

Strategic Regulatory Impact Assessment of Water Framework Directive Draft River Basin Management Plans

Final Report

October 2009

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Acronyms

AFBI	Agri-Food and Biosciences Institute
ALCS	Aggregates Levy Credit Scheme
BREA	Ballinderry River Enhancement Association
CEA	Cost-effectiveness Analysis
CEDA	Central Dredging Association
CFW	Constructed Farm Wetland
CL	Conservation limits
CMS	Countryside Management Scheme
CRP	Collaborative Research Programme
cSAC	candidate Special Area of Conservation
CSO	Combined sewer overflows
DARD	Department of Agriculture and Rural Development
DCAL	Department of Culture, Arts and Leisure
DETI	Department for Enterprise, Trade and Investment
DLCP	domestic laundry cleaning products
DRD	Department for Regional Development
DWPA	Diffuse water pollution from agriculture
ECOPACT	Environmental Code of Practice for Aquaculture, Companies and Traders
EFF	European Fisheries Fund
EPA	Environmental Protection Agency
FEPA	Food and Environmental Protection Act
FNMS	Farm Nutrient Management Scheme
FPM	Freshwater Pearl Mussel
FTE	full-time equivalent
GBR	General Binding Regulations
GDP	Gross Domestic Product
GEP	Good Ecological Potential
GES	Good Ecological Status
GIS	geographical information system
GWDD	Groundwater Daughter Directive
HSO	Higher Scientific Officer
IAS	Invasive (non-native) Alien Species
ICES	International Council for the Exploration of the Sea
ICW	Integrated Constructed Wetland
NAP	Nitrates Actions Programme
NASCO	North Atlantic Salmon Conservation Organisation
NGO	non-governmental organisation
NI	Northern Ireland
NIA	Northern Ireland Assembly
NICMS	Northern Ireland Countryside Management Scheme
NIEA	Northern Ireland Environment Agency
NIHF	Northern Ireland Hotels Federation
NIRDP	Northern Ireland Rural Development Programme
NIW	Northern Ireland Water
OSNI	Ordinance Survey Northern Ireland
pCEA	Preliminary Cost-Effectiveness Analysis
PPG	Pollution Prevention Guidelines
RBD	River Basin District
RBMP	River Basin Management Plan
RBP	River Basin Planning

REACH	Registration, Evaluation and Authorisation of Chemicals
RIA	Regulatory Impact Assessment
ROMP	Review of Old Mineral Permissions
SAC	Special Area of Conservation
SAP	Species Action Plan
SEA	Strategic Environmental Assessment
SEPA	Scottish Environment Protection Agency
SME	small and medium-sized enterprise
SNIFFER	Scotland and Northern Ireland Forum for Environmental Research
SO	Scientific Officer
sRIA	strategic Regulatory Impact Assessment
SSAFO	Silage, slurry, and agricultural fuel oil
SUDS	Sustainable drainage systems
UKTAG	UK Technical Advisory Group
WFD	Water Framework Directive
WTP	Willingness to pay
WWTW	Waste water treatment works

Executive Summary

Introduction

This strategic Regulatory Impact Assessment (sRIA) concerns the additional measures identified as part of the Water Framework Directive (WFD) River Basin Management Plans (RBMPs) for Northern Ireland.

The primary focus of the WFD is to achieve 'good' status (i.e. good ecological status and chemical status for surface waters and good status for groundwaters) by 2015. To achieve this water quality management should be based on river basins, with management of these basins to be achieved through management plans, a plan being created for each River Basin District (RBD).

The draft plans set out objectives for improvements to the water environment for the next three river basin planning cycles to 2015, 2021 and 2027 with a programme of measures to deliver these objectives. The programme of measures is made up of existing measures and further additional (also referred to as 'supplementary' measures within the Directive). It is these additional measures and their application to Northern Ireland which are the subject of this sRIA.

The costs and benefits of the proposed measures

Benefits from implementation of the WFD will fall to the whole of society within Northern Ireland. They include the obvious improvements to the quality of the water environment but also recreational opportunities, increased aesthetic value, biodiversity benefits, recreational and tourism benefits, and benefits related to human health. There may also be benefits associated with the ecosystem services provided by the water environment, such as reduced flood risk and mitigation for climate change.

Costs of implementation will fall to those regulating and implementing the measures through administrative costs, and to certain sectors of society by way of compliance with regulatory measures. All costs are estimates and are not currently funded (unless otherwise stated), and therefore will be subject to the normal Government budgetary processes.

Table i provides a summary of the forty measures, along with their estimated costs (administrative and compliance) and benefits identified as part of this assessment. There are four types of additional measures, each with a different colour shading in Table i; enabling, voluntary, regulatory, and working with the charitable sector. The majority of the forty measures proposed are classified as 'enabling' measures, in that they are proposals for further research or investigations which will improve existing knowledge. In themselves, the measures will not impose constraints or costs on their sectors (e.g. agriculture, business, the water industry). The cost-effectiveness analysis (CEA), used as the basis of many of the costs and benefits identified within this report, notes that these types of measures are inherently cost-effective. However, they are likely to be followed by further, regulatory measures to improve the water environment which will have further compliance costs and wider benefits. Where possible, a likely indication of these further costs or benefits has been provided.

Based on existing knowledge of the measures, the assessment identifies:

Estimated **administrative costs** total £12.2 million.

Strategic **benefits and compliance costs** where they could be determined and monetarised include:

Measure to ban phosphates in laundry detergents will provide £14.1 million benefits plus £6.9 million to Northern Ireland Water in treatment cost savings.

Benefit from all other measures to reduce eutrophication of £2-4 million.

£100,000 possible benefits through works completed by Rivers Trusts (assuming further trusts are established within Northern Ireland and complete similar works to those already in existence).

Provision of wastewater sewerage from currently unsewered properties at £2 million to complete (one-off).

Development of an Alien Species Strategy could lead to works costing 3-5 million.

In addition, the assessment indicates where significant costs and benefits may fall, depending upon the outcome and subsequent actions of other measures. These are likely to fall to the:

Agricultural sector – significant costs and benefits possible through off-farm waste measures

Fisheries sector – significant benefits to the Northern Ireland economy and at a local, river basin district level

Protected areas – significant benefits depending upon actions determined and carried out within the Species Action Plan for fresh water pearl mussels

Tourism/Recreation – significant benefits are likely to follow the planned improvements in the quality of the water environment

Numerous sectors (including households, agriculture, business and water industry) – the promotion of efficient water use could provide significant benefits through reduced abstraction and reduced costs to households, and businesses if these benefits are passed on.

Table i: Summary of costs and benefits of proposed additional measures

Sector	Pressure	Measure number	Measure description	Type of Measure	Total estimated Administrative cost (unfunded) (£k) 2010-2013	Compliance cost (PV) (15 years at 3.5%) (£k)	Benefits (PV) (15 years at 3.5%) (£k)
Water supply, hydropower and flood control	Abstraction and flow regulation	1	Monitor actual abstraction and compensation flows	enabling	50		
		2	Develop biological tools to assess the ecological impacts of changes in hydrology	enabling	211.2		
		3	Further develop Northern Ireland's Monitoring Programme to cover four biological elements and fish to directly monitor impacts and to incorporate the newly developed biological monitoring tools (Measure 2)	enabling	638.4		
		4	Research to further develop our understanding of the relationship between groundwater and surface waters	enabling	58		
		5	More detailed assessment of water resource availability and management priorities	enabling	162		
		6	Developing a tool to assess the extent to which barriers impede migration of a wide range of fish species	enabling	100		

Sector	Pressure	Measure number	Measure description	Type of Measure	Total estimated Administrative cost (£k) 2010-2013	Compliance cost (PV) (15 years at 3.5%) (£k)	Benefits (PV) (15 years at 3.5%) (£k)
Agriculture	Point and Diffuse pollution	7	To promote best management practices including using feedstuffs designed to minimise phosphorus in excreta without compromising animal health (advisory resource to promote best practice in farm yard management and nutrient management. With research funding into poultry diets.)	voluntary	2,120	None	Potentially significant at the RBD level
		8	Work with the intensive pig and poultry farming sectors for an off-farm solution to dealing with manures and thereby reduce phosphorus surplus (technical and policy work relating to development of alternative technologies)	enabling	28	Likely to be significant if subsequent measures can be identified	Likely to be significant if subsequent measures can be identified
		9	Review the need to give statutory effect to phosphorous balances on individual farm holdings	enabling	No further funding required		
		10	Develop GIS-based tool to further identify and regulate diffuse pollution (from agriculture) (same measure as 26 and 21)	enabling	321.2 (to also cover measures 21, and 26)		
		11	Develop catchment management plans to identify and target diffuse pollution from agriculture.	enabling	726.60		Benefit from reduced eutrophication of £2,000 – 4,000 from all measures to address pressure.

Sector	Pressure	Measure number	Measure description	Type of Measure	Total estimated Administrative cost (£k) 2010-2013	Compliance cost (PV) (15 years at 3.5%) (£k)	Benefits (PV) (15 years at 3.5%) (£k)
		40	Effectiveness of wetlands in the reduction of nutrient loadings	enabling	-		1.1
Collection and treatment of sewage	Point and Diffuse pollution	12	Review of wastewater consents	enabling	197.70		
		13	Provision of wastewater sewerage from currently unsewered properties	regulatory	-	2,000 (one-off)	Potentially significant
		14	Improved policy, guidance and development control for septic tanks	enabling	25		
		15	Research mapping and investigation of further controls for large unsewered populations.	enabling	-		
		16	Phosphate-free laundry detergents	regulatory	No further funding required	None	14,100 plus 6,910.38 to NIW
		17	Development control in relation to sewage treatment capacity and receiving water bodies	regulatory	121.2	-	-
		38	Installation of reed beds and constructed wetlands for sewage treatment	voluntary	-	Per application and installation	Localised
		39	Awareness programme on septic tank maintenance, installation and design	enabling	-		

Sector	Pressure	Measure number	Measure description	Type of Measure	Total estimated Administrative cost (£k) 2010-2013	Compliance cost (PV) (15 years at 3.5%) (£k)	Benefits (PV) (15 years at 3.5%) (£k)
Urban development	Point and Diffuse pollution	18	Draft Strategy to manage stormwater using SUDS	regulatory	-	-	-
		19	Strategy for better management of misconnections	enabling	202.80		
		20	Development of an extended regulatory toolkit for diffuse pollution (same measure as 24)	enabling	Same work as Measure 24. Not yet assessed.		
		21	Update diffuse pollution screening and modelling tool (same measure as 26 and 10)	enabling	Under same budget as Measures No. 10 and 26.		
		22	Good practice for the storage and handling of hazardous chemicals	regulatory	-	-	-
Forestry	Point and Diffuse pollution	23	Reduce nutrient loading from forestry in sensitive areas	regulatory	202.8	Costs to agricultural and forestry sectors likely	Likely to be significant depending upon measures identified
Industry and other businesses	Point and Diffuse pollution	24	Development of an extended regulatory toolkit for diffuse pollution (same measure as 20)	enabling	Same as 20. Not yet assessed.		
		25	Review of consents for point discharge controls	enabling	-		

Sector	Pressure	Measure number	Measure description	Type of Measure	Total estimated Administrative cost (£k) 2010-2013	Compliance cost (PV) (15 years at 3.5%) (£k)	Benefits (PV) (15 years at 3.5%) (£k)
		26	Update diffuse pollution screening and modelling tool (same measure as 21 and 10)	enabling	Under the same budget as Measures No. 10 and 21.		
Historical engineering, Urban development, Public water supply, Hydropower, Agriculture and Forestry	Freshwater morphology	27	Review of controls on hydromorphology	enabling	met within existing resources		
		28	River restoration measures review	regulatory	2,927.50		
		29	Strategic appraisal of barriers to fish (Ongoing measure, already funded)	enabling	Funded within existing resources	Measure outside scope sRIA	Measure outside scope sRIA
Ports and Harbours, Aggregate & Fishing/Aquaculture industry (Marine)	Marine morphology	30	Development of a Protocol for Maintenance Dredging	regulatory	-	Insignificant	-
All sectors	Invasive alien species	31	Invasive Species Ireland Project	enabling			

Sector	Pressure	Measure number	Measure description	Type of Measure	Total estimated Administrative cost (£k) 2010-2013	Compliance cost (PV) (15 years at 3.5%) (£k)	Benefits (PV) (15 years at 3.5%) (£k)
		32	Development of Alien Species strategy	enabling	595.50	3,000-15,000	Significant avoidance of further costs possible
Fisheries	All pressures	33	Implementation of Eel Management Plans	regulatory	1,750 (to 2015)		Significant benefits for NI economy and at a local level
		34	Mitigation to impacts of drainage maintenance works on habitat	regulatory	1,050	None	
Protected areas	All pressures	35	Development of action plans for designated freshwater pearl mussel SACs	regulatory	392.4 (if Interreg funding not won)	Dependent upon results of action plan	Dependent upon results of action plan
Public participation	All pressures	36	Facilitate establishment of River Trusts across NI	Working with charitable sector	180.0	None	100
		37	Promotion of efficient use of water	voluntary	136.2		Depending on measures taken – could be significant

Notes to table:

‘-’ denotes it is too early to confirm a value

Measures 10, 21 and 26 are the same measure; as are measures 20 and 24.

1. Structure of the document

- 1.1 Sections 1-11 provide a background and introduction to the assessment including methodology and scope.
- 1.2 Section 12 onwards provides an assessment of the measures according to the sector in which they fall. The pressure is described, followed by an indication of basic measures in place, the additional measures proposed, and their respective costs, risks, and benefits.
 - Section 12: Water Supply, Hydropower and Flood Control (Water Resources)
 - Section 13: Agriculture (Diffuse and Point Source Pollution)
 - Section 14: Collection and Treatment of Sewage (Diffuse and Point Source Pollution)
 - Section 15: Urban Development (Diffuse and Point Source Pollution)
 - Section 16: Forestry (Diffuse and Point Source Pollution)
 - Section 17: Industry and Other Business (Diffuse and Point Source Pollution)
 - Section 18: Historical Engineering, Urban Development, Public Water Supply, Hydropower, Agriculture and Forestry (Freshwater Morphology)
 - Section 19: Ports and harbours, Aggregate and Fishing/Aquaculture Industry (Marine Morphology)
 - Section 20: All sectors (Invasive Alien Species)
 - Section 21: Fisheries (All pressures)
 - Section 22: Protected Areas (All pressures)
 - Section 23: Public Participation (All pressures)
- 1.3 Section 24 is the Competition Test; and Section 25 is the Small Firms Impact Test

2. Background

- 2.1 The Water Framework Directive (WFD) requires Government to assess the water environment in a 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 alien (non-native) species. It also requires that the existing measures and new measures being taken to deal with these impacts are both integrated and coordinated across river basins.
- 2.2 The primary focus of the Directive is to achieve 'good' status (i.e. good ecological status and chemical status for surface waters and good status for groundwaters) by 2015. To achieve this water quality management should be based on river basins, with management of these basins to be achieved through management plans, a plan being created for each River Basin District (RBD).
- 2.3 The river basin planning approach 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 the first plans are being developed for the period from 2009 to 2015.
- 2.4 WFD was established in law in Northern Ireland (NI) 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. The 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 (DARD), the Department of Culture, Arts and Leisure (DCAL) and the Department for Regional Development (DRD).

3. River Basin Management Planning

- 3.1 Within Northern Ireland, draft River Basin Management Plans (RBMPs) and supporting documents were produced in December 2008 for the North Eastern River Basin District and the two International RBDs, the Neagh Bann and the North Western IRBDs¹. A draft plan was also produced for the Shannon International River Basin District (IRBD). Only a small portion of this district lies within Northern Ireland, therefore the drafting of this plan was led by the authorities in Ireland. All four RBDs are shown in Figure 3.1.
- 3.2 Each finalised RBMP contains information relating to the pressures and impacts on the water environment ("Characterisation Reports"). These give some indication of whether such effects are likely to inhibit the accomplishment of good status. The plans set out a programme of measures to show improvements that can be made to meet those objectives. The "Programme of Measures" consists of policies and strategies, such as monitoring programmes, that are intended to reduce the risk to water bodies and allow them to attain good status. Existing measures (referred to as "Basic Measures" within the Directive), will achieve significant improvements to the water environment. However, additional measures (also referred to as "Supplementary Measures" within the Directive), will be needed to achieved further improvements by 2015.
- 3.3 It is these proposed additional or supplementary measures which are the subject of this assessment. By completing a strategic Regulatory Impact Assessment (sRIA) of the measures it will assist in identifying the potential costs, impacts and the benefits they might bring. To this end, the sRIA will help the Government of Northern Ireland effectively plan and manage their implementation within the first and future river basin management planning cycles.

¹ (<http://www.ni-environment.gov.uk/water/wfd.htm>)

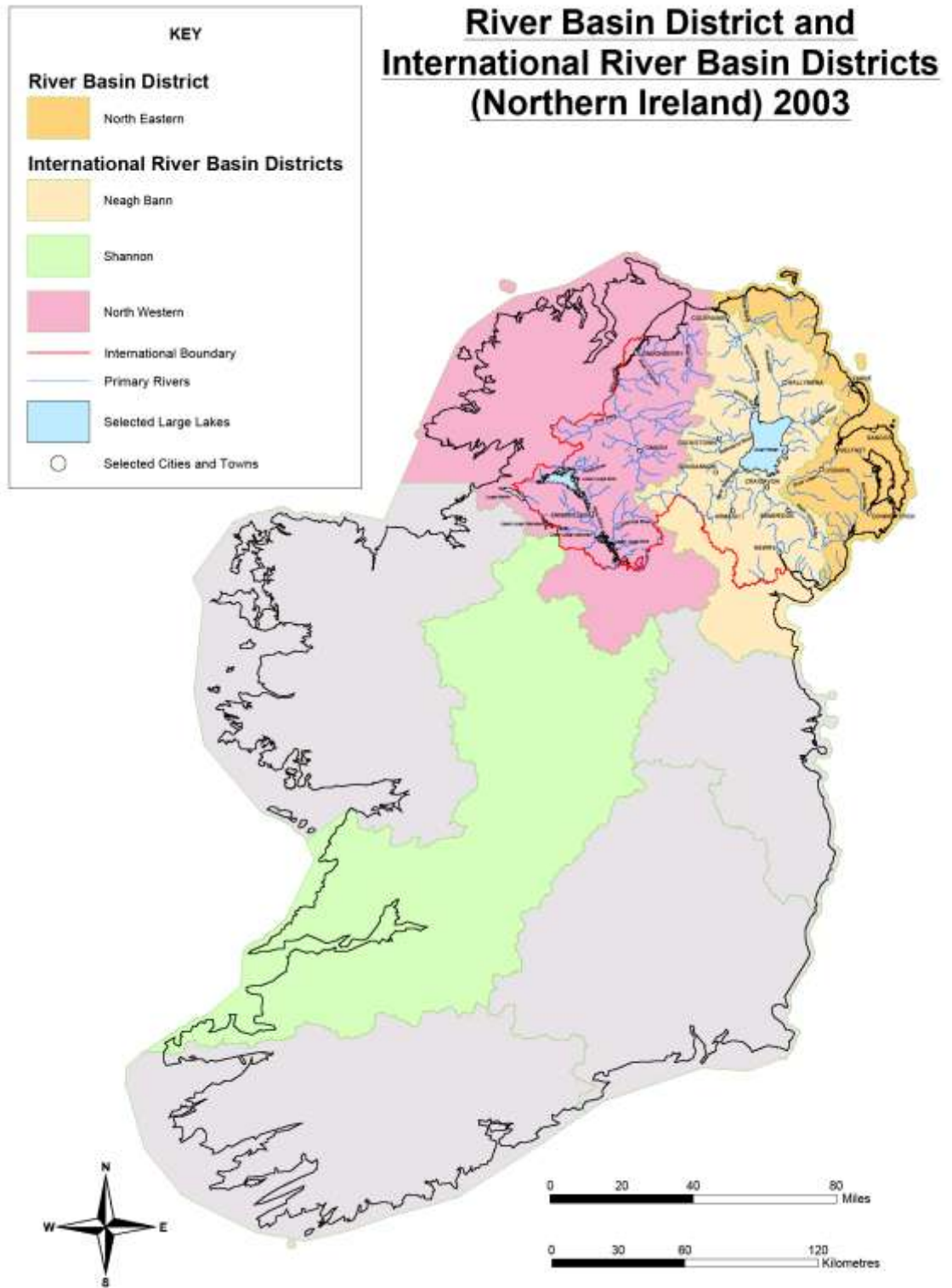


Figure 3.1: National and International River Basin Districts for Northern Ireland

Figure based on OSNI Mapping - Crown Copyright 2004 Permit No. 30376 based on river basin district datasets as prepared by the then Environment and Heritage Service (now NIEA) and the Environmental Protection Agency (EPA) prepared for the purposes of the Water Framework Directive.

4. What is the problem under consideration?

- 4.1 The initial 2005 WFD characterisation assessment indicated that overall around 90% of water bodies in Northern Ireland were at risk of not meeting the Directive's environmental objectives, including 538 rivers, 23 lakes, 7 transitional, 19 coastal and 15 groundwater bodies². These figures were based on an assessment of risk. Further monitoring and assessment undertaken by NIEA indicates that currently 71% of all waterbodies are not meeting WFD objectives, as detailed in Table 5.1 (2009).
- 4.2 Without Government intervention, and the identification of additional measures, there is a significant risk that water environment improvements required by the WFD will not be realised.
- 4.3 The main pressures and issues for those waters in Northern Ireland not achieving good status or better are as listed below, and provide a structure for assessing the impact of the proposed measures:
- 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); and
 - Invasive alien (non-native) species.

5. Purpose of intended effect of Measures

- 5.1 Under the WFD, a programme of measures will be implemented following publication of the final RBMPs with the aim of achieving Good Ecological Status (GES) or Good Ecological Potential (GEP) by 2015. However, it will not be possible to achieve GES or GEP in all water bodies by 2015. In some cases the measures required to achieve that deadline would be technically infeasible or disproportionately expensive. In these cases the Directive allows the timetable to be extended by up to 12 years (two subsequent RBP cycles) by the setting of alternative objectives (extended deadlines). The deadline can be extended to 2027 if it is disproportionately expensive or technically infeasible to achieve Good Status by 2015. If it is still not possible to achieve Good Status by 2027 then it may be possible to set a Less Stringent Objective.
- 5.2 Table 5.1 shows the current situation and agreed approach for Northern Ireland to reach GES or GEP for all waterbodies through the next three cycles.

² Article 5 Report for Northern Ireland (2005) (different to above)

Table 5.1: Northern Ireland WFD compliance 2009

	Number or % of water bodies	2009	2015	2021	2027
Rivers	Good/GEP or better	116	325	535	563
	%	20.2%	56.5%	93.0%	97.9%
	Less than Good/GEP	459	250	40	12
	%	79.8%	43.5%	7.0%	2.1%
Lakes	Good/GEP or better	6	7	14	22
	%	27.3%	31.8%	63.6%	100.0%
	Less than Good/GEP	16	15	8	0
	%	72.7%	68.2%	36.4%	0.0%
Coastal	Good/GEP or better	8	12	20	20
	%	40.0%	60.0%	100.0%	100.0%
	Less than Good/GEP	12	8	0	0
	%	60.0%	40.0%	0.0%	0.0%
Transitional	Good/GEP or better	0	1	4	7
	%	0.0%	14.3%	57.1%	100.0%
	Less than Good/GEP	7	6	3	0
	%	100.0%	85.7%	42.9%	0.0%
Groundwater	Good or better	65	65	66	67
	%	97.0%	97.0%	98.5%	100.0%
	Less than Good	2	2	1	0
	%	3.0%	3.0%	1.5%	0.0%
All Water bodies	Good/GEP or better	195	440	635	679
	%	28.2%	63.7%	91.9%	98.3%
	Less than Good/GEP	496	251	56	12
	%	71.8%	36.3%	8.1%	1.7%

6. Strategic RIA

- 6.1 It should be noted that clear guidance is not available on the completion of a ‘Strategic’ RIA (sRIA). Accordingly, we have interpreted the requirements as such:
- Costs and benefits are assessed at a high level, that is, across the country of Northern Ireland as a whole;
 - Impacts are considered as they apply to Northern Ireland: its regulatory framework, natural environment, citizens and economy;
 - Information from all three RBMPs and accompanying Strategic Environmental Assessments (SEAs) is considered as a whole. However, this does not preclude the inclusion of more specific, localised information where it is judged relevant to the achievement of WFD objectives by 2015; and
 - As many of the additional measures are still at an early stage of development, it may not be possible to determine precise detail on the costs and benefits attributable to them at this stage. A strategic RIA will therefore assist the policy process in determining likely costs, benefits and risks (where information is available) to guide further development of policy options.
- 6.2 The decision to complete a Strategic RIA fits with much of the assessment of the RBMPs to date, completed at the NI scale, and the expectation of further detail on the forty measures being available during the implementation phase.

7. Options

Baseline (do nothing)

- 7.1 The first option is to ‘do nothing’. This refers to the current water quality situation (2009) as outlined in Table 5.1 Continued use of relevant existing standards and basic measures that make up the programme of measures are assumed to be in place. In reality, this is not a realistic option as it will lead to failure to achieve WFD objectives by 2027 and may well put the Northern Ireland government at risk of infraction proceedings by the EU, with the further risk of a fine or the requirement to introduce measures which are less cost-effective than it would otherwise adopt.

Additional Measures

- 7.2 This option is to begin implementation of all remaining³ additional measures, as determined by the NIEA, from 2009. The measures are those identified within the draft RBMPs for Northern Ireland, with further measures suggested from consultee responses. It has been recognised that these measures (also referred to as “Supplementary Measures” within the Directive), will be needed to achieve improvements to the water environment by 2015, in addition to “Basic measures”.
- 7.3 Table 7.1 lists 40 measures along with their respective sectors and pressures.

³ Measure 29 has already been agreed, funded, and work started to complete the measure.

Table 7.1: Table of measures reviewed by sector and pressure and type of measure

Sector	Pressure	Measure type	Number	Measure description
Water supply, hydropower and flood control	Abstraction and flow regulation	enabling	1	Monitor actual abstraction and compensation flows.
		enabling	2	Develop biological tools to assess the ecological impacts of changes in hydrology.
		enabling	3	Further develop Northern Ireland's Monitoring Programme to cover four biological elements and fish to directly monitor impacts and to incorporate the newly developed biological monitoring tools (Measure 2)
		enabling	4	Research to further develop our understanding of the relationship between groundwater and surface waters
		enabling	5	More detailed assessment of water resource availability and management priorities
		enabling	6	Developing a tool to assess the extent to which barriers impede migration of a wide range of fish species
Agriculture	Point and Diffuse pollution	voluntary	7	Proposed voluntary measures to reduce the level of phosphorus in feed stuffs
		enabling	8	Work with the intensive pig and poultry farming sectors for an off-farm solution to dealing with manures and thereby reduce phosphorus surplus
		enabling	9	Review the need to give statutory effect to phosphorous balances on individual farm holdings
		enabling	10	Develop GIS-based tool to further identify and regulate diffuse pollution (same as 21 and 26)
		enabling	11	Develop catchment management plans to identify and target diffuse pollution from agriculture.
		enabling	40	Effectiveness of wetlands in the reduction of nutrient loadings
Collection and treatment of sewage	Point and Diffuse Pollution	enabling	12	Review of wastewater consents
		regulatory	13	Provision of wastewater sewerage from currently unsewered properties
		regulatory	14	Improved policy, guidance and development control for septic tanks

		enabling	15	Research mapping and investigation of further controls for large unsewered populations.
		regulatory	16	Phosphate-free laundry detergents
		regulatory	17	Development control in relation to sewage treatment capacity and receiving water bodies
		voluntary	38	Installation of reed beds and constructed wetlands for sewage treatment
		enabling	39	Awareness programme on septic tank maintenance, installation and design
Urban development	Point and Diffuse pollution	regulatory	18	Draft Strategy to manage stormwater using SUDS
		enabling	19	Strategy for better management of misconnections
		enabling	20	Development of an extended regulatory toolkit for diffuse pollution (same as 24)
		enabling	21	Update diffuse pollution screening and modelling tool (same as 26 and 10)
		regulatory	22	Good practice for the storage and handling of hazardous chemicals
Forestry	Point and Diffuse pollution	regulatory	23	Reduce nutrient loading from forestry in sensitive areas
Industry and other businesses	Point and Diffuse pollution	regulatory	24	Development of an extended regulatory toolkit for diffuse pollution (same as 20)
		enabling	25	Review of consents for point discharge controls
		enabling	26	Update diffuse pollution screening and modelling tool (same as 21 and 10)
Historical engineering, Urban development, Public water supply, Hydropower, Agriculture and Forestry	Freshwater morphology	enabling	27	Review of controls on hydromorphology
		regulatory	28	River restoration measures
		enabling	29	Strategic appraisal of barriers to fish ⁴
Ports and Harbours, Aggregate & Fishing/Aquaculture industry (Marine)	Marine morphology	regulatory	30	Development of a Protocol for Maintenance Dredging
All sectors	Invasive alien species	enabling	31	Invasive Species Ireland Project
		enabling	32	Development of Alien Species strategy

⁴ Measure is currently being taken forward within existing resources

Fisheries	All pressures	regulatory	33	Implementation of Eel Management Plans
		regulatory	34	Mitigation to impacts of drainage maintenance works on habitat
Protected areas	All pressures	regulatory	35	Development of action plans for designated freshwater pearl mussel SACs
Public participation	All pressures	Working with charitable sector	36	Facilitate the establishment of River Trusts across NI
		voluntary	37	Promotion of efficient use of water

Measures 10, 21 and 26 are the same measure, but are to be developed for use within three different sectors (Industry and other businesses, agriculture, and urban development); and Measures 20 and 24 are also the same measure.

Table 7.1 also categorises each measure type, according to whether it is:

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

7.4 The type of measure (as identified in table 7.1) is important in terms of assessing its impact.

7.5 Enabling measures, which make up the majority of the proposed measures, will not in themselves impose any costs on the sectors, or easily quantifiable benefits. They have been proposed to improve the level of understanding within NIEA or other Government organisations, and will in all likelihood be followed by further regulatory measures.

Other potential options

7.6 Consideration would have been given to other options, such as alternative additional measures to achieve WFD objectives, or phased approaches to delivery of measures. However, this has not been possible given the limited time to complete this assessment (September 2009). Notably, work within the implementation phase will include identification of the use of alternative additional measures where appropriate which may also include taking forward measures in a subsequent planning cycle.

8. When will the policy be reviewed to establish the actual cost and benefits and the achievement of the desired effects?

8.1 Further details of the measures and their associated impacts, costs and benefits will become known as the WFD implementation process progresses. Most especially, once the RBP process identifies measures at a RBD level; and following the completion of the enabling (research/tool

Manning, C. (2001) EVALUATION OF THE ECONOMIC BENEFITS OF THE WESTCOUNTRY RIVERS TRUST TAW/TORRIDGE PROJECT. Report Prepared for the Westcountry Rivers Trust

Northern Ireland Hotels Federation (NIHF) (2007) Tourism in Northern Ireland: A Strategy for Growth
http://www.nihf.co.uk/fs/doc/Tourism_in_Northern_Ireland.pdf

Outputs from the Collaborative Research Programme on WFD economics (www.wfdcrp.co.uk):

- a) Project 2c Benchmark costs database and guidance on the application of the cost-effectiveness methodology as updated by Project 2e Deriving the Costs and Effectiveness of Delivery Mechanisms. This includes guidance on cost-effectiveness analysis, cost calculation tool and cost database [currently being reviewed].
- b) Project 4bc – Nera survey report - Report on National Water Environment Benefits survey
- c) Project 3 Guidance on the evidence required to justify disproportionate cost decisions under the WFD. This includes - revised summary guidance

Results of Preliminary Cost Effectiveness Analysis of the Water Framework Directive Revised after Stakeholder Review December 2007(www.wfdcrp.co.uk)

- a) Introduction, policy context and methodology and methodology
- b) Synthesis report chapters for each pressure Chapter 4.1: Chemicals Chapter 4.2: Water Resources Chapter 4.3: Nutrients Chapter 4.4: Alien Species & Fisheries Chapter 4.5: Morphology & Biodiversity Chapter 4.6: Sanitary Chapter 4.7: Sediment Chapter 4.8: Microbiology Chapter 4.9: Minewaters Chapter 4.10: Planning Chapter 4.11: Temperature Chapter 4.12: Administrative Costs
- c) Chapter 5: Sector Summary

Royal Haskoning, 2007. Management Strategies and Mitigation Measures Required to Deliver WFD for Flood Defence Structures and Small Scale Impoundments. SNIFFERWFD 76.

Stokes, K., O'Neill, K. & McDonald, R.A. (2006) Invasive species in Ireland. Report to Environment & Heritage Service and National Parks & Wildlife Service by Quercus, Queens University. Environment & Heritage Service, Belfast and National Parks & Wildlife Service, Dublin.

UKWIR- SNIFFER (2008) Source control of phosphorus from domestic sources: Options and Impacts.

Tamar Consulting (2006) Rivers in trust - the success of the rivers trusts in the UK. A report for WWF-UK

Young, M.R., Cosgrove, P.J. & Hastie, L.C. (2000) The extent of, and causes for, the decline of a highly threatened naiad: *Margaritifera margaritifera*. In: Bauer, G. and Wachtler, K. (eds) Ecology and Evolutionary Biology of Freshwater Mussels Unionoidea. Springer-Verlag, Heidelberg.