5.3 Collection & Treatment of Sewage 5.4 Urban development 5.5 Forestry 5.6 Industry & Other Business 5.7 Waste
	Freshwater Morphology	5.8 Historical Engineering, Urban Development, Public Water Supply, Hydropower, Agriculture, Forestry
	Marine Morphology	5.9 Ports & Harbours, Aggregate & Fishing / Aquaculture Industry
	Invasive Alien species	5.10 All Sectors
	All	5.11 Fisheries

Production of the draft Plan has identified progress towards meeting the WFD environmental objectives. However, it has shown that there are gaps in measures to manage key pressures, as a result of which we may not be able to fully achieve good status until 2027. The objective setting process indicates that the following environmental problems in particular need additional measures to reduce their impacts:

- nutrient enrichment in our rivers, lakes, and estuaries;
- changes to the physical habitat of rivers and barriers to fish migration;
- invasive non-native species.

Recognising the need to ensure that Northern Ireland makes further progress towards meeting our WFD obligations over this and subsequent cycles, environmental policy will have to evolve to take into account:

- increasing evidence as to the best course of action to sustainably manage the water environment and address the most significant pressures;
- cost-effective and proportionate action that could address the most significant pressures.



Further information is available in the **Programme of Measures** section of the website.

Other Northern Ireland policy initiatives, such as the marine, coastal planning and flooding related legislation, will also enhance the management of the water environment.

Some of the potential new measures which are under consideration in this draft Plan include:

- the introduction of phosphate free detergents at a UK level to help reduce overall phosphate loadings;
- development of an extended regulatory toolkit for addressing diffuse pollution;
- the need to prioritise work on catchments where diffuse pollution may cause failure against WFD standards and protected area obligations by 2015, 2021 or 2027;
- the development of a restoration policy framework to implement remedial works that could where appropriate move water bodies downgraded by historic engineering impacts to good status under WFD;
- prevent the spread of invasive non-native species which could downgrade water bodies from good status under the WFD.

In the following programme we have not attempted to include every piece of legislation and guidance applicable to each sector. Instead we have highlighted only the key legislation and guidance.

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## Pressure Type: ABSTRACTION AND FLOW REGULATION

### 5.1 Key Sectors: WATER SUPPLY, HYDROPOWER & FLOOD CONTROL

#### 5.1.1 Introduction

Abstraction refers to the process where water is removed from a surface water or groundwater body, either permanently or temporarily (for example, water can be temporarily diverted and then returned elsewhere within the same system). Abstraction of water can be by a number of means such as pumping, piping, diverting water into a reservoir, or by sinking a borehole or well. In Northern Ireland we abstract water for public drinking water supply, industrial use, use in the food and drink industry, hydro-power generation, agricultural and agri-industry use, recreational use (such as golf courses) and for use in fisheries.

In Northern Ireland, 99% of the drinking water supply is provided by Northern Ireland Water (formerly Water Service). Approximately 786,000 domestic and commercial properties in Northern Ireland are connected to the public water supply and each day Northern Ireland Water (NIW) supplies approximately 625 million litres of drinking water to customers. The main sources of this public water supply are reservoirs (48%) and loughs (40%). Rivers and groundwater each supply 6%. Rising demand (due to population growth) and the impact of climate change may mean that some areas will experience a reduction in the available water resource in the future.

The assessment of hydrological impacts is based upon the use of condition limits for rivers, lakes and estuaries developed by the UK Technical Advisory Group (UKTAG). These condition limits have been set for each status class on the basis of the best available information on ecological impacts as recommended by UKTAG. In order to assess whether a condition limit has been exceeded, the Northern Ireland Environment Agency (NIEA) undertakes water balance calculations, this includes both known abstractions and discharges, to determine the degree of change from modelled natural river flows or lake levels.

In the case of groundwater, the surface water condition limits are also used for determining whether groundwater abstraction is sustainable where there is a connection between groundwater and surface waters. In addition consideration is also taken of the overall level of abstraction compared with how much water is replenishing the groundwater body, the effect of abstraction on nearby dependent ecosystems and whether saline intrusion is occurring.

Abstraction and flow regulation for water supply accounts for 90% of the impacts upon hydrology in river water bodies. The remaining 10% of water bodies are affected by a range of sectors including flood control and manufacturing industries. For some surface water bodies, abstraction of groundwater within the catchment, which reduces baseflow to the surface water body, can be a contributory factor to the failure.

Abstraction and flow regulation for water supply accounts for 89% of the impacts upon hydrology in lakes. The remaining 11% of water bodies are affected by flow regulation impacts.

The main issues identified for groundwater bodies relate to local impacts on dependent river water bodies and overall balance between abstraction and recharge.

#### 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" (GES), the environmental objective for HMWBs is 'good ecological potential' (GEP), which has to be achieved by 2015. Some of these HMWBs have been designated because they have a specified use for drinking water storage for public supply. These designated water bodies will

require mitigation measures that maximise their ecological potential, as opposed to 'restoring' the natural condition.

NIEA has held a series of workshops with relevant agencies and stakeholders to define ecological potential of the designated HMWBs. A 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' (MEP) or worse is assigned. Work to further develop the indicative list of measures will be undertaken over the next year with stakeholders and operators. 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.

### 5.1.2 What causes the environmental impact?

Over abstraction or changes in flow regulation within a water body may lead to a reduction of water levels in rivers, lakes, wetlands and wells. This can lead to increased risk of pollution through reduced dilution and stress or mortality of fish and/or invertebrates. Over abstraction of water can result in making water supplies unsustainable and can have a negative impact on aquatic plants and animals and wetland areas. In extreme cases rivers beds may dry up, lake shores can become exposed and high levels of groundwater abstraction can draw polluted or saline water into aquifers compromising their long-term use. Stable flows below some dams may lead to sedimentation of fish spawning areas which are no longer cleaned out by spates.

The classification data shows that 9% of our surface waters are failing because of impacts upon hydrology associated with low flows, lowering of levels caused by abstractions or the regulation of flows down stream of reservoirs. For some surface water bodies, abstraction of groundwater within the catchment, which reduces baseflow to the surface water body, can be a contributory factor to the failure.

Impoundment structures associated with abstraction activities such as weirs and dams can cause environmental impacts by causing barriers to fish passage. A number of fish species, including trout, salmon, eels and lamprey migrate along rivers to and from the sea as part of their natural breeding ecology. These species have evolved to be able to travel over small structures in the water, such as rocks, but larger structures can block their passage. Sometimes this occurs naturally due to features such as waterfalls, but many barriers are man-made. A poorly designed or managed impoundment can also prevent sediment movement down river systems and cause build up of sediment leading to changes to the river bed habitat.

### 5.1.3 What action are we already taking?

#### KEY LEGISLATION

##### **Water Abstraction and Impoundment (Licensing) Regulations (NI) 2006**

Article 11 of the Water Framework Directive (WFD) requires that the Programme of Measures established by river basin plans should include controls over abstractions and impoundments. Requirements in Article 6 of the Habitats Directive also require member states to have a formal or legal method of assessing the potential impact of abstraction/impoundments on protected and sensitive sites. As a result of these requirements the Department of the Environment (DOE) introduced the Water Abstraction and Impoundment (Licensing) Regulations (NI) in 2006. These regulations aim to provide a single and consistent environmental risk based approach to the assessment and authorisation of water abstraction and impoundment activities within Northern Ireland.

Small scale activities with abstraction volumes less than 10m<sup>3</sup> per day are not required to notify NIEA but must adhere to Permitted Controlled Activities (PCA) conditions ensuring that:

- there is a means of measuring the volume abstracted;



- water leakage shall be kept to a minimum;
- the activity will cause no contamination or pollution; and
- abstraction from a borehole for the purpose of testing the hydraulic properties of an aquifer or testing water quality is allowed, providing the total volume abstracted is less than 150m<sup>3</sup> in any period of one year.

Operators with abstraction volumes between 10m<sup>3</sup> and 20m<sup>3</sup> per day must notify NIEA of the location of the activity and show compliance to the PCA. Abstraction volumes greater than 20m<sup>3</sup> per day require a formal licence from NIEA which may stipulate conditions.

Under these regulations all hydroelectric schemes require a license to abstract water. NIEA consult externally with Northern Ireland Water, Loughs Agency, Planning Service, Department of Culture, Arts and Leisure (DCAL) and internally with Natural Heritage and Hydrology teams about the possible impacts of the scheme before issuing a license. All environmental impacts are considered and mitigation measures are included in any license issued. The amount of water permitted for abstraction will depend upon the scale and nature of the project and site-specific fishery, nature conservation protection designations and WFD hydrology standards. Getting the balance right between supporting hydropower development and protecting and improving the water environment is a key challenge for this and future River Basin Management Plans.

Under the Abstraction and Impoundment (Licensing) Regulations impounding works/structures not associated with an abstraction, which do not control the water level upstream and do not create a height differential between the upstream and downstream water surfaces of more than 1 metre, are permitted as a Permitted Controlled Activity. In all other circumstances authorisation through formal licence may be required for impoundments of water. The DOE will consult with other agencies that have responsibility for fisheries legislation and, where relevant, the Habitats Regulations in Northern Ireland as part of the assessment and decision making process.

#### **Water Resources (Environmental Impact Assessment) Regulations (NI) 2005**

The Water Resources (Environmental Impact Assessment) Regulations (NI) 2005 require agricultural water management projects, such as spray irrigation, which involve the impoundment, abstraction and/or diversion of water from surface or underground sources of volumes greater than 200m<sup>3</sup> per day, to submit an environmental statement to the DOE. Following a determination made under this legislation, an abstraction/impoundment licence may be required.

#### **The Fisheries Act (Northern Ireland) 1966**

Part 4 of the Fisheries Act protects fisheries and their habitats making it an offence to 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.

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. 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 the 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 continued to ensure that the most appropriate fishery protection measures were included in the permit conditions. DCAL refreshed guidelines in this regard during 2007.

Enforcement of the legislation is carried out by the Fisheries Conservancy Board except in the Foyle and Carlingford catchments where the Loughs Agency of the Foyle, Carlingford and Irish Lights Commission is responsible. Most

weirs have fish passes under the Fisheries Act. However an issue has been periodic lack of flow through some fish passes which will be addressed through the abstraction licensing regulations.

#### 5.1.4 What action are we taking to promote sustainable water use and safeguard drinking water quality?

The WFD places requirements on Member States to introduce measures to promote efficient and sustainable water use and measures to safeguard the quality of drinking water supplies. There are a number of measures that we are currently taking or are in the process of developing to address these requirements.

##### **Water Supply (Water Fittings) Regulations (Northern Ireland) 2009**

The proposed Water Supply (Water Fittings) Regulations (NI) 2009, when finalised, will reduce possible contamination of the public drinking water supply by prescribing the installation of appropriate backflow prevention devices in order to prevent contaminated water from entering the public supplies. The Regulations prescribe standards for water pipes, fittings and apparatus using water in order to prevent waste and misuse of water supplied by NIW. The Regulations only apply to fittings connected to the public drinking water supply. The proposed Regulations are designed to ensure that water systems in premises do not contaminate the wider mains water supply. Under the proposed Regulations, NIW will proactively inspect both commercial and domestic properties using a risk-based approach to enforcement.

##### **Water Supply (Water Quality) (Amendment) Regulations (Northern Ireland) 2009**

Water Quality Amendment Regulations will update the existing subordinate legislation Water Supply (Water Quality) Regulations (Northern Ireland) 2007 to ensure continued monitoring of surface water, which will cover the repeal of the European Surface Water Abstraction Directive. The Amendments promote the principles of the European Union Drinking Water Directive by legislating for the monitoring and risk assessment of substances in water supplies used for food preparation and human consumption. The Amendments will also offer better clarity and efficiency in communications between Northern Ireland Water and the Department of Regional Development.

##### **Reduction in water supply leakage levels**

Drinking water sources have been developed over many years and in many cases aging distribution networks are subject to high levels of leakage. A key priority for Northern Ireland Water is to reduce leakage to the Economic Level of Leakage, this is a calculated level of leakage at which any further reduction in the leakage level would incur costs in excess of the benefits derived from the savings. The current figure to be achieved by March 2010 is 135.5 mega litres per day. However in accordance with industry best practice the Economic Level of Leakage figure is currently being reviewed. Reduction in leakage rates will reduce:

- environmental impacts at sites where over-abstraction occurs;
- pumping and treatment costs; and
- energy use and therefore carbon dioxide emissions.

##### **Drinking Water Safety Plans**

The WFD sets out requirements to introduce measures to safeguard water quality in order to reduce the level of purification treatment required for the production of drinking water. Both surface water and groundwater drinking water sources are vulnerable to pollution which can pose health risks which can consequently result in higher treatment costs. NIW has initiated a programme to develop Drinking Water Safety Plans by 2010. NIW and NIEA will develop a risk assessment approach to identify where action is required to reduce the risk of pollution which could affect public drinking water sources as part of the development of water safety plans. Over the period of the first plan similar risk assessments for private drinking water sources will be completed, however this process is reliant on new regulations being made and will only be mandatory for those private drinking water sources required to be registered under this new legislation.

### **Northern Ireland Water Resource Strategy 2002 – 2030**

It is estimated that each person in Northern Ireland uses an average 145 litres of water per day. The Northern Ireland Water Resource Strategy 2002 – 2030 forecasts that present demand will increase by 150 million litres per day by 2030. The strategy emphasises the need to rationalise existing uneconomic water sources and concentrate on the sources that can meet our needs cost effectively and reliably. The main aim is rationalisation of drinking water sources. Implementation of the Northern Ireland Water Resource Plan, which is currently under review, will ensure that this rationalisation takes place.

NIW developed a drought plan in July 2008. This will be further developed as need arises.

#### **Education and awareness**

NIW also encourage the wise use of water through a number of campaigns. An example of such a campaign is the promotion of the 'Hippo Water Saver'. This is a simple and low cost water saving device to help conserve water in toilet cisterns. Every time a toilet is flushed the Hippo saves approximately 3 litres of water.

### **5.1.5 What improvements will current measures achieve?**

The actions we have described will deliver clear environmental benefits with flows being returned to rivers and fish migration extended. This will have biodiversity, amenity and fisheries benefits. The Water Abstraction and Impoundment (Licensing) Regulations will ensure that abstractions are sustainable and both abstractions and impoundments do not impact on the river's ecological status. Implementation of Fisheries Act legislation will continue to ensure that fish passes are provided in reinstated and new weirs. While implementation of the Abstraction and Impoundment Regulations will also ensure that adequate flow is provided at weirs etc. with existing fish passes resulting in improved access to habitats for fish to breed and grow.

This river basin management plan is also part of the process which will enhance the protection of drinking water sources from pollution helping to ensure that Northern Ireland Water can continue to provide high quality drinking water. Northern Ireland Water's investment to reduce leakage and promote efficient water use by consumers will also deliver benefits for the water environment.

### **5.1.6 What further actions can we take to deliver environmental improvements?**

NIEA has been progressively improving its assessment of hydrological impacts as the information it holds on licensed activities has improved. Over the period of the first plan NIEA will take the following actions to progressively improve this assessment:

- a) Monitor actual abstraction and compensation flows in those abstractions and dams which have the greatest environmental impact. Actual abstraction and compensation flows will then be used to assess compliance with licence conditions.
- b) Develop biological tools in association with other agencies which can be used to assess the ecological impacts of changes in hydrology, including water transfers. It is expected to take until 2011 until the new tools are available for use.
- c) Further develop Northern Ireland's Monitoring Programme to directly monitor impacts and to incorporate the newly developed biological monitoring tools.
- d) Further develop our understanding of the relationship between groundwater and surface waters.
- e) The classification process has identified where the balance between water entering (recharging) a groundwater body and water being abstracted, taking into account the water needs of dependent ecosystems, may be inappropriate. More detailed assessment of water resource availability and management priorities will be targeted at such water bodies.
- f) NIEA and the Loughs Agency are involved in a British Isles steering group which is developing a tool for assessing the extent to which barriers impede migration of a wide range of species. This tool is expected to be available for

use from 2010 and will progressively improve our understanding of the impacts of barriers upon fish movements and migration.

The improvements in data held by NIEA over the period up to 2015 will allow the identification of further measures required to deliver environmental improvements.

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Summary of existing actions					
Pressure Type: ABSTRACTION AND FLOW REGULATION					
Key Sectors: WATER SUPPLY, HYDROPOWER AND FLOOD CONTROL					
Improvement Required	Measures	Responsible Organisations/ Sectors	Delivery mechanism and support	Support Provider/Regulator	
<b>Improve flows in rivers and levels in lakes</b>	Control of abstraction and impoundment activities	NIEA	Water Abstraction and Impoundment (Licensing) Regulations (NI) 2006 Water Resources (Environmental Impact Assessment) Regulations (Northern Ireland) 2005	NIEA	
	Reduce leakage rates	Northern Ireland Water	Leakage reduction targets to be reviewed through the Price Control process	DRD / Northern Ireland Water and the Northern Ireland Authority for Utility Regulation (NIAUR)	
	Improve efficiency of use	Northern Ireland Water	Guidance and publicity on industrial best practice. Information for customers on how to use water efficiently focused on areas e.g. Use Water Wisely campaigns	NIEA	
<b>Allow fish migration</b>	Construction of fish passes where weirs are built or reinstated	DCAL, Loughs Agency	Fisheries Act (Northern Ireland) 1966	DCAL and Loughs Agency	
	Fishery protection measures at all water abstraction sites	DCAL, Loughs Agency	Fisheries Act (Northern Ireland) 1966	DCAL and Loughs Agency	

<p><b>Protect drinking water sources and provide safe drinking water</b></p>	<p>Monitoring of raw water quality and undertaking risk assessment of raw water entering water treatment works</p> <p>Proactive prevention of non-compliance. Complete catchment and treatment risk assessments for all water supply systems by the end of 2010.</p>	<p>Water Industry</p> <p>Northern Ireland Water</p>	<p>This is currently delivered by a Service Level agreement between NIEA and NIW. However this will be incorporated into Water Supply (Water Quality) Regulations (Northern Ireland) 2009</p> <p>Development of Drinking Water Safety Plans</p>	<p>DRD, NI Water, NIEA (Drinking Water Inspectorate)</p> <p>NI Water / DRD</p>
<p><b>Promote sustainable development of public water supply</b></p>	<p>Demand Management Provide for additional demand whilst minimising environmental harm</p>	<p>Northern Ireland Water</p>	<p>Water Resource Plan – anticipate where demand will be</p>	<p>NIEA, DRD</p>

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**Pressure Type: DIFFUSE & POINT POLLUTION**

**5.2 Key Sector: AGRICULTURE**

**5.2.1 Introduction**

Agriculture and food processing is an important industry in Northern Ireland and the sector accounts for 3.5% of total added value in Northern Ireland's economy. There are currently 26,100 farm businesses in Northern Ireland, of which only 25% are regarded as large enough to provide full-time employment for one or more persons (based on a standardised labour requirement). Farm numbers have been declining at an annual average rate of 1.9 % over the past 10 years and the size of the agricultural labour force has been reducing at an annual average rate of 2.1% over the last 10 years.

Farms cover about 70% of the total land area; therefore this sector has a major role in the protection and improvement of the environment with over one million hectares used for agricultural production. Around 80% of the area farmed is grassland, 15% hill or rough land and 5% is arable or horticulture. Beef, milk, sheep and poultry account for approximately 80% of the value of agricultural produce; meat and milk products are major exports. Average stocking levels on farms in Northern Ireland are 1.3 livestock units per hectare, (1.8 in lowland areas).

Intensive land management including livestock and crop production can give rise to diffuse agricultural pollution. A significant contribution to diffuse pollution is also made from farm yard run-off. Such activities can generate a release of potential pollutants which individually may not have an impact but together, at the scale of a river catchment, can cause environmental, health and economic impacts.

**5.2.2 What causes the environmental impact?**

The main water quality problems which may be associated with diffuse and point pollution from agricultural activities arise from:

- Nutrients (nitrogen and phosphorus) – where the inappropriate application and storage of manures and inorganic fertiliser can lead to leaching of excess nutrients to groundwater or run-off into surface waters.
- Organic matter, ammonia and faecal pathogens – caused by animal waste washed from farm yards and fields as well as the direct access of cattle and sheep to rivers.
- Toxic substances (e.g. pesticides) – where use or storage occurs too close to water, spillages in farm yards or where inappropriate disposal of spent products can lead to leaching into groundwater or run-off into surface water.
- Sediment – loss of soil through the erosion of cultivated land or poaching by livestock.

**5.2.3 What action are we already taking?**

**KEY LEGISLATION**

**The Nitrates Action Programme Regulations (Northern Ireland) 2006 (NAP Regulations)**

These regulations implement The Nitrates Directive (91/676/EEC) aiming to improve water quality by protecting water against pollution caused by nitrates from agricultural sources. Both the Department of Agriculture and Rural Development (DARD) and the Department of the Environment (DOE) have joint statutory responsibility for the implementation of the Directive. In particular, it is about promoting better management of animal manures, manufactured fertilisers and other nitrogen-containing materials spread onto land. The Directive allows Member States to either designate discrete areas of land as Nitrate Vulnerable Zones and apply an action programme or establish an action programme to be applicable to the whole territory. The action programme requires farmers to observe rules to reduce and prevent nitrate pollution, including measures on storing manure and periods when spreading manure and manufactured fertiliser to land is not allowed. A review must be carried out at least every four years

5.2

Until 1 January 2007, Northern Ireland had designated seven NVZs on the basis of elevated nitrate levels in groundwaters. These NVZs were very small and covered less than 1% of Northern Ireland's area. However, Northern Ireland also has a widespread problem of eutrophication of surface waters and a large proportion of this nutrient enrichment is attributable to agriculture. Following extensive consultation, the total territory of Northern Ireland was established on 29 October 2004 as the area to which an action programme would be applied under the Protection of Water Against Agricultural Nitrate Pollution Regulations (Northern Ireland) 2004.

On 1 January 2007 the Nitrates Action Programme Regulations (Northern Ireland) 2006 (the NAP Regulations) came into operation. These Regulations apply to all farmers across Northern Ireland from that date apart from some transitional arrangements on closed spreading periods and manure storage requirements.

The key measures in the NAP Regulations include: a closed period for the application of organic and inorganic fertilisers; a minimum livestock manure storage requirement; a limit on the amount of nitrogen that can be applied to land from livestock manures of 170 kg nitrogen per hectare per year; and the inclusion of nitrogen efficiency measures.

The action programme covers the period 1 January 2007 – 31 December 2010 and will be subject to review in 2010.

One of the key requirements of the Directive is the livestock manure spreading limit of 170 kg N/h/year. However, to facilitate compliance with the Directive by intensive grassland farms, Northern Ireland was also successful in obtaining a derogation to enable such farms to spread up to a limit of 250kg N/h/year. The amending Regulations giving effect to Commission Decision 2007/863/EC came into operation on 9 June 2008 and there are approximately 350 farms with approved derogations in 2008.

#### **The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) (SSAFO) Regulations (Northern Ireland) 2003**

The SSAFO Regulations cover the design, siting, construction and maintenance of silage, slurry and agricultural fuel oil stores. The Regulations minimise the risk of water pollution by setting minimum standards for the construction and maintenance of these structures. Compliance with the SSAFO Regulations, with regard to livestock manure and silage effluent storage facilities, is now a requirement of the NAP Regulations.

#### **The Phosphorus (Use in Agriculture) Regulations (Northern Ireland) 2006 (Phosphorus Regulations)**

The Phosphorus Regulations control the application of chemical phosphorus fertiliser and were introduced, by DOE, on 1 January 2007 to complement the NAP Regulations in support of its environmental obligations. These Regulations were introduced as it was recognised that phosphorus played a key role in freshwater eutrophication and to ensure that chemical phosphorus fertiliser was not applied in excess of crop requirement.

#### **The Water (Northern Ireland) Order**

This legislation aims to prevent pollution of all waterways and groundwater. It is an offence under the Water Order to knowingly, or otherwise, make a polluting discharge into a waterway or underground strata without the consent of DOE. Under the Order a range of notices may be served to prevent pollution from occurring or to remedy pollution that has already occurred.

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

The PPC Regulations implemented the Integrated Pollution Prevention and Control Directive (91/61/EC) and extended an environmental permitting system to a range of new sectors including intensive rearing of pigs and poultry above certain thresholds (40,000 places for poultry, 2000 places for production pigs >30kg or 750 places for sows). IPPC farms which spread slurry/manure to land are required to demonstrate that they have sufficient land to take the quantity of manure generated on the installation. New or expanded farms are being asked to demonstrate that they have either sufficient land to spread slurry or manure in accordance with crop requirements or have an alternative means for utilizing the material before they are permitted. For existing farms, a staged approach is being taken whereby applicants had to submit a nutrient budget and identify the extent of nutrient surpluses at the application stage. They were then allowed until 6 months after the issue of a permit to come up with firm proposals to resolve any shortfall in available spreading land or to identify possible alternative uses.



### **Waste Management Licensing Regulations (Northern Ireland) 2003 (WML Regulations)**

The storage and application of certain industrial organic wastes to agricultural land including the application of wastes from the dairy products industry, is controlled through the WML Regulations. The application of the waste must result in either "benefit to agriculture" or "ecological improvement". Benefit to agriculture is assessed against specific criteria including the nitrogen, phosphorus and other plant nutrients in the waste, the soil nutrient status, other sources of nutrient supply and the needs of the planned crop rotation. Furthermore the material must be applied in accordance with the NAP Regulations.

Agricultural waste exemptions are required when using lined biobeds, which can effectively retain and/or degrade pesticide residues, when spreading diluted milk from a farm on land for agricultural benefit and when treating land with spent mushroom compost for agricultural benefit or ecological improvement etc.

### **The Sludge (Use in Agriculture) Regulations (Northern Ireland) 1990 (The Sewage Sludge Regulations)**

The Sewage Sludge Regulations implement the Sewage Sludge Directive (86/278/EEC). This legislation applies only to the application of sewage sludge and septic tank sludge to commercial food crops, including for stock rearing purposes. These Regulations prohibit the use of sludge in agriculture as described above unless specified requirements are fulfilled. These include spreading controls, crop nutrient requirements, harvesting timetables, controls on the addition of certain metals and requirements to supply information. Both the sludge and the soil must be tested regularly to avoid a build up of nutrients and heavy metals.

### **The Groundwater Regulations (Northern Ireland) 1998 (Groundwater Regulations)**

The Groundwater Regulations implement the Groundwater Directive (80/68/EEC) which seeks to protect groundwater by preventing the direct discharge of certain hazardous substances and subjecting the discharge of other substances to an authorisation procedure. For the majority of farms in Northern Ireland this means an authorisation is required for the disposal of waste sheep dips and pesticides. The terms of any authorisation including record keeping must be followed. Farmers must also ensure that direct and indirect discharges do not occur, such as from a poorly maintained sheep dipper. A consultation exercise setting out proposals to transpose the new Groundwater Daughter Directive (2006/118/EC) is ongoing which includes a more flexible authorisation procedure. Following the consultation exercise new transposing Regulations incorporating the existing Groundwater Regulations and the relevant requirements of the WFD will be introduced in 2009.

### **The Environmental Impact Assessment (Agriculture) Regulations (NI) 2007**

These Regulations implement the EIA Directive and the Habitats Directive in that they:

- Replace the existing EIA Regulations applying to projects for the use of uncultivated land and semi-natural areas for intensive agricultural purposes; and
- Introduce new rules applying to projects for the restructuring of rural land holdings.

The Regulations require an assessment of whether such projects, above certain thresholds, are likely to have significant effects on the environment. If so, an environmental impact assessment and public consultation must take place before a final consent decision is made.

### **Food and Environmental Protection Act 1985, Chapter 48, Part III**

This legislation provides the powers to make secondary legislation for the control of sale, supply, storage, use and advertisement of pesticides. The term 'pesticide' includes herbicides, fungicides, insecticides, rodenticides, soil sterilants, wood preservatives and surface biocides. Under this legislation, which is enforced by the Health and Safety Executive, it is an offence to:

- Pollute the environment and / or use a pesticide in such a way that would be likely to cause harm to humans and animals;
- Not follow the instructions in the statutory box on the pesticide label;
- Spray pesticides on land without a certificate or competence if born after 31 December 1964.

### **Control of Pesticides (Amendment) Regulations (Northern Ireland) 1997**

Devastating effects to river life and water supplies can occur if pesticides are stored carelessly or applied / disposed of in a careless manner. The Regulations place restrictions on use of pesticides or any substance that is used for protecting plants or wood. Any pesticides that are used on farms in Northern Ireland must be approved by DARD. In order to be approved the product is tested for safety, harmful effects on wildlife, mobility in soil and potential contaminate to groundwater.

### **Plant Protection Products Regulations (Northern Ireland) 2005**

This legislation controls the sale and supply of plant protection products, mainly agricultural pesticides. Under this legislation it is an offence to use or distribute a non-approved pesticide. The Regulations are enforced by the Health and Safety Executive for Northern Ireland.

### **Local Risk Assessment For Pesticides (LERAPS)**

Certain pesticides have a buffer zone requirement to afford protection for aquatic life against pesticide spray drift. For those pesticides with a buffer zone requirement there is a legal obligation to carry out and record the results of a Local Risk Assessment For Pesticides (LERAPS). Different products carry different buffer zones. The scheme has been in force for ground crop sprayers since 1999 and is now extended to broadcast air assisted (orchard) sprayers. LERAPS are only necessary when pesticides are applied next to watercourses such as streams and ponds.

## **FINANCIAL INCENTIVES**

### **Cross Compliance**

From 1 January 2005 as a condition of receiving direct payments (including the Single Farm Payment), farmers must demonstrate for all the land on their holding, that they are meeting the requirements of certain existing European laws (known as Statutory Management Requirements, SMRs) covering the environment, food safety, animal and plant health and animal welfare, as well as maintaining their land in Good Agricultural and Environmental Condition (GAEC). The GAEC requirements comprise a framework of basic environmental management practices designed to avoid land abandonment and environmental degradation and DARD are the competent authority in relation to compliance with these requirements. The EC Birds, Habitats, Groundwater, Sewage Sludge and Nitrates Directives are the 5 environmental SMRs under Cross-Compliance. NIEA on behalf of the DOE is the competent control authority for these 5 SMRs.

### **Agri-environment Schemes**

DARD's agri-environment schemes support agricultural production methods which protect the water quality of rivers and lakes. The schemes reward farmers for carrying out their activities in an environmentally friendly manner to bring about environmental improvement on farms. Effective pollution control is a requirement of all agri-environment schemes and scheme participants are provided with farm nutrient and pollution control advice as part of their application process. Since May 2005, the advisory visit has included guidance on the preparation and maintenance of a 'Farm Waste Management Plan'. By the close of the Northern Ireland Rural Development Programme (NIRDP) 2000-2006 some 13,000 farmers were participants in agri-environment schemes, with approximately 455,000 hectares of land under agreement or 45% of farmed area under agreement.

The Northern Ireland Countryside Management Scheme (NICMS) is an integral part of the NIRDP 2007–2013. Under the NIRDP, the NICMS further enhances the agri-environment programme's ability to reduce water pollution from agricultural sources and to improve water quality on farms. NICMS participants will continue to draw up obligatory farm waste management plans and in addition they will have the option of taking up new farm waterway and riparian zone management measures which aim to enhance river and riverbank biodiversity and help local agriculture meet the requirements of the EU Water Framework Directive.

There are around 11,000 beef and sheep farmers taking part in a farm quality assurance scheme involving audits and environmental care.

5.2

The Organic Farming Scheme (OFS) is an integral part of the NIRDP. The OFS has been set up to encourage farmers to convert to organic farming to meet the demand for organic food and benefit the environment.

### **Farm Nutrient Management Scheme**

The Farm Nutrient Management Scheme (FNMS) was introduced by DARD in 2005 to assist farmers to comply with the Nitrates Directive and reduce water pollution by improved storage and use of livestock manures. Increased storage facilities enable farmers to spread manures when weather, soil conditions and crop uptake of nutrients are optimum. This minimises the risk of water pollution and ensures that farmers can comply with the closed period for manure spreading required by the NAP Regulations.

The FNMS provided 60% capital grant support towards the cost of building slurry and manure storage facilities, up to a maximum grant limit of £51k. The FNMS closed to applications on 31 March 2006 and some 4500 applications were received. The average investment per project is approximately £50k. The original budget of £45m was increased to £144m in 2007 to ensure that all applicants could be funded. It is anticipated that some 3,500 facilities will have been completed when the scheme closes on the 31 December 2008.

Facilities are built to standards set by the SSAFO Regulations and have a minimum 20 year design life. The investment of some £200 million to improve farm infrastructure through the FNMS is fundamental to reducing agricultural pollution and protecting the water quality of our rivers and lakes.

### **CODES OF PRACTICE AND GUIDANCE**

#### **Pollution Prevention Guidelines (PPG)**

The pollution prevention guidelines on 'Sheep Dipping', PPG 12, have been drawn up to assist all who are involved in dipping sheep, including farmers and contractors. They should be followed in order to reduce the risk of pollution of watercourses and groundwater. Aspects covered include the siting of sheep dips, design of sheep dip baths and holding pens, sheep dip concentrate storage, preparation of wash solution, operation of bath, disposal of spent dip and disposal of containers and contaminated materials.

#### **Code of Good Agricultural Practice (COGAP)**

DARD recently issued a new Code of Good Agricultural Practice (COGAP) for the prevention of pollution of water, air and soil. The Code is designed to provide practical guidance for farmers and growers in relation to pollution control. It also serves as a reference document for those involved in providing pollution control advice to farmers.

### **EDUCATION AND AWARENESS**

#### **Advisory roles and information for farmers**

The delivery of the objectives in this plan is dependent upon farmers themselves taking the initiative to meet accepted standards of good practice to reduce pollution. To do this, farmers need information and support so that they can modify the way they manage the land. A range of guidance documents and support tools (e.g. farm nutrient management calculators) which assist farmers to comply with various regulations have been produced by NIEA and/or DARD and distributed to the sector.

In the period from April 2004 to 2008 the College of Agriculture, Food and Rural Enterprise (CAFRE) have held 1,068 training workshops that included coverage of Cross Compliance, Field Boundary Management, Dealing with Farm Wastes, Nitrates Information and Nitrates derogation. A total of 15,053 persons attended these courses.

## VOLUNTARY INITIATIVES

### The Voluntary Initiative for pesticides

The Voluntary Initiative (VI) is a programme of self regulation measures proposed by the agricultural and agrochemical industries to minimise the environmental impact of pesticides and has been agreed by government. Farmers are asked to participate in the areas related to the application of sprays, crop protection management plans and appropriate training.

### Storing pesticides - BASIS

BASIS (Registration) Ltd is a voluntary system of self-regulation to establish and assess standards in the pesticide industry relating to storage, transport and competence of staff involved the agricultural and agrochemical industries. It is recommended that all those with large volume pesticide stores register with BASIS.

## RESEARCH AND DEVELOPMENT

In relation to the effectiveness of the NAP Regulations the European Commission has requested research should be carried out into the following:

**Closed periods** - environmental justification for continuing to permit manure applications in early October and February.

**Dirty water** - development of new treatment methods to avoid land application of dirty water in the winter months.

**Minimising phosphorus losses** - development of practical methods for reducing the hazard of phosphorus losses to water from manure applications.

**Minimising nitrous oxide losses** - development and definition of manure application methods which minimise nitrous oxide losses to the atmosphere.

In addition, where derogations have been approved there is a requirement to carry out reinforced water monitoring and studies to collect detailed scientific information on intensive grassland systems.

### 5.2.4 What improvements will current measures achieve?

A key basic measure for agriculture is the implementation of the Nitrates Directive. The current action programme covers the period 1 January 2007 – 31 December 2010 and will be subject to review in 2010. This review will examine the effectiveness of the action programme in meeting the environmental aims and objectives of the Nitrates Directive.

It has been assumed that a 20% rate of improvement will be delivered by all of the current actions listed above in order to achieve the objectives set in this plan. Further research is being undertaken to determine whether these measures have been successful or whether additional measures will be required.

## 5.2.5 What further actions can we take to deliver environmental improvements?

### MEASURES TO REDUCE PHOSPHORUS INPUTS

During development of the NAP and Phosphorus Regulations it was recognised that further measures may be required to address the agricultural contribution to the excess levels of nutrients in waters. It was agreed that additional measures governing phosphorus may be required to arrive at the situation where all holdings are in a sustainable phosphorus balance by 2015. To determine whether such measures might be necessary DARD agreed:

- a) to promote best management practices including using feedstuffs designed to minimise phosphorus in excreta without compromising animal health.
- b) to work with the agricultural industry within two years of the introduction of the NAP Regulations to examine commercial/technical proposals that would have the potential to bring about a significant reduction in the phosphorus surplus.
- c) by December 2008 to have reviewed the need to give statutory effect to phosphorus balances on individual holdings to be introduced on a phased basis.

### DISTRIBUTION OF DIFFERENT TYPES OF POLLUTION

Some areas of the country are more seriously affected by diffuse pollution. An understanding of how the different types of diffuse pollution are distributed is essential to ensure the focusing of work to the appropriate parts of the country. The pressures and impacts of diffuse pollution depend on several factors including rainfall, topography, soil type, geology and both the sensitivity and the use of the receiving water body.

d) NIEA plan to develop Geographical Information Systems (GIS) to assist in the identification of areas more seriously affected by diffuse pollution. The GIS information will be used to enable farmers to take action to address the impacts caused by different types of diffuse pollution. The maps will also allow focused support, advice and where necessary regulatory action on particular types of agricultural practice as well as the promotion of funding mechanisms by the Northern Ireland Rural Development Programme (NIRDP).

### PRIORITY CATCHMENTS

e) NIEA plans to focus its resources on priority catchments, typically areas where for example there is lower uptake in DARD agri-environment schemes and where there are high levels of diffuse pollution which affect parts of the water environment and a range of other users. The intention is to develop catchment management plans by 2015 which identify those parts of the catchment which are the most important sources of pollution where advice and regulatory action will be focused.

Summary of existing actions					
Pressure Type: DIFFUSE & POINT POLLUTION Key Sector: AGRICULTURE					
Improvement Required	Actions	Responsible Organisations/ Sectors	Delivery mechanism and support	Lead Department	
<b>Reduction in nutrient inputs &amp; Reduction in organic waste (organic matter, faecal pathogens, &amp; ammonia)</b>	<p>Closed spreading periods for the application of organic manures and chemical fertilisers</p> <p>Land application restrictions for example distances from waters, weather and ground conditions and application methods</p> <p>Chemical nitrogen and phosphorous fertiliser application to crop requirement</p> <p>Livestock manure storage requirements i.e. capacity, construction standards and maintenance</p> <p>Livestock manure loading</p> <p>Land management practices which reduce nutrient run-off</p>	Agriculture	<p>Nitrates Action Programme Regulations (Northern Ireland) 2006 (NAP Regulations)</p> <p>Phosphorus (Use in Agriculture) Regulations (Northern Ireland) 2006 (Phosphorus Regulations)</p> <p>Silage, Slurry and Agricultural Fuel Oil (SSAFO) (Northern Ireland) Regulations 2003</p> <p>The Pollution Prevention and Control Regulations (Northern Ireland) 2003</p> <p>Cross-Compliance including Good Agricultural and Environmental Conditions</p> <p>The Farm Nutrient Management Scheme (FNMS)</p> <p>Northern Ireland Countryside Management Scheme (NICMS)</p> <p>The Sludge (Use in Agriculture) Regulations (Northern Ireland) 1990 (The Sewage Sludge Regulations)</p> <p>Waste Management Licensing Regulations (Northern Ireland) 2003</p>	<p>DARD/DOE</p> <p>DOE</p> <p>DOE</p> <p>DOE</p> <p>DOE</p> <p>DARD/DOE</p> <p>DARD</p> <p>DARD</p> <p>DOE</p> <p>DOE</p>	

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5.2

<b>Reduction in pesticide inputs</b>	Pesticide Storage siting and management Restriction on pesticide marketing Pesticide Spraying Disposal of dilute pesticides and washings Sale and supply of approved pesticides Crop protection management plans Transport of Pesticides Competence of operators	Agriculture	Sludge (Use in Agriculture) Regulations (Northern Ireland) 1990	DOE
			The Code of Good Agricultural Practice for the Prevention of Pollution of Water, Air and Soil (COGAP)	DARD
			Advisory, education and training	DARD
			Cross-Compliance Statutory Management Requirements	DARD/DOE
			The Code of Good Agricultural Practice for the Prevention of Pollution of Water, Air and Soil (COGAP)	DARD
			Groundwater Regulations (Northern Ireland) 1998	DARD
			The Water (Northern Ireland) Order 1999	DOE
			Food and Environment Protection Act 1985 (FEPA)	DOE
			The Control of Pesticides (Amendment) Regulations (Northern Ireland) 1997	DARD
			Plant Protection Products Regulations (Northern Ireland) 2005	DARD
Waste Management Licensing Regulations (Northern Ireland) 2003	DOE			
Voluntary Initiative for pesticides (VI)	DARD/DOE			
BASIS (Registration)	DARD/DOE			
Local Environmental Risk Assessment for Pesticides (LERAP)	DARD			
Pollution Prevention Guidelines (PPG)	DOE			
Advisory, education and training	DARD			

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**Pressure Type: DIFFUSE AND POINT SOURCE POLLUTION**

**5.3 Key Sector: COLLECTION AND TREATMENT OF SEWAGE**

**5.3.1 Introduction**

Northern Ireland Water (NIW) is the sole provider of water sewerage services in Northern Ireland. Every year NIW collects 133 million tonnes of wastewater from 660,000 businesses and households.

There has been extensive investment in the provision of wastewater collection and treatment systems in Northern Ireland over recent years. Over the five year period up to 2008 £1.1 billion was spent on services protecting both public health and the environment.

There are localised and cumulative environmental problems in rural areas caused by sewage from scattered houses and industry which are typically treated by privately operated septic tanks or small treatment works. In Northern Ireland more than 110,000 properties (approximately 20% of the total) are currently without public sewerage provision, representing around 0.3 million people (a fifth of Northern Ireland’s population), and generating around 65 million litres of wastewater a day.

Following the investment that has been made the most serious remaining problems are now associated with a high density of septic tanks that are defective or not maintained properly and old combined sewers which, during periods of heavy rainfall, overflow excessive amounts of storm waste water into rivers causing pollution and flooding.

**5.3.2 What causes the environmental impact?**

The key pollutants from sewage discharges are:

- nutrients;
- organic matter, ammonia and faecal pathogens;
- toxic substances – from industrial effluent, household chemicals and road run-off;
- Sewage-related debris.

**5.3.3 What action are we already taking?**

**KEY LEGISLATION**

**Urban Waste Water Treatment Regulations (Northern Ireland) 2007**

In Northern Ireland the Urban Waste Water Treatment Directive is implemented through the Urban Waste Water Treatment Regulations (NI) 2007. The Regulations require that all significant discharges of sewage are treated, before the discharge to an inland surface water, groundwater, estuary or coastal water and that towns and cities above a certain population are provided with an adequate sewer system. The Regulations identifies sensitive areas where receiving waters are susceptible to the amount of nutrients discharged and further treatment is required e.g. Lough Erne and Lough Neagh catchments. Additionally, the Regulations have also banned the disposal of sewage sludge at sea since 1998.

NIW is obliged to monitor the effluent quality at treatment plants and their compliance with the requirements of the Directive are assessed by the Northern Ireland Environment Agency (NIEA).

**Water and Sewerage Services (Northern Ireland) Order 2006**

The Water and Sewerage Services (Northern Ireland) Order 2006 establishes a regulatory regime to ensure compliance with environmental, consumer protection and efficiency standards and sets out new rights for consumers. The Order supports the establishment of a government owned company (Northern Ireland Water) to deliver water and sewerage services from April 2007. As a result wastewater discharges from public sewerage

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infrastructure in Northern Ireland are now subject to enforcement action if the conditions of consent are not met or pollution incidents are caused by a failure to properly maintain and operate the infrastructure.

### **The Water (Northern Ireland) Order 1999**

Under the Water (Northern Ireland) Order 1999 (the Water Order) it is an offence to discharge trade or sewage effluent to waterways or water in underground strata without the consent of the Department of the Environment (DOE). NIEA administers a system of discharge consents which lay down conditions relating to the quality and quantity of effluent that may be discharged. Numerical limits may be placed on a variety of parameters such as Biochemical Oxygen Demand, Dissolved Oxygen, trace metals, temperature, suspended solids, pH, flow and visible oil and grease.

### **Pollution Prevention and Control Regulations (Northern Ireland) 2003**

NIEA regulates major industrial activities under the Integrated Pollution Prevention and Control (IPPC) Directive. Small-scale commercial and industrial discharges to sewer systems and waters are licensed or consented by NIW. If the proposed discharge to sewer consists of special category effluent then NIW must refer the application to the NIEA to determine whether or not it should be prohibited or if any specific conditions should be applied to the discharge.

Other key drivers for the setting of investment and priorities in this sector are compliance with the Freshwater Fish Directive, the Bathing Water Directive and the Shellfish Directive.

## **PLANNING CONTROLS**

In terms of septic tanks, the Water Order consenting process is the key control for ensuring the protection of our waters and this operates alongside the planning system by restricting the location of new developments. Domestic, commercial and industrial developments must obtain planning approval. Planning Service has issued a planning strategy for rural Northern Ireland; standards and joint UK guidance for on-site systems are also available. NIEA consents all discharges and undertakes inspections and enforcement where water pollution related to septic tanks and / or proprietary on-site systems is identified.

These controls and guidance play a major role in protecting water quality in non mains sewer areas, but problems arise where tanks or systems are not properly planned, designed, managed and operated. NIEA is undertaking research to examine legislative requirements and responsibilities and identification of best practice in relation to on site waste water treatment systems. This will result in a more consistent approach and provide guidance for a wider range of situations.

## **INVESTMENT PROGRAMMES AND PLANS**

### **Northern Ireland Capital Works Programme (2007 – 2010)**

The Capital Works Programme Strategic Business Plan has been agreed to cover the period March 2007 to March 2010. The three year expenditure programme has a budget of £676 million. The Capital Works Programme outputs from the period covering 2007 and 2008 included 52.4km of sewers and completion of projects to upgrade eight waste water treatment works (WWTW).

## **URBAN POLLUTION MANAGEMENT**

NIEA works closely with NIW to identify and rectify unsatisfactory combined sewer overflows, to rationalise sewer systems and to reduce the volume spilt from overflows. NIEA issues performance standards that control the flow forwarded for treatment, spill frequency, volume of discharge and associated pollutant loads so that water quality objectives and the desired amenity value of receiving waters are not compromised.

## **SUSTAINABLE URBAN DRAINAGE SYSTEMS (SUDS)**

Sustainable Urban Drainage Systems (SuDS) control the quantity and quality of run-off waters by providing storage in tanks, swales or ponds. This delays or prevents discharge to streams or rivers until there is capacity to accommodate it.

SuDS is not widely used in this sector at present however NIEA have produced a draft SuDS strategy with the aim of encouraging wider adoption of SuDS (see Urban Sector for more detail).

## EDUCATION AND AWARENESS CAMPAIGNS

### NI Water's 'Bag It and Bin It'

NI Water's 'Bag It and Bin It' campaign promotes the disposal of sanitary material such as cotton buds in the bin rather than flushing them down the toilet. This keeps them out of the sewage stream altogether, preventing them from being discharged from Combined Sewer Overflows (CSOs) during heavy rain or choking the fine screens at wastewater treatment works, both of which can cause pollution.

### Education

It is important that we all appreciate our role in controlling the pollution which is caused by what passes to the drains from our homes. If we reduce pollution at source it lowers the costs associated with its treatment and produces environmental benefits. This is especially true for hazardous substances, nutrients and sanitary litter. For example, not using certain substances in domestic products (e.g. strong disinfectants) reduces the need for treatment to remove them from sewage and reduces their concentration in sewage sludge.

### 5.3.4 What action are we taking to promote sustainable water use?

NIW has an important role in supporting development across Northern Ireland. If a developer wishes to build houses or industrial/commercial sites in a city or town served by an NIW sewerage system then they must be able to discharge their effluent to sewer. NIEA and Planning Service will not normally allow a development to avoid the costs of connection to the sewer by constructing a private sewerage works which discharges directly to the environment. This prevents the potential environmental, health and public nuisance impacts which would result from large numbers of small privately operated sewerage works in urban areas. The requirement to maintain a strategic drainage system which provides a high level of environmental protection may constrain development if there is no longer any capacity in the trunk sewer, treatment system or the receiving water.

At present NIEA, NIW and Planning Service aim to provide information on potential constraints to allow developers to direct development towards areas where there is available capacity in the sewerage infrastructure and the environment. Where this is not possible, NIW will plan investment to provide additional capacity, in line with its current strategic business plan, funding and environmental prioritisation.

NIW is currently developing a policy document for the adoption of proposed or existing private WWTW. Any person constructing or proposing to construct a private WWTW in accordance with the terms of the agreement may make an application to a sewerage undertaker under Article 161 of The Water and Sewerage Services (Northern Ireland) Order 2006 requesting the undertaker to make an agreement for the works to be vested (adopted) by the undertaker at a future date. NIW and a developer may enter into an agreement to adopt a private WWTW at a future date subject to the conditions of the Order, provided the conditions, including financial conditions if appropriate, are met.

### 5.3.5 What improvements will current measures achieve?

Over the period up to 2015, NIW will make significant investments in the sewerage network and WWTW which in turn will improve the water environment. NIEA and NIW are currently working to deliver the capital works programme associated with the Strategic Business Plan 2007 – 2010. The proposed programme for 2009 to 2010 includes £492 million of improvements to WWTWs and sewers and £10 million for poorly performing small WWTWs. Additionally NIW employs the use of Public Private Partnership (PPP) investment to complement conventionally funded programmes. PPP programmes for WWTW and collections systems with a capital value of £122 million are also being taken forward throughout this period.

Investment by NIW represents the single most important improvement programme for Northern Ireland's water environment which will deliver improvements in the quality of:

- bathing waters protected and providing greater opportunities for tourism and recreation;
- shellfish growing waters supporting the further development of the shellfish industry;
- waters designated for freshwater fisheries resulting in greater fishery potential with associated local economic and recreational benefits; and
- all rivers, lakes and estuaries supporting a greater diversity of aquatic plants and animals which will support wider recreational and amenity use.

The importance of improving the amenity value of rivers is especially important in urban areas where this can make an important contribution to urban regeneration. The economic benefit of this together with the direct support available to facilitate development provides substantial support to the Northern Ireland economy.

### 5.3.6 What further actions can we take to deliver environmental improvements?

#### CAPITAL WORKS PROGRAMME

a) Over the next year NIEA will be reviewing the environmental investment required for the period up to 2013 and will be working with NIW to prioritise the environmental problems so that indicative lists of improvement schemes can be developed. These lists will prioritise schemes on the basis of the scale of the environmental, social and economic benefits that can be delivered. The output from this process will be the basis of the submission to the next Northern Ireland investment round to fund the Capital Works Programme. More information on the output of this process will be available in the final River Basin Management Plans.

#### REVIEW OF CONSENTS

b) NIEA will review waste water consent conditions during 2008 to take account of the new water quality targets. The consent conditions will have to be revised to ensure that adequate controls and emission limits are set to achieve new water quality standards in receiving waters. This may require minor changes to licences or consents issued by NIEA or NIW. NIEA are also considering the further development of mathematical models for all of Northern Ireland to look at cumulative impacts of discharges at a catchment scale. Detailed studies are also being undertaken to support the review of the consents for sewer systems and to address the volume spilt from overflows in urban areas.

#### WASTEWATER FROM UNSEWERED PROPERTIES

c) Where small settlements cause local pollution because of inadequate sewerage provision it affects the quality of life of local people and can prevent development because the capacity of the environment to accept further discharges is fully utilised. The provision of sewerage grants may be considered as a mechanism to address the environmental impacts of these private sewerage discharges and support sustainable development in these areas.

d) The current policy and guidance for septic tanks will be changed to improve existing controls. Detailed studies are progressing to support updated guidance for new systems and to prioritise actions in areas with high concentrations of existing on-site systems. The aim is to ensure that new unsewered development is located in areas where adequate on-site wastewater treatment and soil percolation can be achieved, rather than in areas where groundwater or surface water is vulnerable to pollution or where the risk of flooding is significant.

Sensitive areas, used for shellfish growing or to supply drinking water, will receive particular attention. Development control and enforcement practices may have to be modified to reflect these restrictions. Guidance will address improved procedures for site selection, design, installation and construction supervision.

e) For existing systems, large unsewered populations are being mapped and methods are being developed to calculate the vulnerability of receiving waters to loading from on-site systems. In priority areas, where water quality is threatened, options such as providing main sewers or septic tank maintenance programmes may be investigated.

### **PHOSPHATE FREE DETERGENTS**

f) Consideration will be given to how Northern Ireland can support UK wide removal of phosphates from domestic detergents to reduce nutrient loading entering the water environment as well as supporting management of diffuse pollution at a catchment scale.

### **DEVELOPMENT CONTROL**

g) Consideration is being given to the possibility of NIEA and NIW developing a process to identify where there are potential constraints on development and taking action to address these. NIEA would identify whether there is capacity in the water bodies in terms of further development and categorise them as red, amber or green. NIW already categorise their assets as red, amber and green on the basis of the capacity to receive additional effluent for collection and treatment. Where a water body or a NIW asset is defined as red, only very small scale development is possible which will not cause a significant increase in pollution.

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5.3

<b>Summary of existing actions</b> <b>Pressure Type: POINT SOURCE POLLUTION</b> <b>Key Sector: COLLECTION AND TREATMENT OF SEWAGE</b>					
<b>Improvement Required</b>	<b>Actions</b>	<b>Responsible Organisations/ Sectors</b>	<b>Delivery mechanism and support</b>	<b>Support Provider/ Regulator</b>	
<b>Reduction in pollution</b>	Comply with discharge standards in quality and quantity	NIW	Identification of improvements through the Capital Works	DRD NIEA	
	Reduction in contaminants at source	NIW	Urban Pollution Management Studies	NIEA DOE	
<b>Reduction in nutrient and dangerous substances</b>	Reducing unknown and un-consented losses of waste water to marine, river and lake environments	NIW	The Water (Northern Ireland) Order 1999	NIEA	
	Address unsatisfactory CSO through assessment of environmental impact and planned investment	NIW	The Water and Sewerage Services (Northern Ireland) Order 2006		
	Comply with existing water directives.	NIW	Pollution Prevention and Control Regulations (Northern Ireland) 2003		
	Reduces nutrient and dangerous substance loadings to sewer		Compliance with other Directives e.g. Shellfish, Bathing Waters, Freshwater Fish	NIEA	
	Improving water quality to meet objectives.		Education campaigns		

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## Pressure Type: DIFFUSE & POINT SOURCE POLLUTION

### 5.4 Key Sector: URBAN DEVELOPMENT

#### 5.4.1 Introduction

Whilst this section is entitled urban development it is equally relevant to development in what are primarily rural areas.

Rain water, falling upon impermeable surfaces (roads, pavements, yards and roofs), washes pollutants into the drainage system ultimately finding their way to the water environment. Sustainable drainage systems (SuDS) are a vital tool that can be used to reduce both pollution and the quantity of run-off. They mimic a more natural water cycle using a number of techniques including:

- reducing the area of impermeable surfaces to allow infiltration at source;
- using systems such as artificial ponds or wetlands to allow for some treatment and attenuation before the runoff is discharged back into the water environment.

Many everyday products are used increasingly often in rural and urban households (for example medicines and cleaning products) which contain a wide range of chemicals that may be harmful to our water environment. There are many potential sources including regulated, unregulated or accidental releases such as:

- contamination from applying pesticides to recreational areas, roads, paths, railways or gardens ;
- accidental misuse or inappropriate disposal of products.

In addition, misconnection between the sewerage system and surface water drains may result in untreated wastewater entering the environment, rather than going to wastewater treatment works. Incorrect plumbing could mean that wastewater from dishwashers, washing machines, sinks, baths and even toilets is flushed directly into a local river.

#### 5.4.2 What causes the environmental impact?

The key pollutants from urban drainage are:

- sediment (e.g. soils, grit and silt) washed off the streets during heavy rain and from construction sites;
- nutrients, organic matter, ammonia and faecal pathogens – associated with misconnection of sewers into surface water drains, sewer chokes and discharges, and faeces from pets and urban wildlife; and
- toxic substances (oils, toxic metals, rubber, and exhaust particles from motor vehicles), spillages and leaks from oil and chemical stores, disposal of waste materials such as paints, oils, lubricants and pesticides.

There are other environmental impacts associated with the volume of water which flows from our urban areas:

- flooding is exacerbated by the rapid run-off of rain from impermeable urban surfaces; and
- run-off to combined sewers exacerbates sewage pollution by causing storm overflows to operate more frequently and sewers to discharge.

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### 5.4.3 What action are we already taking?

#### KEY LEGISLATION

Several pieces of legislation control potential pollution arising from activities of this sector including :

- The Water (Northern Ireland) Order 1999
- Groundwater Regulations (Northern Ireland) 1998
- European Community Regulation on Registration, Evaluation and Authorisation of Chemicals (REACH) (EC 1907/2006)
- Food and Environment Protection Act 1985 (FEPA)
- The Control of Pesticides Regulations (Northern Ireland) 1987.

The legislation is covered in detail in the key sectors on Industry & Other Businesses and Agriculture.

#### Roads (Environmental Impact Assessment) Regulations (NI) 1999

These Regulations implement the European Council Directive 97/11/EC of 3rd March 1997 on the assessment of the effects of certain public and private projects on the Environment, in respect of those proposals to construct new roads and to improve new roads to which the Directive applies. The Regulations follow closely the provisions of the corresponding regulations in operation in Great Britain.

#### POLICY AND BEST PRACTICE

##### Development control

NIEA encourages the use of SuDS in all responses to planning and permitted development applications. SuDS are promoted in the DOE Planning Service Planning Policy Statement 15 (PPS 15) titled 'Planning and Flood Risk'. PPS15 provides information about the principles underpinning SuDS and the possible advantages it may offer in alleviating flood risk in Northern Ireland.

##### New road construction and development

Roads Service has designed SuDS into several new road systems. Current guidance promoted includes 'The SuDS manual' on design and construction standards. This manual provides best practice guidance on the planning, design, construction, operation and maintenance of SuDS to facilitate their effective implementation within developments. SuDS will be embraced, for the regulation of storm drainage, for all new motorways, dual carriageways and improvements to roads of that standard and above, where technically and economically feasible.

Roads Service has many examples of SuDS drainage systems implemented on its principal road networks. For example in the North Western River Basin District SuDS have been incorporated into the Limavady by-pass. On this scheme filter drains, storm wetland and retention ponds have been used. The storm wetlands become heavily vegetated with marshland plants and provide a valuable wildlife habitat. The retention ponds allow sediment to settle out.

#### 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 in urban areas including activities relating to construction and domestic properties. For example:

- PPG1 provides a basic introduction to pollution prevention and advises businesses and individuals of their responsibility for compliance with environmental regulations and signposts to other PPGs.
- PPG 2 guidelines are intended to assist those responsible for 'Above ground oil storage tanks'.
- PPG 3 advise on the 'Use and design of oil separators in surface water drainage systems' fitted to surface water drainage systems to protect the environment from pollution by oils namely diesel, petrol and engine oil;
- PPG 4 provides guidance on 'Disposal of sewage where no mains drainage is available' noting disposal for
- chemicals, oils, solvents or paint brush cleaning fluids can impair the treatment process and may even cause

- damage, discharge of grease may also reduce the efficiency of the treatment process;
- PPG 5 These guidelines cover construction and maintenance works in, near or liable to affect surface waters and groundwaters;
- PPG 6 'Working at construction and demolition sites' is intended specifically to assist those in the construction and demolition industry with responsibility for managing the environmental impact of their activities. Compliance with these should minimise the effect of the work on the environment;
- PPG 8 'Safe Storage and disposal of used oils' are intended to help everyone that handles used oils including disposal of domestic used oils such as engine oil and vegetable oil;
- PPG 13 'Vehicle washing and cleaning', this good practice guidance will help prevent pollution from vehicle washing and cleaning using automatic wash systems, high pressure or steam cleaners and washing by hand.

Northern Ireland Environment Agency (NIEA) general guidelines have been produced to prevent pollution at home and good general practices should be observed in the domestic environment including oil tanks /boilers and connections to sewers. General guidance on pollution prevention can be obtained from the Pollution Prevention Pays series of publications.

The NIEA Oil Care Campaign exists to help people avoid causing oil pollution incidents and aims to minimise the environmental impact of oil and fuels throughout their lifecycle, by promoting safe practices for handling, delivery and storage of oil and the proper collection of used oil. A number of Oil Care Campaign advisory publications are available.

Further information on above guidelines and campaign is available on the NIEA website ([www.ni-environment.gov.uk](http://www.ni-environment.gov.uk)).

The Health and Safety Executive Northern Ireland promote guidance on the safe disposal of pesticides used for non-agricultural purposes through their Approved Codes of Practice including 'The safe use of pesticides for non-agricultural purposes' ([www.hseni.gov.uk/pesticides\\_safe\\_use.pdf](http://www.hseni.gov.uk/pesticides_safe_use.pdf)).

#### 5.4.4 What improvements will current measures achieve?

The current measures are not adequate to prevent further deterioration due to urban drainage. Reducing urban pollution changes rivers so that they can become a community asset improving the quality of life for large numbers of people. It should be an essential part of urban regeneration.

The challenge for this river basin management plan is to promote good practice on urban drainage and to encourage all stakeholders to take active responsibility for drainage of surface water thereby reducing pollution and alleviating flooding.

As well as delivering benefits for the water environment, SuDS can also directly enhance the urban environment by providing additional green space and enhancing biodiversity.

Domestic householders must adopt good practice with respect to disposal to drains and sewers in order to put into practice a source control over potentially polluting products.

#### 5.4.5 What further actions can we take to deliver environmental improvements?

### NEW LEGISLATION, POLICY AND FUNDING

#### a) Draft Strategy 'Managing Stormwater'

The Northern Ireland Sustainable Development Strategy, "First Steps Towards Sustainability" recommended the wider



use of sustainable drainage techniques. A Working Party with representation from across government chaired by NIEA has produced a draft Strategy to promote the uptake of SuDS in NI. 'Managing Stormwater' has been drafted by the working party and it is anticipated will go out to consultation early in 2009.

Surface water management using SuDS can be implemented at all scales ranging from good housekeeping measures and soakaways for individual premises through infiltration devices and tank storage to basins and wetlands for larger developments.

The wider introduction of SuDS in appropriate circumstances will require new approaches to ownership, maintenance and regulation. This will involve greater awareness of SuDS and may require changes in policy and legislation to ensure that SuDS features may be adopted and maintained.

Statutory measures, policy and appropriate funding mechanisms are required to be implemented to provide the necessary legislative, policy and financial framework upon which to establish SuDS as a realistic storm water management option to the more traditional piped solutions.

SuDS will be promoted as the preferred approach to managing storm water drainage. Achieving the shift towards sustainable storm water management requires the draft strategy to be turned into specific actions. This will be achieved using a variety of delivery mechanisms.

The development of an effective Strategy is a continuous process that requires effective monitoring and regular review to ensure that the initial objectives are still appropriate. Research and development is also a key aspect to the successful long term implementation of SuDS in Northern Ireland to ensure localised issues are fully integrated within the SuDS philosophy.

#### **b) Management of misconnections**

Current NIEA procedures are to investigate and attempt to resolve misconnection issues that are causing significant water pollution and water quality problems:

NIEA is currently developing a strategy that considers and develops the following issues:

- Best practice throughout UK;
- The development of public awareness;
- Identification of water quality problems throughout Northern Ireland caused by misconnections;
- The development of working relationships with local and government agencies to resolve the issue.

#### **c) The development of an extended regulatory tool kit**

Control of diffuse sources of pollution is required by both the Water Framework Directive and Article 6 of the Groundwater Daughter Directive (GWDD). Transposition of the GWDD will provide opportunities to extend the toolkit available to the Department of the Environment for addressing diffuse pollution whilst at the same time allowing more flexibility to address point sources of pollution. Through more work an extended toolkit may be required. This future action is covered in detail in the key sector on Industry & Other Businesses.

### **RESEARCH AND DEVELOPMENT**

d) NIEA are considering updating and further developing the diffuse pollution screening and modelling tool with a view to assessing diffuse loads from a wide range of sectors and allow for their prioritisation of new actions. Application of the screening tool may also allow NIEA to take a wider look at the potential diffuse source contributions from other sectors such as amenity and recreational sectors and the transport sector.

### **Advice, education and awareness**

Education and awareness programmes will help stakeholders make informed decisions on the applicability of SuDS as a concept and on SuDS techniques as a method of storm water management on a case by case basis.

e) There is a need to promote and adopt good practice with respect to storage, use and disposal of hazardous chemicals. This may require engaging with a wide stakeholder group including local councils, recreation and general public. Homeowners can help to prevent pollution by checking homes for misconnections and avoiding disposal of oil, garden and household chemicals, paint or detergent in drains or gutters in the road.

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5.4

Summary of existing actions					
Pressure Type: DIFFUSE & POINT SOURCE POLLUTION			Key Sector: URBAN DEVELOPMENT		
Improvement Required	Actions	Responsible Organisations/ Sectors	Delivery mechanism and support	Support Provider/ Regulator	
<b>Reduction in pollution and flood risk</b>	Control pesticide sale, supply, storage, advertisement and use.	All	Food and Environment Protection Act 1985 (FEPA)	DOE	
		All	The Control of Pesticides Regulations (Northern Ireland) 1987.	DOE	
	Assess potential environmen- tal impacts of new roads	Road Service	Roads (Environmental Impact Assessment) Regulations (NI) 1999	DRD	
	Encourage use of SUDS through development control	DOE, Construction Industry	DOE Planning Service Planning Policy State- ment 15	DOE	
	Control of pollution in developed areas	All	Guidelines	DOE	
	Adoption of SuDS for all new motorways, dual carriageways and improvements to roads of that standard and above, where technically and economically feasible	DRD Road Service	Follow current guidance (CIRIA manual C697 on design and construction standards) for Sustainable Drainage Systems	DOE	

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## Pressure Type: DIFFUSE SOURCE POLLUTION

### 5.5 Key Sector : FORESTRY

#### 5.5.1 Introduction

The fundamental importance of forests is now recognised globally in appreciation of their capacity to provide many social, economic and environmental benefits. Forest and woodland cover now accounts for just over 6% of Northern Ireland's land area, up from about 1% in 1920. The 6% woodland cover is still the lowest of any European country with the exception of Iceland.

Forestry restoration was driven first by a need to develop a strategic reserve of timber for use in a national emergency, and then by a need to promote economic development through the supply of raw material to the timber processing industry. The objective in Northern Ireland is to steadily expand woodland over the next 50 years to achieve 12% forest cover. The expansion of forest area may help to offset carbon emissions as trees are net carbon users so meeting Kyoto protocol commitments.

Forests can also provide recreational locations and create habitats, enhancing biodiversity when replacing other more intensive land uses. Forests also provide an alternative energy source reducing dependence and consumption of fossil fuels. Public forests amount to 70% of Northern Ireland's woodland. Private forest owners have been planting in significant amounts since the 1980s. The composition of new planting within private forests is predominantly broadleaf. This reflects better soil conditions with consequently no anticipated fertiliser requirement. As these trees mature they will account for a greater proportion of forest cover and of timber harvesting (which now occurs mainly in public forests).

Local concerns were raised during consultations that some afforested areas are situated in sensitive salmon and trout spawning areas in upland headwaters. This underpins the need for adequate control on forestry operations in sensitive areas.

#### 5.5.2 What causes the environmental impact?

Forests, although providing many positive benefits, have the potential to negatively impact on the environment. The negative impacts are largely related to poor management or to planting on unsuitable soils, and many of the current water problems associated with afforestation are a legacy of old practices, which have been subsequently amended. When a forest is established, site cultivation and drainage may give rise to nutrient or sediment loss.

Forest canopies intercept rainfall, some of which is returned to the atmosphere; the remainder is stored or finds its way to soil, underlying rock or surface waters. Changing canopy cover can alter the quantity and quality of water flowing from forested areas. Forest canopies can absorb air pollutants that may affect water quality, depending on the geological setting. Road construction and harvesting may also result in sediment and nutrient loss. Depending on the subsequent land use, inappropriate deforestation may result in soil erosion, slope instability, nutrient leaching and reduced water-holding capacity in floodplains.

The key potential water problems that can result are:

- acidification: forest canopies can capture sulphur and nitrogen compounds from the atmosphere. Rain becomes more acidic as it passes through the canopies to the ground below, and may worsen the chemical balance of receiving waters.
- nutrient enrichment: forestry activities can introduce extra nutrients which, in naturally nutrient-poor areas, can lead to problems such as algal growth.

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- sedimentation: road-making and harvesting operations can cause erosion and sedimentation on susceptible soils. Mobile sediments may reduce water quality or damage sensitive areas.
- flow pattern changes: the amount of water reaching the soil surface is reduced by evaporation of water intercepted by the canopy. Clearfelling of forests may lead to a change in flow patterns.
- pesticide contamination: incorrect application of pesticides may result in contamination of waters.

### 5.5.3 What action are we already taking?

#### KEY LEGISLATION

##### The Forestry Act

The Forestry Act (Northern Ireland) 1953 establishes statutory responsibility for promoting the interests of forestry, afforestation, production and supply of timber and the maintenance of adequate reserves of growing timber. Recent policy developments are anchored in the UK Government's international commitments on sustainable forest management, biodiversity and climate change.

##### Environmental Impact (Forestry) Regulations

Forest Service implements Environmental Impact Assessment (Forestry) Regulations (NI) 2006, carrying out environmental impact assessments on projects relating to afforestation, deforestation, forest roadworks and forest quarries. Most forestry projects are eligible for grant aid, so Forest Service is notified that a development is intended. The regulations require Forest Service to formally consult with the Northern Ireland Environment Agency (NIEA) in relation to forestry projects.

##### The Control of Pesticides (Amendment) Regulations (Northern Ireland) 1997

Prior to the aerial application of pesticides within 250 m of a watercourse, consultation with the water regulatory authority is legally required under the Control of Pesticides Regulations.

Other Legislation which the sector must comply with include:

- Groundwater Regulations (Northern Ireland) 1998
- The Water (Northern Ireland) Order 1999
- Food and Environment Protection Act 1985 (FEPA)
- Plant Protection Products Regulations (Northern Ireland) 2005

The legislation is covered in detail in the key sectors on Industry & Other Businesses and Agriculture.

#### CODES OF PRACTICE & GUIDELINES

##### Northern Ireland Forestry – A Strategy for Sustainability and Growth

Legal responsibility for forestry lies with the Forest Service, Department of Agriculture and Rural Development (DARD). Northern Ireland Forestry – A Strategy for Sustainability and Growth confirms forest policy and implementation strategy.

##### The UK Forestry Standard

The UK Forestry Standard sets out criteria and standards for the sustainable management of all forests and woodlands in the UK and are the basis for forest monitoring. The UK Forestry Standard is currently being revised and will be supported by a suite of new guidelines.

##### The Forest and Water Guidelines

The Forest and Water Guidelines (substantially revised in 2003) set out the environmental principles and standards required in relation to water quality issues.

### UK Woodland Assurance Standard

The Forest Service and some private forestry interests are certified under the UK Woodland Assurance Standard, which is endorsed by the Forest Stewardship Council and assessed by third-party audit. Private woodlands are subject to the requirements of the UK Forestry Standard; about 3,500 ha of private woodland have also been certified under the UK Woodland Assurance Standard, bringing the total of woodland certified in Northern Ireland to 75%.

### Guidance Paper - Application of Sewage Sludge to Forestry Land

This paper details the technical, scientific and environmental factors which should be taken into account when considering the application of sewage sludge to forests in Northern Ireland. It has been prepared by DARD, Forest Service and Agri-Food and Biosciences Institute (AFBI). It should be read in conjunction with Forestry Commission Information Note FCIN079, Use of Sewage Sludges and Composts in Forestry. The paper identifies suitable soil types within Northern Ireland for sewage sludge applications that are consistent with those specified by the Forestry Commission Information Note. It also sets out maximum rates of fertilisation that will meet the nutrient demand of trees. These rates are based on current fertilisation practices operational within Northern Ireland.

### Woodland Grant Scheme

All proposed Woodland Grant Schemes must comply with the UK Forestry Standard and Guidelines including the Forests and Water Guidelines. Special conditions may apply where planting is proposed within sensitive water catchment areas following consultation with NIEA. Grants are conditional on such conditions being met.

### Environmental Guidelines for Timber Harvesting

Timber harvesting, particularly clearfelling, has the potential to have a more significant impact on the environment than other forestry operations. Sound operational practice and cost-efficiency must be combined with care for the environment. These guidelines are intended to assist forest managers, harvesting managers and contractors to organise and carry out felling and extraction operations in a planned, environmentally sensitive manner. Adherence to the guidelines will contribute to sustainable forest management.

#### 5.5.4 What improvements will current measures achieve?

The risk of acidification has been dramatically reduced during the last 10 years due to collective international efforts to reduce air pollution which is considered the source of the problem resulting in acid rain.

The measures already in place are expected to prevent further deterioration in status. Strategically positioned new woodland and well managed existing forests will benefit the aquatic environment by protecting soils from erosion, landslip and by providing a 'buffer' between watercourses and other land uses.

Riparian woodland can be used as an effective measure to reduce runoff, bank erosion and slow flood waters. Riparian zones act as a nutrient buffer, thus reducing diffuse pollution. Leaf litter from forestry also provides a valuable food source for aquatic species and provides the habitat required for macroinvertebrates that are so important for salmonids. Overhanging trees provide dappled shade and regulate water temperature which is critical for providing suitable spawning and nursery grounds for fish.

The existing measures will improve the quality of the water environment supporting a greater diversity of flora and fauna.

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### 5.5.5 What further actions can we take to deliver environmental improvements?

#### REVISED LEGISLATION, GUIDELINES AND STRATEGY

The existing legislation, binding environmental codes of practice and guidelines play a major role in protecting water quality in forested areas. However, as research increases knowledge of the interaction between forest and water, guidelines may have to be strengthened. Additional guidelines may be required on protection of highly sensitive catchments with species such as the freshwater pearl mussel, trout and salmon.

The Strategy for Sustainability and Growth provides a road map for addressing potential difficulties, for example, current unregulated felling and regeneration of forests will be addressed through the introduction of new regulations compelling forest owners to manage their woods with greater consideration to sustainability, including the timing and extent of felling and the composition of regenerating woods. The lack of an indicative forestry expansion strategy will be addressed through the development of maps indicating the areas where Forest Service believes that forests should be developed. These maps will take account, amongst other matters, of the water environment in connection with increased afforestation, particularly in environmentally sensitive areas with regard to limiting nutrient and sediment losses and acidification.

For forests and associated activities, the key actions are:

- a) Improved guidance based on scientific research for highly sensitive and protected areas (e.g. Pearl Mussel). Environmental protective measures for forestry in sensitive areas can include establishing riparian buffer zones in advance of harvesting, managing the size of coupe (crop) area to be felled to limit nutrient input, managing drainage systems and establishing sediment control systems such as ponds or diffuse overland flow;
- b) to introduce more stringent actions for the most sensitive areas, when scientific evaluation establishes a need. For example, nutrient loading could be reduced in sensitive areas by the phased felling of smaller harvesting coup rather than felling a large forest block all at once;
- c) development of maps indicating where forests should be developed taking account of sensitive and protected areas.
- d) to ensure that future development is undertaken strictly within statutory regulations, water protection guidelines and codes of practice so that forests will have little or no impact on water quality. That applies especially in environmentally sensitive areas, with a need to limit nutrient and sediment losses and acidification;
- e) operations posing a significant threat to water quality should be assessed on a whole catchment basis.

Guidelines must be applied rigorously to ensure compliance with water quality standards; modified or additional codes may be required. These actions will therefore affect the forestry sector: both publicly and privately owned plantations as well as the associated saw-milling and processing industries.

The Pesticides Safety Directorate units will continue to review pesticide authorisation based on the current scientific advice. The cycle of pesticide surveys has been harmonised across Northern Ireland and Ireland so that the same crops are surveyed in the same year throughout.

Summary of existing actions				
Pressure Type: DIFFUSE & POINT SOURCE POLLUTION				
Key Sector: FORESTRY				
Improvement Required	Actions	Responsible Organisations/ Sectors	Delivery mechanism and support	Support Provider/ Regulator
<b>Reduce Sedimentation and Nutrient Input</b>	Catchment management planning	DARD - Forest Service, Private landowners	UK Forestry Standard.	DARD- Forest Service
	Site planning and forest operations		Forest and water guidelines (2003)	DARD- Forest Service
<b>Reduce Pesticide Inputs</b>	Restriction on pesticide marketing Sale and supply of approved pesticides Transport of Pesticides Pesticide Spraying Disposal of dilute pesticides and washings Crop protection management plans Competence of operators	DARD - Forest Service, Private landowners	Alternative energy grants	DARD- Forest Service
			UK Woodland Assurance Standard	DARD- Forest Service
			Woodland Grant Scheme	DARD- Forest Service
			Environmental Impact assessment (Forestry)	DARD- Forest Service
			Northern Ireland Forestry – A strategy for sustainability and growth	DARD- Forest Service
			Guidance Paper - Application of Sewage Sludge to Forestry Land	DARD- Forest Service
			Environmental Guidelines for Timber Harvesting	DARD- Forest Service
			Groundwater Regulations (Northern Ireland) 1998	DOE
			The Water (Northern Ireland) Order 1999	DOE
			Food and Environment Protection Act 1985 (FEPA)	DOE/HSE
The Control of Pesticides (Amendment) Regulations (Northern Ireland) 1997	DOE			
Plant Protection Products Regulations (Northern Ireland) 2005	DOE/HSE			

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## Pressure Type: DIFFUSE & POINT SOURCE POLLUTION

### 5.6 Key Sector: INDUSTRY & OTHER BUSINESSES

#### 5.6.1 Introduction

Northern Ireland has traditionally had an industrial economy, most notably in shipbuilding and textiles. The food and drink sector is now Northern Ireland's largest manufacturing industry. The sector employs over 18,000 people with over 330 processing companies. Other large sectors in Northern Ireland include the electrical and electronics sector and the transport equipment sector. The aquaculture industry in Northern Ireland has grown to be an increasingly successful economic sector. At present there are over 100 licensed aquaculture sites.

The majority of industry is concentrated in industrial estates on the outskirts of Belfast and Londonderry/Derry and other large towns within Northern Ireland. However there are areas of the province where industry is located in more isolated areas. Major industrial estates contain a wide range of businesses from food processors, chemical manufacturers and fuel depots to car washes. Several small streams may flow through these sites and drain into a river, which can be continually affected by various types of pollution from the industrial estate. Within industrial estates drainage networks can often be complex and in many cases small streams are culverted. As new sites are developed and premises change ownership, it is increasingly difficult to locate storm systems, foul sewers, and streams. Companies may not be aware that their drainage is causing pollution, therefore tracing the source and cleaning up becomes difficult when an incident occurs. Industrial sites may also be located in areas where groundwater is vulnerable to inputs of pollutants from spills, leaks or inappropriate disposal.

Industries which discharge directly to waterways are controlled by the Northern Ireland Environment Agency (NIEA) either through Water Order consent or through a Pollution Prevention and Control (PPC) Permit. Other industries discharge effluent to the public sewer and come under the control of Northern Ireland Water.

#### 5.6.2 What causes the environmental impact?

In 2006, industry accounted for 23.2% of substantiated water related pollution incidents. Water pollution associated with industrial premises arises from inadequately treated effluents which can contain:

- Organic matter and ammonia;
- Nutrients;
- Toxic dissolved metals;
- Suspended solids; and
- Hazardous organic chemicals.

The main water pollution types associated with industrial premises include oil, sewage, chemicals and fine sediments. In addition certain types of effluent may cause an increase in the temperature in the receiving water.

#### 5.6.3 What action are we already taking?

##### Key legislation

##### The Water (Northern Ireland) Order 1999

Under the Water (Northern Ireland) Order 1999 (the Water Order) it is an offence to discharge trade or sewage effluent to waterways or water in underground strata without the consent of the Department of the Environment. NIEA administers a system of discharge consents which lay down conditions relating to the quality and quantity of effluent that may be discharged. Numerical limits may be placed on a variety of parameters such as Biochemical Oxygen Demand, Dissolved Oxygen, trace metals, temperature, suspended solids, pH, and visible oil and grease.

Failure to comply with the conditions of a discharge consent is an offence under the Water Order, and, if a discharge

is non-compliant, appropriate action is taken by NIEA, depending on compliance history and/or the severity of the breach of consent and its effect on the environment.

Once a discharge consent has been issued, compliance assessment monitoring is normally carried out where the consent permits a maximum daily discharge of 5 cubic metres or more, or where the consent relates to significant site drainage discharges, such as those for quarries.

### **Pollution Prevention and Control Regulations (Northern Ireland) 2003**

The PPC Regulations control the operation of any installations or mobile plant carrying out activities listed in Schedule 1 of the Regulations. Industries that require regulation under the PPC Regulations include food processing industries, chemical manufacturers, power plants and intensive agricultural operations. NIEA regulate both part A and B processes, a Part A permit covers releases to all media, but Part B Permits cover releases to air only.

Permit conditions for each installation are set in a similar fashion to Water Order Discharge Consents so as to achieve a high level of protection for the aquatic environment. These conditions relate to the quality and quantity of effluent that may be discharged and require the installation to use 'Best Available Techniques' to achieve compliance. Installations are inspected regularly and monitoring requirements are specified in permits which include use of appropriate standards for sampling and analysis. Compliance monitoring is supplemented by independent check monitoring carried out by NIEA. NIEA currently regulates some 230 Part A installations under the Regulations, of these only 16 installations have a direct process discharge to a water course.

Any Part A permitted sites which have discharges to a watercourse have discharge conditions contained within the permit to reduce the pollution potential of the discharge e.g. from roof and yard run off. Failure to comply with a permit discharge condition is an offence under the Regulations and, if a discharge is non-compliant, appropriate action is taken by NIEA, depending on compliance history and/or the severity of the breach of condition and its effect on the watercourse.

### **The Water and Sewerage Services (Northern Ireland) Order 2006**

Industries that discharge trade effluent to sewer are regulated by Northern Ireland Water under the Water and Sewerage Services Order. Northern Ireland Water administers the system of trade effluent discharge consents and applies standards or restrictions to the composition, strength and flow and of consented discharges. Ultimately discharge of treated water from wastewater treatment works is controlled by Water Order consents (please refer to the Programme of Measures sector on the 'Collection and treatment of sewage' for more detail).

### **Groundwater Regulations (Northern Ireland) 1998**

The Groundwater Regulations (NI) 1998 implement the Groundwater Directive (80/68/EEC) which seeks to protect groundwater by preventing the direct discharge of certain hazardous substances and subjecting the discharge of other substances to an authorisation procedure.

A consultation exercise setting out proposals to transpose the new Groundwater Daughter Directive (GWDD) (2006/118/EC) is ongoing. Following the consultation exercise new transposing Regulations incorporating the existing Groundwater Regulations and the relevant requirements of the WFD and the GWDD will be introduced in 2009. More information on this can be found in the 'What further actions can we take to deliver environmental improvements?' section below.

### **European Community Regulation on Registration, Evaluation and Authorisation of Chemicals (REACH) (EC 1907/2006)**

REACH is a new Regulation on chemicals and their safe use. REACH aims to improve the protection of human health and the environment through the better and earlier identification of the intrinsic properties of chemical substances. It will make those who place chemicals on the market responsible for understanding and managing the risks associated with their use. The REACH Regulation will be implemented progressively over a number of years in Northern Ireland with the most hazardous, high volume substances addressed first. Risks to the environment and human health will be

identified and, where necessary, controls will be put in place to ensure a high level of 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;

- PPG 19 - to assist those involved in the management and maintenance of garages and similar vehicle servicing operations;
- PPG 24 - to assist those involved in the management and operation of stables, kennels and catteries;
- PPG 25 - to assist all those involved in the management and maintenance of hospitals and health care establishments.

### **Contingency Planning**

Guidance notes have been drawn up to assist in the development of site specific pollution incident response plans to prevent and mitigate damage to the water environment caused by accidents such as spillages and fires i.e. Pollution incident response planning PPG21. The Control of Major Accident Hazards Regulations (NI) 2000 also requires certain sites to prepare more detailed pollution incident response plans.

### **Environmental Code of Practice for Aquaculture Companies and Traders (ECOPACT)**

The ECOPACT Initiative was launched in Northern Ireland in November 2004 and was developed to bring about the widespread adoption of Environmental Management Systems into the aquaculture industry to provide a strong basis for fish farmers and associated businesses which impact positively on their communities and the environment.

### **PROACTIVE POLLUTION PREVENTION**

NIEA regularly carry out pollution prevention work and inspection and enforcement work targeted at industries that are non-compliant. Numerous targeted surveys have been carried out in order to investigate potential pollution pathways, provide advice on pollution prevention and instigate legal proceedings where pollution incidents are discovered and traced. Surveys can cover a very significant and expanding area. Liaison, follow up work and further site visits are required to ensure that companies take appropriate action to minimise long term pollution risks.

### **VOLUNTARY SCHEMES AND GUIDANCE**

A UK-wide Levy was introduced on the commercial exploitation of aggregates in recognition of the environmental damage caused by their extraction. In Northern Ireland a voluntary Aggregates Levy Credit Scheme (ALCS) was created whereby aggregate operators can avail of an 80% reduction in the Levy. On joining the ALCS Operators sign a legal agreement to comply with all regulatory requirements and to carry out environmental improvements identified by the DOE, following periodic review. On joining the Scheme operators receive a Code of Practice and Audit Protocol which identifies the type of environmental requirements needed to remain within the Scheme. In 2003 NIEA in liaison with the Quarry Products Association established a working group. Through this group significant progress has been made to improve the compliance of this sector particularly in relation to the Aggregates Levy Scheme. In order to avail of the Scheme, a quarry operator must have in place and comply with all relevant environmental consents/licenses. Regular audits are carried out by Planning and Environmental Policy Group of DOE to assess compliance with the scheme.

More recently Guidance for the Wise use of Water in the Aggregates and Quarry Products Industry has been jointly produced by NIEA and the Quarry Products Association of Northern Ireland.

### **EDUCATION AND AWARENESS**

NIEA has established a number of industrial sector working groups aimed at improving compliance with Water Order discharge consents. These groups include quarry operators, sand and gravel extractors, fish farm and hatchery owners and peat bog extractors. NIEA also works in partnership with Invest NI to raise awareness of consent compliance and wider environmental protection issues through workshops, seminars and publications.

**5.6.4 What improvements will current measures achieve?**

In 2006 there were 2336 business with an active discharge that were consented under the Water Order or The Pollution Prevention and Control Regulations (NI) 2003. Of these 759 were monitored. Overall consent compliance in 2006 was 64%. The overall compliance figure of 64% includes monitored compliance for private sewage which is addressed in the chapter on the 'Collection and Treatment of Sewage. Table 5.6 shows compliance for some of the key sectors monitored.

Table 5.6. Number of monitored discharges and compliance for key industry sectors

Industry sector	2000		2006	
	Number of monitored discharges	% Compliance (based on 95%ile)	Number of monitored discharges	% Compliance (based on 95 %ile)
Aggregates and concrete	133	48	89	75
Private Sewage	93	47	120	51
Site drainage	25	52	120	68
Fish farms	17	88	9	78
Food processing	26	23	13	46

Compliance for these sectors has been assessed over a 6 year period between 2000 and 2006. In terms of improvements that have been made as a result of current measures, the aggregates sector (which covers quarries, mines and sand and gravel extractors) has shown an increase in compliance of 27% over the 6 year period. Sand and gravel operations have generally demonstrated a greater improvement in compliance over this period. However compliance problems have been occurring in some concrete and cement manufacturing plants in relation to the pH of effluents.

Fuel depots and premises with site drainage consents have shown modest improvements in discharge compliance in the 6 year period with increases in compliance of 21% and 16% respectively. The type of premises requiring site drainage consent is quite diverse, and includes car parks, peat extraction operations, scrapyards, waste transfer stations and construction sites.

The aquaculture industry sector had the best compliance (78%) with discharge consent conditions in 2006. However over the 6 year period the sector has had a slight reduction (10%) in compliance levels, which was largely due to the failure to provide safe sampling facilities on site. NIEA has been working with the Aquaculture Initiative and in 2007 launched an agreed environmental improvement scheme for this sector.

The food processing industry has consistently show poor compliance over the 6 year period and had a 46% compliance level in 2006. Frequent enforcement action has been taken against a number of consent holders in this sector and a number of these discharges are now subject to control under PPC permit.

Installations permitted under the 2003 Pollution Prevention and Control Regulations require the operator to employ the use of BAT to prevent or minimise pollution. Included in the permits are improvement programmes designed to ensure compliance with permit conditions. Where necessary, improvement conditions may require significant investment to deliver a higher standard of treatment for releases and /or a reduced risk of pollution. Where an operator breaches permit conditions appropriate enforcement action is taken in line with NIEA enforcement policy.

## 5.6.5 What further actions can we take to deliver environmental improvements?

### NEW LEGISLATION AND POLICY

#### a) Oil Storage Regulations

The DOE are currently progressing the development of Oil Storage Regulations for Northern Ireland. The proposed regulations, subject to consultation, will codify existing good practice and set minimum standards for new and existing above ground oil storage facilities. This will provide a legal framework to ensure construction standards are met to minimise the risk of pollution to our waterways.

#### b) European Union 'Mining Waste Directive'

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 Department of the Environment are in the process of introducing legislation to give legal effect to this Directive.

#### c) Proposed Environmental Impact Assessment (Fish Farming in Marine Waters) Regulations

The proposed Regulations will revoke and re-enact, with amendments, the Environmental Impact Assessment (Fish Farming in Marine Waters) Regulations 1999. The proposed Regulations will set out the environmental impact assessment procedures to be undertaken in respect of certain fish farming projects.

#### d) The development of an extended regulatory toolkit

The Groundwater Regulations (NI) 1998 set out an authorisation regime for discharges and disposals in accordance with the 1980 Groundwater Directive and provides NIEA with powers to control other activities which may cause groundwater pollution including consideration to the introduction of codes of practice for potentially polluting activities. Control of diffuse sources of pollution is required by both the Water Framework Directive (WFD) and Article 6 of the Groundwater Daughter Directive (GWDD). Transposition of the GWDD proposes to use a more flexible groundwater protection regime using better regulation principles to extend the toolkit available to the DOE for addressing diffuse pollution whilst at the same time allowing more flexibility to address point sources of pollution.

In Scotland under the Water Environment (Controlled Activities) (Scotland) Regulations 2005, a system of General Binding Rules (GBRs), registration and licensing was introduced. GBRs cover specific low risk activities and activities complying with the rules do not have to apply for a licence as compliance with GBR is considered to be authorisation. Specific small-scale activities that individually pose a small environmental risk but, cumulatively, can result in environmental harm, must register with the Scottish Environmental Protection Agency (SEPA) and adhere to best practice. SEPA issue licences to activities that pose a higher risk and site-specific conditions are set within licences to protect the water environment. It may be that such an extended toolkit may be of benefit in Northern Ireland.

e) A new Planning Policy Statement (PPS) on Planning and Minerals (PPS 19) is currently being prepared within the context of Shaping Our Future – The Regional Development Strategy for Northern Ireland 2025.

### IMPROVED POINT DISCHARGE CONTROLS

#### f) Review of consents

NIEA has committed to delivering a key strategic target of achieving 90% compliance with Water (NI) Order 1999 discharge consent standards by 2016. Industrial discharge consent or permit conditions will be reviewed and where necessary revised, by 2012 to ensure that adequate controls and emission limits are set to achieve new water quality standards in receiving waters. This may require changes to consents or permits issued by NIEA and Northern Ireland Water. NIEA are also considering the further development of mathematical models for all of Northern Ireland to look at cumulative impacts of discharge consents at a catchment scale.

## FURTHER RESEARCH

### g) Diffuse pollution modelling

NIEA are considering updating and further developing the diffuse pollution screening and modelling tool with a view to assessing different loads from a variety of sectors and to allow for prioritisation of new actions. Application of the screening tool will also allow NIEA to take a wider look at the potential diffuse source contributions from other sectors such as amenity and recreational sectors and the transport sector.

### h) Department of Environment, Food and Rural Affairs (DEFRA) Peat Partnership

NIEA are now formally part of the DEFRA peat partnership which aims to facilitate and encourage the coordination of planned activity in order to contribute towards water quality improvement. The anticipated benefits of this project to Northern Ireland include the compilation of an inventory of management best practice and reduction in peat usage.

## Summary of existing actions

**Pressure Type: DIFFUSE & POINT SOURCE POLLUTION**  
**Key Sector: 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
	Reduce nutrient and dangerous substances loadings from industrial discharges	NIEA, NI Water	Water Order consent reviews IPC permit reviews Trade effluent inspections REACH	NIEA
Reduction in nutrients and dangerous substances	Review of minerals planning permissions	Mining and quarrying sector	Review of Old Mineral Permission (ROMP) under Planning Reform Order 2006	DOE

**Pressure Type: DIFFUSE & 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.

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### **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.

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#### 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 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 & POINT SOURCE POLLUTION				
Key Sector: WASTE				
Improvement Required	Actions	Responsible Organisations/ Sectors	Delivery mechanism and support	Support Provider/ Regulator
<b>Reduction in Organic Waste</b>	Prosecution of illegal deposit of controlled waste	All	Water (Northern Ireland) Order 1999 and The Waste & Contaminated Land (Northern Ireland) Order 1997	DOE/ NIEA
	Recovery of benefit from illegal activities which harm the environment	All	The Litter (Northern Ireland) Order 1994 Proceeds of Crime Act (POCA) 2002	District Councils DOE
	Consenting and regulation of all effluent discharges	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	
		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;

5.8

- 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"> <li>• Direct loss of habitat for animals and plants especially fish together with loss of wetlands.</li> <li>• Reduction in biodiversity value.</li> <li>• Increased flood risk by reducing storage of flood water within the system.</li> <li>• Reduction in resilience of system to pollution.</li> </ul>
Abstractions and operation of reservoirs	Lakes and reservoirs	<ul style="list-style-type: none"> <li>• 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.</li> </ul>

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Barriers to fish migration	Rivers, lakes	<ul style="list-style-type: none"> <li>Long-distance migration stopped for salmon, sea trout, eels and lamprey. Reduction in fish stock and potential fishery.</li> <li>Limits short distance migration by other fish. Creates isolated populations which are less resilient to environmental change.</li> </ul>
Barriers to sediment movement	Rivers	<ul style="list-style-type: none"> <li>Dams prevent movement of gravels downstream. Spawning areas for salmonids lost.</li> <li>Ports and breakwaters divert sediment movement along the coast which increases vulnerability to erosion and therefore flooding.</li> </ul>
Engineering structures within water environment	Rivers, lakes	<ul style="list-style-type: none"> <li>Structures use space for ecology depending upon the scale of the works and may prevent the development of normal ecology.</li> <li>Affects the amenity value of water bodies.</li> </ul>
Loss of flood plain	River flood plains	<ul style="list-style-type: none"> <li>Removes wetlands, fish nursery areas and natural buffers against diffuse pollution.</li> <li>Increases flood risk by removing flood plain storage.</li> </ul>
Loss of natural bankside vegetation	Rivers	<ul style="list-style-type: none"> <li>Leads to increased erosion, loss of habitat and reduction of leaf input to rivers (important source of food for insects).</li> <li>Removes wetlands and natural buffers against diffuse pollution.</li> </ul>

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**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 Water Course 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 (Northern Ireland) 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 Deele 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.

#### 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 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

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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.

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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	
<b>Control modifications to surface waters</b>	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	
<b>Control removal of substrate from rivers</b>	Prevent the removal of material from river beds	DCAL	Fisheries Act (Northern Ireland) 1966	DCAL	
		Loughs Agency	For the Foyle and Carlingford Fisheries (Northern Ireland) Order 2007 / Carlingford Fisheries Act 2007 (applies to the Foyle and Carlingford areas)	Loughs Agency	
<b>Protection of fisheries and habitats</b>	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	
<b>Riparian vegetation</b>	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 Sector: MARINE (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 infeasible. 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

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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.

### **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 licence 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.

#### 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.

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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	
<b>Protection of the aquatic marine environment</b>	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)	
<b>Better management of dredging activities within harbours</b>	Adoption of industry or best practice standards	Ports	Existing Harbour Works Regulations	DRD, DARD	
<b>Enhanced Management Practices</b>	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	

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**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 Glastray 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

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	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 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 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 Western River Basin District:

- Common Cord Grass has been found in the coastal waters of Lough Foyle; and
- Zebra Mussels have been found in Upper and Lower Lough Erne and in Carran Lough near Derrygonnelly.

### 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"> <li>• Competition with native flora; results in monoculture of Japanese Knotweed along river banks</li> <li>• Undermining of infrastructure</li> <li>• In winter Japanese Knotweed dies back, exposing the soil which is washed into rivers and causes bank erosion.</li> </ul>
Himalayan Balsam ( <i>Impatiens glandulifera</i> )	Rivers	<ul style="list-style-type: none"> <li>• Compete with native flora which results in a monoculture of Himalayan Balsam along riverbanks</li> <li>• 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.</li> </ul>
Giant Hogweed ( <i>Heracleum mantegazzianum</i> )	Rivers	<ul style="list-style-type: none"> <li>• Pose a health hazard to humans as skin contact with the sap of the plant causes irritation</li> <li>• Exclude native herbaceous plants which can result in riverbank stability</li> <li>• In winter Giant Hogweed dies back, exposing the soil which is washed into rivers and causes bank erosion.</li> </ul>

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<p>Zebra Mussel (<i>Dreissena polymorpha</i>)</p>	<p>Lakes</p>	<ul style="list-style-type: none"> <li>• Smothering of native unionid mussel</li> <li>• Increased macrophyte growth due to increased light penetration which impedes fishing and boat navigation</li> <li>• Decrease in phytoplankton and zooplankton abundance</li> <li>• Mask impact of nutrient status which may result in toxic algae blooms</li> <li>• Cause changes in fish populations</li> <li>• Damage boat engines, block water abstraction intakes and foul jetties.</li> </ul>
<p>Wireweed (<i>Sargassum muticum</i>)</p>	<p>Coasts and estuaries</p>	<ul style="list-style-type: none"> <li>• Competition with native flora</li> <li>• Smother Eel grass beds that are important feeding areas for wading birds in Special Protection Areas.</li> <li>• Reduce light penetration available to under story species.</li> <li>• Prevent oxygen transfer between air and water when present in dense stands. Dense stands can impede navigation in marinas.</li> <li>• Can cause anoxia when the population declines.</li> </ul>

**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 to 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.

#### 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 DOE to take action to control, contain or eradicate 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>.

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

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## 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 Twaité 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 1992, as amended which provide for the making of regulations and byelaws, annually as required, that specify:

- a licensing regime
- close 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 and their 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<sup>2</sup>.
- 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.

<sup>2</sup> 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](http://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 Western River Basin District the Loughs Agency in 1999 initiated a genetic survey of the Foyle salmon stock. This comprised sampling the riverine population and returning adults in the commercial fisheries. This has since been built on over the years and it highlights the diversity of the stocks within the Foyle area and is currently used in managing these to ensure achievement of conservation limits which have been developed for all the major rivers within the Foyle and Carlingford areas. The Agency currently operates a real time management regime in the Foyle area to control exploitation on salmon.

## **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.

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### **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.

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Summary of existing actions

Key Sector: FISHERIES

Improvement Required	Actions	Responsible Organisations/ Sectors	Delivery mechanism and support	Support Provider/ Regulator
<b>Protection of fisheries and habitats</b>	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
<b>Protection and restoration of Salmon habitats</b>	Tagging schemes	Fisheries/ Conservation <i>Consent of copyright holder required for any other use</i>	Atlantic Salmon Management Strategy for Northern Ireland / NASCO Resolutions and Agreements	DCAL/FCB/LA
	fish counting/juvenile stock assessment habitat improvement works		Salmon Management Plan	DCAL/FCB/LA
<b>Protection and maintenance of eel populations</b>	Regulation of commercial eel fisheries	Fisheries/ Conservation	National Eel management Plan for 3 eel river basins	DCAL/LA
<b>Protection and maintenance of coarse fish and pike populations</b>	Coarse fish and pike management	Fisheries/ Conservation	The Fisheries (Amendment) Byelaws (Northern Ireland).	DCAL/FCB/LA
			The Fisheries (Conservation of Coarse Fish) Byelaws (Northern Ireland)	
<b>Improved Fishery management</b>	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
<b>Protection of fisheries and habitats</b>	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;
- a lengthening of 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 25km<sup>2</sup> 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; and
- 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 4. 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 7 - Summary of the implications of climate change for the water environment

Pressure type	Potential implications of climate change
<p><b>Diffuse &amp; point source pollution</b></p>	<ul style="list-style-type: none"> <li>- higher river flows will reduce the impact of pollution in rivers, but can increase loading of pollutants to the sea. This could increase the risk of the failure of microbiological standards in bathing waters and shellfish waters.</li> <li>- higher rainfall with more intense episodes may increase loads of diffuse pollutants from both urban and rural areas.</li> <li>- during periods of lower summer flow, some point source discharges may no longer be adequately diluted.</li> <li>- lower summer flows can also cause reduction in sewer base flows , leading to blockages and potential flooding risks.</li> <li>- higher intensity rainfall in summer following dry periods will increase combined sewer overflow discharges and consequent damage to aquatic life.</li> <li>- 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.</li> <li>- 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.</li> </ul>
<p><b>Abstraction and flow regulation</b></p>	<ul style="list-style-type: none"> <li>- 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.</li> <li>- 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.</li> <li>- drier, hotter summers will increase demand for water and water-related products and activities, putting pressure on abstractions.</li> </ul>

<p><b>Morphology</b></p>	<ul style="list-style-type: none"> <li>- the possibility of more frequent and severe river flooding will increase requirements for flood defence schemes and sustainable flood management.</li> <li>- more intense rainfall and higher flows will result in higher rates of river erosion.</li> <li>- higher rainfall will lead to an increased risk of slope failure causing local hazards and the input of sediments into water courses.</li> <li>- increased erosion from land can lead to siltation of fish spawning gravels and increased nutrient loading to loughs and marine waters.</li> <li>- 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.</li> </ul>
<p><b>Alien Species</b></p>	<ul style="list-style-type: none"> <li>- 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.</li> <li>- 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.</li> <li>- there will be changes in the abundance and distribution of native species and the length of growing season.</li> <li>- higher temperatures will be less favourable for some native species.</li> <li>- 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.</li> <li>- increased riparian and coastal erosion may adversely affect key native species.</li> </ul>

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

Table 5 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 5 - 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"> <li>- Ensure that licences take account of projected new low-flow regimes</li> <li>- Ensure that flood management plans are adequate for projected new higher-flow regimes</li> <li>- Assess impact of new rainfall patterns on combined storm overflow inputs to water bodies.</li> </ul>	<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	Assess existing data for long term trends Assess factors which influence whether pollutant concentration are likely to increase or decrease as a result of increased run-off.	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.



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

## 7 Implementation of the North Western 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 Western 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

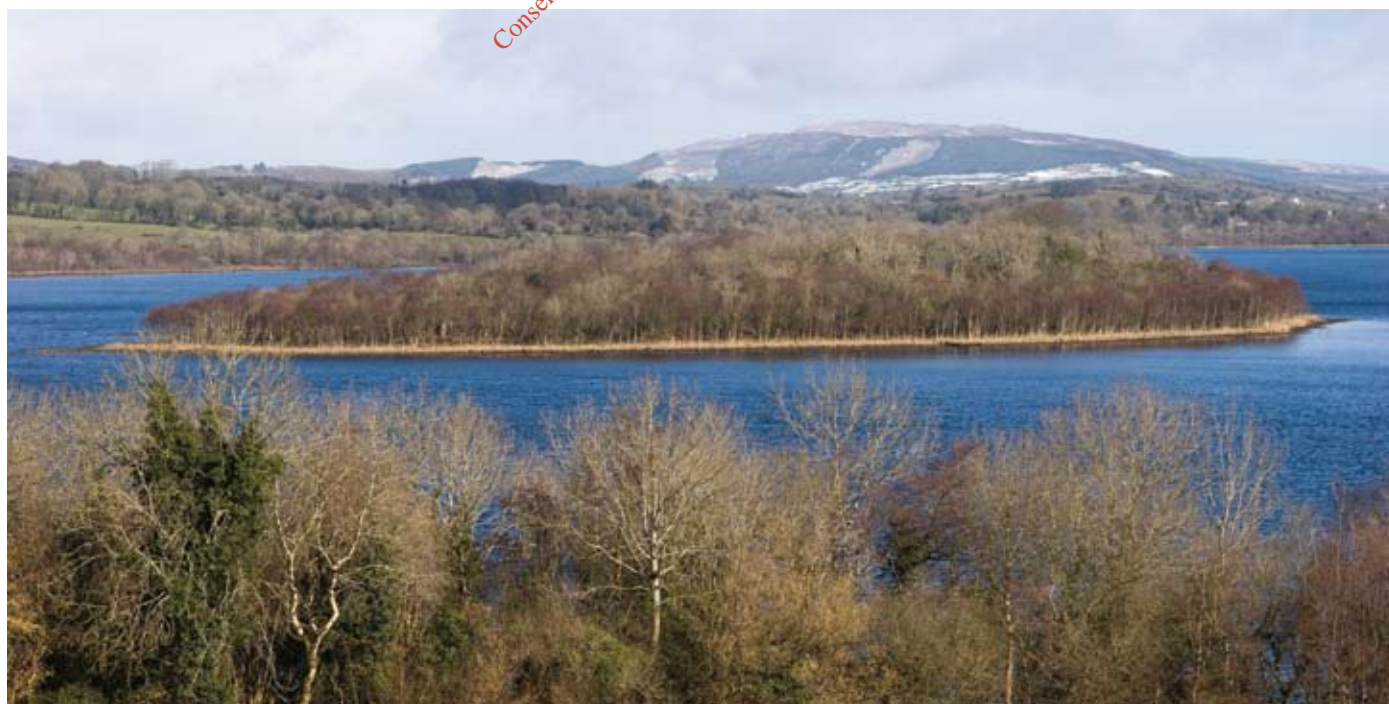
There are a number of existing plans and programmes that contribute to the management of water bodies and act as drivers for change to the water environment. Our water objectives can only be achieved if these plans and programmes in other water protection policy areas are coordinated and integrated.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

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.

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Lough Erne near Kesh

## 8. Public consultation: give us your views

The proposals in the draft North Western 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?

**This consultation runs from 22 December 2008 until 22 June 2009.**

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 Western River Basin District in December 2009.



## How you can respond to this consultation

We encourage you to participate in this consultation. Please respond online at [www.ni-environment.gov.uk/wfd](http://www.ni-environment.gov.uk/wfd) or send your comments to:

- email [riverbasinplanning@doeni.gov.uk](mailto:riverbasinplanning@doeni.gov.uk)
- post Jo Campbell  
North Western River Basin District;  
Northern Ireland Environment Agency  
Water Management Unit  
17 Antrim Road, Lisburn.  
BT28 3AL
- phone 028 92 623100

## 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](http://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 above.

## 9. Acknowledgements

### Photographers

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GSNI

### Maps

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**Northern Ireland portion of the North Western International River Basin District**

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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.

[www.ni-environment.gov.uk](http://www.ni-environment.gov.uk)



An Agency within the Department of  
**Environment**  
[www.doeni.gov.uk](http://www.doeni.gov.uk)



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Winter Farming



River Roe



Castlerock

AW



Whooper Swan

JD