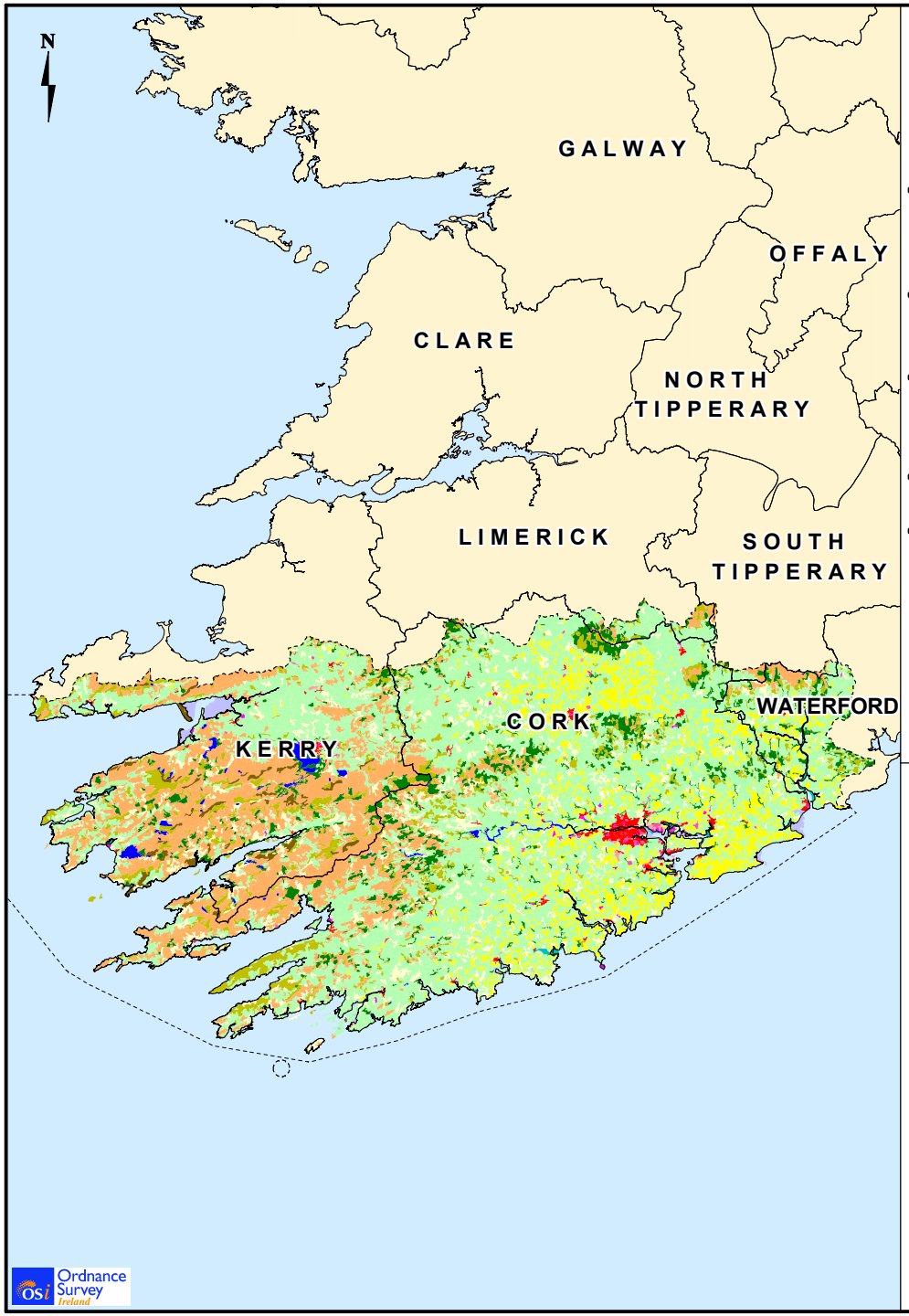
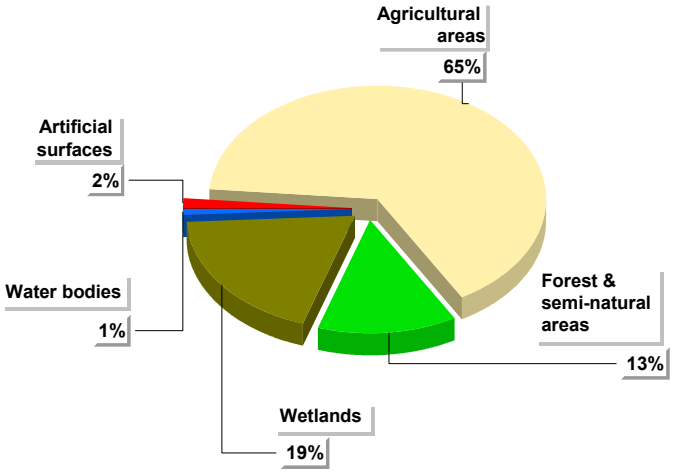



## LEGEND:

Corine Landcover

| Level 1 | Level 2 | Level 3 |
|---|---|---|
| Artificial Surface | Urban fabric | Continuous urban fabric<br>Discontinuous Urban Fabric |
| | Industrial, commercial and transport units | Industrial or commercial units<br>Roads and rail network<br>Airports |
| | Mine, dump and construction sites | Mineral extraction sites<br>Construction sites |
| | Artificial, non-agricultural vegetated areas | Sport and leisure facilities |
| Agricultural Areas | Arable land | Non-irrigated arable land |
| | Pastures | Pasture |
| | Heterogeneous agricultural areas | Complex cultivation patterns<br>Land principally occupied by agriculture |
| Forest and Semi-Natural Areas | Forests | Broadleaf Forest<br>Coniferous Forest<br>Mixed forest |
| | Scrub and/or herbaceous vegetations | Natural grasslands<br>Moors and heathland<br>Transitional woodland/scrub |
| | Open spaces with little or no vegetation | Beaches dunes sands |
| Wetlands | Inland wetlands | Inland Marshes<br>Peat Bogs |
| | Coastal wetlands | Intertidal flats<br>Salt marshes |
| Water Bodies | Continental waters | Water Bodies |
| | Marine waters | Estuaries |

## Corine Landcover Level 1




**Data Source: EPA**



**Project** *South Western River Basin Management Plan SEA*

**Title**

# Corine Landcover for South Western RBD

**Figure** 5.14

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| Issue Details | | | |
|---|---|---|---|
| Drawn: | A. A. | Project No. | MDE0751 |
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**Notes**

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# 6 REVIEW OF RELEVANT POLICIES, PLANS AND PROGRAMMES

The objective of the SEA Directive is "to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations in the preparation and adoption of plans and programmes with a view to promoting sustainable development".

In order to meet the requirements of the Directive in this respect, the environmental assessment must "identify the environmental protection objectives, established at International, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation".

The purpose of this review is to take into consideration the policy and legislative framework within which the South Western River Basin Management Plan and Programme of Measures is being developed. Consideration of the key statutory and non-statutory plans, programmes and policies relevant to the RBMP and associated POM was undertaken in order to inform the SEA of the environmental objectives and targets of these other plans, policies and programmes. As the scope of the Plan has been set at River Basin District level the review includes national, European and International plans and programmes. In reviewing other plans, the following questions were asked:

(i) Does the Plan contribute to the fulfilment of objectives and goals set in other Plans?

(ii) To what degree are the goals and objectives set in other plans and programmes impacted by the Plan?

**Tables 6.1 to 6.4** below summarise the key legislation, Plans and Programmes considered most relevant to the RBMP and POM. The full list of legislation, plans and programmes considered is included in the appendix to this chapter.

**Table 6.1** outlines the key **international** legislation, plans and programmes of relevance.

**Table 6.2** includes key **European Union** legislation, plans and programmes covering all relevant aspects of environmental protection.

**Table 6.3** presents the key Legislation, plans and programmes in **Ireland**; these overlap somewhat with the European level plans and programmes.

**Table 6.1 Key Conventions, Legislation, Plans, Policies and Programmes - International**

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan? |
|---|---|---|---|---|
| Biodiversity | OSPAR Convention (1992) The Convention for the Protection of the Marine Environment of the North-East Atlantic | The current instrument guiding international cooperation on the protection of the marine environment of the North-East Atlantic. Objectives include the protection of the marine environment. | The purpose of the Plan is to achieve good water quality status in all water bodies, including coastal water bodies, or maintain high quality or good status in those bodies currently achieving these. As such the Plan will aim to prevent pollution of the marine environment. | The POM, which is an integral part of the Plan, includes specific measures aimed at addressing pollution of the marine environment. It should be noted however that these measures are restricted to the one-nautical mile radius boundary identified in the Plan. |
| | UN Convention on Biological Diversity (1992) | Objectives include the maintenance and enhancement of Biodiversity. | The Plan should aim to minimise impacts on biodiversity. The impacts of the Plan on biodiversity are largely expected to be positive, with potential negative impacts likely occurring only at a site level (e.g. construction of new infrastructure). The favouring of infrastructure that carry a lower risk of damage to biodiversity could however be emphasised in the Plan. | These objectives are addressed in several places in the POM as these are aimed at protecting and improving water quality in order to protect aquatic environments and the species dependent on these. In addition, the POM includes measures aimed at maintaining the quantity of water available for aquatic habitats and species as well as maintaining the required morphological conditions. |
| | The Ramsar Convention The Convention on Wetlands of International Importance (1971 and amendments) | Objectives include protection and conservation of wetlands, particularly those of importance to waterfowl as Waterfowl Habitat. | The impacts of the Plan on wetlands are largely expected to be positive, due to the water quality objectives included in the Plan. | See above. |
| Climate | UN Kyoto Protocol The United Nations Framework Convention on Climate Change (UNFCCC) Kyoto Protocol 1997 | Objectives seek to alleviate the impacts of climate change and reduce global emissions of GHGs. | Impacts related to climate change should be considered during development of the Programme of Measures for the Plan. | Several mitigation measures included in the SEA recommend mechanisms to reduce GHG emissions associated with water management. These are aimed at achieving the objectives of this Protocol. |

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan? |
|---|---|---|---|---|
| Environment / Pollution Prevention | The MARPOL Convention International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78). | Objectives include for the protection of the marine environment. | The purpose of the Plan is to achieve good water quality status in all water bodies, including coastal water bodies, or maintain high quality or good status in those bodies currently achieving these. As such the Plan will aim to prevent pollution of the marine environment. | The POM, which is an integral part of the Plan, includes specific measures aimed at addressing pollution of the marine environment. It should be noted however that these measures are restricted to the one-nautical mile radius boundary identified in the Plan. |
| Human Health / Air | The Stockholm Convention (2001) | Objectives seek to protect human health and the environment from persistent organic pollutants (POPs). | The Plan should aim to prevent such pollution. The impacts of the Plan on human health are largely expected to be positive due to the water quality objectives included in the Plan. | The items in the POM aimed at reducing inputs of dangerous substances are, in part, aimed at reducing the impact of POPs and thus the impact to water quality, human health and the general environment. |

*Please see the appendix to this chapter for the full list of legislation, plans and programmes considered.*

### Table 6.2 Key Legislation, Plans, Policies and Programmes – European Union

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan? |
|---|---|---|---|---|
| Biodiversity | The EU Habitats Directive (92/43/EEC) | Objectives seek to prevent and eliminate the causes of habitat loss and maintain and enhance current levels of biodiversity. | The measures required under this Directive must be incorporated in the Programme of Measures included in the Plan as required under Annex VI Part A of the WFD. | See UN Convention on Biodiversity.<br>In addition, the requirement to carry out appropriate assessment, prior to implementation of specific projects related to the POM, is aimed at addressing the objectives of this Directive. |
| | The EU Birds Directive (as modified) (79/409/EEC) | Objectives seek to prevent and eliminate the causes of bird species loss and maintain and enhance current levels of biodiversity. | The measures required under this Directive must be incorporated in the Programme of Measures included in the Plan as required under Annex VI Part A of the WFD. | See EU Habitats Directive. |

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan? |
|---|---|---|---|---|
| | The EU Freshwater Fish Directive (78/659/EEC) | Objectives seek to protect those fresh water bodies identified by Member States as waters suitable for sustaining fish populations. For those waters it sets physical and chemical water quality objectives for salmonid waters and cyprinid waters. | Under the WFD, waters containing economically significant aquatic species are to be designated as protected and be addressed as part of the Plan. | See EU Habitats Directive. |
| **Human Health** | The EU REACH Initiative Registration, Evaluation and Authorisation of Chemicals (REACH) | Objectives seek to limit the harmful effects to the environment and human health from certain chemicals through improved analysis and data collection. | The Plan should aim to prevent the harmful effects of chemicals identified under REACH. The impacts of the Plan on human health are largely expected to be positive due to the water quality objectives included in the Plan. | The items in the POM aimed at reducing pollution discharges to water, including dangerous substances are, in part, aimed at reducing impacts to water quality, from chemicals identified under the REACH Initiative. |
| | The EU Shellfish Directive (79/923/EEC) | Objectives seek to maintain those coastal and brackish waters, which need protection or improvement, in order to allow shellfish to develop and to contribute to the high quality of shellfish products intended for human consumption. | Under the WFD, waters containing economically significant aquatic species are to be designated as protected and be addressed as part of the Plan. | The measures included in the POM are primarily aimed at improving and/or preserving water quality. The shellfish areas identified within the Register of Protected Areas are identified in the Plan and are subject to specific measures to protect their water quality. |
| | The Plant Protection Products Directive (91/414/EEC) | Objectives seek to harmonise the overall arrangements for authorisation of plant protection products within the European Union. This is achieved by harmonising the process for considering the safety of active substances at a European Community level by establishing agreed criteria for considering the safety of those products. Product authorisation remains the responsibility of individual Member States. | The measures required under this Directive must be incorporated in the Programme of Measures included in the Plan as required under Annex VI Part A of the WFD. | The measures included in the POM include a. comprehensive suite of obligations under eleven key European Directives of which the Plant Protection Products Directive is one. |

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan? |
|---|---|---|---|---|
| | Framework Directive on the sustainable use of pesticides (Draft) | The Directive will establish a framework which will promote 'best practice' in the storage, use and disposal of pesticides, and their packaging. Key features include: the establishment of national action plans; compulsory testing of spray machinery and certification of spray operators, distributors and advisors; a ban (subject to derogations) on aerial spraying; special measures to protect the aquatic environment, public spaces and special conservation areas; minimising the risk of pollution through handling, storage and disposal; and the promotion of Integrated Pest Management (IPM). | The measures included under this Directive (once adopted) should be considered for incorporation into the River Basin Management Plan when it is updated in 2015 | The measures included in the POM include a. suite of measures aimed at maintaining/ improving water body status through the sustainable use of pesticides. |
| | The Major Accidents (Seveso) Directive (96/82/EC as amended) | Objectives seek to prevent major accidents involving dangerous substances and limit their consequences for man and the environment, with a view to ensuring high levels of protection throughout the Community. | The measures required under this Directive must be incorporated in the Programme of Measures included in the Plan as required under Annex VI Part A of the WFD. | The measures included in the POM include a. comprehensive suite of obligations under eleven key European Directives of which the Major Accidents (Seveso) Directive is one. |
| **Soils** | The Soils Directive (Draft) | The proposed Directive lays down a framework for the protection and sustainable use of soil based on the principles of integration of soil issues into other policies, preservation of soil functions within the context of sustainable use, prevention of threats to soil and mitigation of their effects, as well as restoration of degraded soils to a level of functionality consistent at least with the current and approved future use of the land. | Elements of the Plan that could create direct and indirect impacts on soils should be included in the assessment. | The items in the POM aimed at reducing pollution discharges to water are, in part, aimed at reducing impacts both to soils and from soils, including for example soil erosion and land contamination.<br><br>In addition, the requirement to carry out environmental impact assessment, including impacts to soils and geology, prior to implementation of specific projects related to the POM, is aimed at addressing the objectives of Draft Directive. |

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan? |
|---|---|---|---|---|
| Sustainable Development | The SEA Directive (2001/42/EC) | Objective is to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development, by ensuring that, in accordance with this Directive, an environmental assessment is carried out of certain plans and programmes which are likely to have significant effects on the environment. | Under the SEA Directive, the Plan requires an SEA. The Plan must take account of protection of the environment and integration of the Plan into the sustainable planning of the island as a whole. | The preparation of the Environmental Report as part of the overall implementation of the SEA process is aimed at achieving the objectives of the SEA Directive. |
| | The EIA Directive (85/337/EEC) as amended by Directive 97/11/EC | Objective is to require Environmental Impact Assessment of the environmental effects of those public and private projects, which are likely to have significant effects on the environment. | The measures required under this Directive must be incorporated in the Programme of Measures included in the Plan as required under Annex VI Part A of the WFD. | Some of the projects required pursuant to implementation of the POM for the Plan may require EIA under the provisions of the EIA Directive. This process would meet the objectives of the EIA Directive. |
| Water | The Water Framework Directive (2000/60/EC) | Objectives seek to maintain and enhance the quality of all surface waters, ground waters and dependent ecosystems in the EU. | The RBMPs and POMs are a requirement of this directive. | The Plan and POM has been prepared in response to the requirements of this Directive. |
| | Groundwater Directive (2006/118/EC) | This directive establishes a regime, which sets underground water quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater. | The purpose of the Plan is to achieve good water quality status in all water bodies or maintain high quality or good status in those bodies currently achieving these. As such the Plan should have regard to the standards and measures included in this Directive. | The measures included in the POM are primarily aimed at improving and/or preserving water quality, including groundwater. |
| | EU Floods Directive (2007/60/EC) | The Floods Directive applies to river basins and coastal areas at risk of flooding. With trends such as climate change and increased domestic and economic development in flood risk zones, this poses a threat of flooding in coastal and river basin areas. | The Plan should not result in an increase in flood events or severity. | The mitigation measures required to achieve the requirements of SEA Objectives 2, 7 and 8 are aimed, in part, at meeting the objectives of this Directive. |

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan? |
|---|---|---|---|---|
| | Bathing Water Directive (2006/7/EC) | The overall objective of the revised Directive remains the protection of public health whilst bathing, but it also offers an opportunity to improve management practices at bathing waters and to standardise the information provided to bathers across Europe. | The measures required under this Directive must be incorporated in the Programme of Measures included in the Plan as required under Annex VI Part A of the WFD. | The measures included in the POM include a. comprehensive suite of obligations under eleven key European Directives of which the Bathing Water Directive is one. |
| | The Nitrates Directive (91/676/EEC) | This Directive has the objective of reducing water pollution caused or induced by nitrates from agricultural sources and preventing further such pollution. | The measures required under this Directive must be incorporated in the Programme of Measures included in the Plan as required under Annex VI Part A of the WFD. | The measures included in the POM include a. comprehensive suite of obligations under eleven key European Directives of which the Nitrates Directive is one. |
| | The Urban Wastewater Treatment Directive (91/271/EEC) as amended by Directive 98/15/EEC | The primary objective is to protect the environment from the adverse effects of discharges of urban wastewater, by the provision of urban wastewater collecting systems (sewerage) and treatment plants for urban centres. The Directive also provides general rules for the sustainable disposal of sludge arising from wastewater treatment. | The measures required under this Directive must be incorporated in the Programme of Measures included in the Plan as required under Annex VI Part A of the WFD. | The measures included in the POM include a. comprehensive suite of obligations under eleven key European Directives of which the Urban Wastewater Treatment Directive is one. |
| | The Sewage Sludge Directive (86/278/EEC) | Objective is to encourage the use of sewage sludge in agriculture and to regulate its use in such a way as to prevent harmful effects on soil, vegetation, animals and man. To this end, it prohibits the use of untreated sludge on agricultural land unless it is injected or incorporated into the soil. | The measures required under this Directive must be incorporated in the Programme of Measures included in the Plan as required under Annex VI Part A of the WFD. | The measures included in the POM include a. comprehensive suite of obligations under eleven key European Directives of which the Sewage Sludge Directive is one. |

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan? |
|---|---|---|---|---|
| | IPPC Directive (96/61/EC) as amended by Directive 2008/1/EC | Objective is to achieve a high level of protection of the environment through measures to prevent or, where that is not practicable, to reduce emissions to air, water and land. The Directive provides an integrated approach to establish pollution prevention from stationary "installations". This codified act includes all the previous amendments to the Directive 96/61/EC and introduces some linguistic changes and adaptations. | The measures required under this Directive must be incorporated in the Programme of Measures included in the Plan as required under Annex VI Part A of the WFD. | The measures included in the POM include a. comprehensive suite of obligations under eleven key European Directives of which the IPPC Directive is one. |
| | Drinking Water Directive (80/778/EEC) as amended by Directive 98/83/EC | The primary objective is to protect the health of the consumers in the European Union and to make sure drinking water is wholesome and clean. | The measures required under this Directive must be incorporated in the Programme of Measures included in the Plan as required under Annex VI Part A of the WFD. | The measures included in the POM include a. comprehensive suite of obligations under eleven key European Directives of which the Drinking Water Directive is one. |
| | EU Dangerous Substances Directive (76/464/EEC) | The objective is to regulate potential aquatic pollution by thousands of chemicals produced in Europe. The Directive covers discharges to inland surface waters, territorial waters, inland coastal waters and groundwater. | The purpose of the Plan is to achieve good water quality status in all water bodies or maintain high quality or good status in those bodies currently achieving these. As such the Plan should have regard to the standards and measures included in this Directive. | See the Stockholm Convention. |
| | The EU Environmental Liability Directive (2004/35/EC) | The main objectives include the application of the "polluter pays" principle for environmental laibility. This Directive establishes a common framework for liability with a view to preventing and remedying damage to animals, plants, natural habitats and water resources, and damage affecting the land. | The Plan should aim to prevent or remedy damage to animals, plants and natural habitats through interaction with water resources. The impacts of the Plan on these receptors are largely expected to be positive due to the water quality objectives included in the Plan. | Many of the measures included in the POM are aimed at reducing pollution discharges to water, in part to prevent and remedy damage to animals, plants, natural habitats and water resources. |

*Please see the appendix to this chapter for the full list of legislation, plans and programmes considered.*

**Table 6.3 Key Legislation, Plans, Policies and Programmes - Ireland**

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan? |
|---|---|---|---|---|
| Biodiversity | The National Biodiversity Plan (2002) | Objectives include the enhancement and conservation of biodiversity. Although such issues would be dealt with at local or site level, the Plan should have regard to these objectives and promote such objectives where possible. | The Plan should aim to minimise impacts on biodiversity. However, impacts of the Plan on biodiversity would be primarily at a site level (i.e. the location of a particular piece of infrastructure, etc.). The favouring of water infrastructure and management measures that carry a lower risk of damage to biodiversity (i.e. through the appropriate siting of facilities) could be emphasised in the Plan. It should be noted that overall the impacts of the Plan on biodiversity are largely expected to be positive. | See the UN Convention on Biodiversity. |
| | The Wildlife Act 1976. The Wildlife (Amendment) act 2000 | The purpose of the Wildlife Act, 1976 and the Wildlife Amendment Act, 2000 is to provide for the protection of Wildlife (both Flora and Fauna) and the control of activities, which may impact adversely on the conservation of Wildlife. | See EU Habitats Directive and EU Birds Directive | See EU Habitats Directive and EU Birds Directive. |
| | European Communities (Natural Habitats) Regulations, SI 94/1997, as amended SI 233/1998 and SI 378/2005 | These Regulations give effect to Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) and the Minister to designate special areas of conservation (endangered species and habitats of endangered species) as a contribution to an EU Community network to be known as NATURA 2000. | See EU Habitats Directive and EU Birds Directive | See EU Habitats Directive and EU Birds Directive. |

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan? |
|---|---|---|---|---|
| | Quality of Salmonid Waters Regulations 1988 (SI 293 of 1988) | Prescribe quality standards for salmonid waters and designate the waters to which they apply, together with the sampling programmes and the methods of analysis and inspection to be used by local authorities to determine compliance with the standards. Also, give effect to Council Directive No. 78/659/EEC on the quality of fresh waters needing protection or improvement in order to support fish life. | See EU Freshwater Fish Directive. | See EU Freshwater Fish Directive. |
| **Cultural Heritage** | The Planning and Development Act 2000 | Under this Act the County Councils are required to compile and maintain a Record of Protected Structures (RPS) in their Development Plans. Sites included in the RPS are awarded automatic protection and may not be demolished or materially altered without grant of permission under the Planning Acts. | The impacts of the Plan on structures listed on the RPS are largely expected to be associated with site level impacts (e.g. change in hydrologic regime, construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to listed structures could be emphasised in the Plan. | The requirement to carry out EIAs, including archaeological, architectural and cultural heritage assessments prior to implementation of specific items in the POM is aimed at addressing the objectives of this Act. |
| **Human Health** | Quality of Bathing Waters Regulations 1988 (SI 84 of 1988) and amendments | Prescribe bathing water quality standards and the bathing areas to which they apply, together with the sampling programmes and the methods of analysis and inspection to be used by local authorities to determine compliance with the standards. Give effect to Council Directive No. 76/160/EEC concerning the quality of bathing water. | See EU Bathing Water Directive | See EU Bathing Water Directive. |

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan? |
|---|---|---|---|---|
| | Quality of Shellfish Waters Regulations 2006 (SI 268/2006) | Give effect to Council Directive 79/923/EEC of 30 October 1979 on the quality required of shellfish waters and prescribe quality standards for shellfish waters and designate the waters to which they apply, together with sampling and analysis procedures to be used to determine compliance with the standards. | See EU Shellfish Directive. | See EU Shellfish Directive. |
| **Planning** | National Spatial Strategy 2002-2020 (2002) | Objectives of the NSS are to achieve a better balance of social, economic and physical development across Ireland, supported by more effective planning. | Increasing demand for wastewater treatment and water supply means that adequate accessible water management infrastructure is now regarded as a necessity for certain development and in certain regions. The strategic development of such infrastructure could therefore aid the objectives of the NSS and NDP and act as an incentive for development in these areas.<br>The Plan should, where possible, have regard to the objectives of the NSS and consider the adequacy of existing infrastructure to accommodate the proposed level of future development. | The mitigation measures recommended to achieve SEA Objective 2 are aimed at achieving the objectives of the NSS. |
| | National Development Plan from 2007 to 2013 | Objectives of the NDP are to promote more balanced spatial and economic development. | See above. | See above. |

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan? |
|---|---|---|---|---|
| | Planning and Development Act 2000 | Revised and consolidated the law relating to planning and development by repealing and re-enacting with amendments the Local Government (Planning and Development) Acts, 1963 to 1999; to provide, in the interests of the common good, for proper planning and sustainable development including the provision of housing; to provide for the licensing of events and control of funfairs; to amend the Environmental Protection Agency Act 1992, the Roads Act 1993, the Waste Management Act 1996, and certain other enactments. | The Plan must take into account the proper planning and sustainable development of the RBD as a whole. | See Above. |
| **Sustainable Development** | European Communities (Environmental Assessment of Certain Plans and Programmes Regulations 2004 (S.I. 435 of 2004) | Objectives include protection of the environment and integration of plan making processes into the sustainable planning of the country as a whole. The EU SEA Directive was transposed into Irish Law under S.I. 435 in 2004. | See EU SEA Directive. | See EU SEA Directive. |
| **Environment** | The Environmental Protection Agency Act 1992 | Objectives include the better protection of the environment and the control of pollution through improved licensing and monitoring. | The Plan should consider, where relevant, the success and efficiency of existing environmental management systems and legislation, including the IPPC licensing and waste licensing regimes, and monitoring/reporting systems. | See EU IPPC Directive. |

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan? |
|---|---|---|---|---|
| Water | Drinking Water Regulations SI 439 of 2000 | Prescribe quality standards to be applied in relation to certain supplies of drinking water, including requirements as to sampling frequency, methods of analysis, the provision of information to consumers and related matters. Give effect to provisions of EU Council Directive 98/83/EC on the quality of water intended for human consumption. | See EU Drinking Water Directive. | See EU Drinking Water Directive. |
| | Local Government (Water Pollution) Act, 1977 (Water Quality Standards for Phosphorus) Regulations 1998 (SI 258 of 1998) | Provides for specified improvements in water quality conditions in rivers and lakes based on phosphorus concentrations or related water quality classifications and give effect to certain requirements arising under Council Directive 76/46/EC on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community. | See EU Dangerous Substances Directive. | See EU Dangerous Substances Directive. |
| | European Communities (Water Policy) Regulations (SI 722 of 2003) | Provide for the transposition into Irish national law of the provisions of the EU Water Framework Directive. | See EU Water Framework Directive. | See EU Water Framework Directive. |

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan? |
|---|---|---|---|---|
| | European Communities (Good Agricultural Practice for Protection of Waters) Regulations 2005 (S.I. No. 378 of 2006) | Provide statutory support for good agricultural practice to protect waters against pollution from agricultural sources. Give further effect to several EU Directives including Directives in relation to protection of waters against pollution from agricultural sources ("the Nitrates Directive"), dangerous substances in water, waste management, protection of groundwater, public participation in policy development and water policy (the Water Framework Directive). | See EU Nitrates Directive. | See EU Nitrates Directive. |
| | European Communities (Environmental Liability) Regulations 2008 (S.I. 547 of 2008) | Place obligations on operators to prevent environmental damage and, where such damage has occurred, the operator is required to control, contain, remove or manage contaminants or causes of damage. Give effect to provisions of EU Liability Directive 2004/35/EC. | See EU Liability Directive. | See EU Liability Directive. |

*Please see the appendix to this chapter for the full list of legislation, plans and programmes considered.*

In addition, certain plans at the regional and local level will need to have regard to the objectives of the SWRBD RBMP at such time as they are reviewed / amended. These plans include: Land Use and Spatial Planning Plans; Conservation Measure Plans; Water Services Strategic Plans; Pollution Reduction Plans; Sludge Management Plans; Forest Management Plans; Heritage Plans; and several others. In addition, the RBMP and its associated POM should have regard to the objectives of these plans, where appropriate. For a summary of the relevant plans and programmes in Ireland please see the document, *Register of Plans and Programmes, Background Document to the River Basin Management Plans in accordance with Article 13(3) of the European Communities (Water Policy) Regulations 2003 (S.I. No 722 of 2003)*, prepared by the Shannon IRBD (September 2008).

# 7 STRATEGIC ENVIRONMENTAL OBJECTIVES, TARGETS AND INDICATORS

## 7.1 INTRODUCTION

Because SEA is, as its name suggests, set at a strategic level, it is not possible for the baseline environment to be described (and assessed) in as much detail as could be done for a project-level environmental impact assessment. Instead, SEA uses a system of *objectives*, *targets* and *indicators* to rationalise information for the purposes of assessment.

In order to streamline the assessment process, this report has used broad themes, based on the environmental topics listed in the SEA Directive, to group large environmental data sets, e.g., human health, cultural heritage and climate. Assigned to each of these themes is at least one high-level Strategic Environmental Objective that specifies a desired direction for change, e.g. reduce $CO_2$ emissions, against which the future impacts of the Plan and POM can be measured. These high-level Strategic Environmental Objectives are then paired with specific Targets. The progress towards achieving these specific Targets is monitored using Indicators, which are measures of identified variables over time.

**Section 7.2** describes the Strategic Environmental Objectives, Targets and Indicators used in assessing the Plan/POM.

## 7.2 DEVELOPMENT OF STRATEGIC ENVIRONMENTAL OBJECTIVES, TARGETS AND INDICATORS

### 7.2.1 Strategic Environmental Objectives

There are essentially three types of Objectives considered as part of this SEA. The first relates to the *Objectives of the WFD and the RBMP* (see **Chapter 3**). The second relates to wider *Environmental Objectives*, i.e. environmental protection objectives at national and European level (see **Chapter 6**), and finally there are the *Strategic Environmental Objectives,* which were devised to test the environmental effects of the Plan / POM.

The Strategic Environmental Objectives reflect the existing environmental issues relevant to water management. They are focussed on protecting and enhancing the natural and human environment and on minimising negative effects. The objectives were developed to be consistent with

environmental protection objectives established by International, European and national environmental policies, objectives and standards.

The selected Strategic Environmental objectives for this SEA are set out in **Table 7.1**. These environmental objectives are based on the current understanding of the key environmental issues identified. In addition, the selection of the environmental objectives had regard to the environmental protection objectives contained within the existing 11 Directives listed in Annex IV of the WFD as well as the indicative list of environmental protection objectives outlined in the documents *Implementation of SEA Directive 2001/42/EC* (DoEHLG, 2004). Selection was also based on consultation with statutory consultees and stakeholders during the scoping stage as well as on discussions during a workshop on November 10, 2008 between the SEA and Plan Teams.

Also, included in **Table 7.1** are Detailed Assessment Criteria, which represent the issues that will be considered during the assessment of whether the RBMP and POM, including the proposed alternatives, will contribute to meeting the Strategic Environmental Objectives.

**Table 7.1 Strategic Environmental Objectives**

| Objective | Detailed Assessment Criteria* – To what extent will the RBMPs and POMs: | Related to SEA Topic(s) |
|---|---|---|
| **Objective 1** Prevent damage to terrestrial, aquatic and soil biodiversity, particularly EU designated sites and protected species | • Provide effective protection of international and nationally designated biodiversity sites?<br>• Sustain, enhance or where relevant prevent the loss of ecological networks or parts thereof which provide significant connectivity between areas of biodiversity?<br>• Avoid loss of relevant habitats, geological features, species or their sustaining resources in national and international designated ecological sites?<br>• Support delivery of national Biodiversity Action Plan strategies and objectives?<br>• Reduce water related impacts by alien species?<br>• Contribute to the impact of floods and / or droughts on habitats, species and wetlands of international importance? | Biodiversity, Flora and Fauna (BFF) |
| **Objective 2** Contribute to sustainable development. | • Guide land use planning?<br>• Ensure adequate water and wastewater treatment infrastructure capacity is in place?<br>• Reduce water quality?<br>• Reduce water quantity in an unsustainable manner?<br>• Improve the provision of treatment services to those areas where deficiencies exist at present?<br>• Contribute to floods and droughts on established populations | Population (P) |

| Objective | Detailed Assessment Criteria* – To what extent will the RBMPs and POMs: | Related to SEA Topic(s) |
|---|---|---|
| **Objective 3** Protect and reduce risk to human health in undertaking water management activities | • Protect drinking water areas (including private abstractions), bathing waters, economic shellfish waters and fisheries? | Human Health (HH) |
| **Objective 4** Avoid damage to the function and quality of the soil resource in the River Basin District | • Accelerate or reduce erosion due to Plan implementation?<br>• Result in impacts on the productivity of agricultural land?<br>• Safeguard soil quality, quantity and function? | Soil (S) |
| **Objective 5** Prevent deterioration of the status of water bodies with regard to quality, quantity and improve water body status for rivers, lakes, transitional and coastal waters and groundwaters to at least good status, as appropriate to the WFD | • Provide effective protection of drinking water sources, as required by the WFD?<br>• Reduce the impacts from point source pollution, diffuse source pollution, abstraction, impoundment, flow regulation, direct discharges to groundwater, priority substance pollution, physical modifications, accidental pollution incidents and other activities with an impact on the status of water, as required by the WFD?<br>• Reduce impact from physical modifications on habitat and fish passage?<br>• Provide effective protection of "protected areas" as defined in the WFD? | Water (W) |
| **Objective 6** Minimise emissions to air as a result of Plan activities | • Increase air emissions (e.g. methane and $NO_x$)?<br>• Increase odour nuisance problems? | Air (AQ) |
| **Objective 7** Minimise contribution to climate change by emission of greenhouse gasses associated with Plan implementation | • Contribute to reducing GHG emission from water management activities?<br>• Provide for measures that are vulnerable climate change?<br>• Encourage improved energy efficiency? | Climatic Factors (C) |
| **Objective 8** Maintain level of protection provided by existing morphological infrastructure, e.g. flood defences, coastal barriers, groynes, etc. | • Interfere with existing infrastructure – e.g. flood defences, coastal barriers, groynes, etc.?<br>• Provide for measures that are vulnerable to the effects of climate change? | Material Assets (MA1) |
| **Objective 9** Provide new and upgrade existing water management infrastructure to protect human health and ecological status of water bodies | • Make more efficient use of water management infrastructure?<br>• Encourage the planned phased introduction of critical infrastructure including wastewater treatment, water supply and surface water drainage? | Material Assets (MA2) |
| **Objective 10** Support economic activities within the District without conflicting with the objectives of the WFD | • Result in a loss of land available for economic activity?<br>• Result in significant changes to an existing economic activity, which would render it unviable? | Material Assets (MA3) |

| Objective | Detailed Assessment Criteria* – To what extent will the RBMPs and POMs: | Related to SEA Topic(s) |
|---|---|---|
| **Objective 11** Protect water as an economic resource. | • Provide for efficient and sustainable use of water for consumption, as a tourism and recreational resource and for other economic activities, e.g. commercial aquaculture?<br>• Maintain the economic benefit of water associated with navigation and trade activities? | Material Assets (MA 4) |
| **Objective 12** Avoid damage to cultural heritage resources in the River Basin District | • Interfere with archaeological, architectural or cultural heritage features? | Cultural Heritage (CH) |
| **Objective 13** Avoid damage to designated landscapes in the River Basin District | • Interfere with designated landscape areas? | Landscape (L) |

*Detailed criteria are cited where appropriate and these will be used to ensure consistent application of the objectives.

#### 7.2.1.1 Internal Compatibility of Strategic Environmental Objectives

The internal compatibility of the Strategic Environmental objectives has been examined to identify potential areas of conflict in relation to each objective so that subsequent decisions can be well based. As shown in **Figure 7.1**, below, generally the thirteen objectives above are compatible. For example, the objectives for air quality and climate change are consistent with protecting and enhancing biodiversity and protecting human health. In some cases there is no obvious relationship between the objectives, e.g. no direct link between enhancing soil quality and function and making efficient use of water management infrastructure. Potential conflict arises for Objectives 1, 12 and 13 as a number of the other objectives, e.g. 3 and 5, may require increased treatment and construction of infrastructure and, depending on siting and design, this could have impacts on designated landscapes (Objective 13), cultural heritage features (Objectives 12) and biodiversity (Objective 1). This is explored further in **Chapter 8**.

**Figure 7.1 Matrix of SEA Objective Internal Compatibility**

| | Objective 1 BFF | Objective 2 P | Objective 3 Human Health | Objective 4 S | Objective 5 W | Objective 6 AQ | Objective 7 C | Objective 8 MA1 | Objective 9 MA2 | Objective 10 MA3 | Objective 11 MA4 | Objective 12 CH | Objective 13 L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Objective 1 BFF** | | | | | | | | | | | | | |
| **Objective 2 P** | Y / N | | | | | | | | | | | | |
| **Objective 3 HH** | Y / N | Y | | | | | | | | | | | |
| **Objective 4 S** | Y | Y | Y | | | | | | | | | | |
| **Objective 5 W** | Y / N | Y | Y | Y | | | | | | | | | |
| **Objective 6 AQ** | Y | Y | Y / N | Y | Y / N | | | | | | | | |
| **Objective 7 C** | Y | Y | Y / N | Y | Y / N | Y | | | | | | | |
| **Objective 8 MA1** | Y / N | Y | Y | Y | Y / N | Y | Y | | | | | | |
| **Objective 9 MA2** | Y / N | Y | Y | Y / N | Y | Y / N | Y / N | Y | | | | | |
| **Objective 10 MA3** | Y / N | Y / N | Y | Y / N | Y / N | Y / N | Y / N | Y | Y | | | | |
| **Objective 11 MA4** | Y / N | Y | Y | Y | Y | Y | Y | Y | Y | Y / N | | | |
| **Objective 12 CH** | Y / N | Y / N | Y / N | Y | Y / N | Y | Y | Y | Y / N | Y | Y | | |
| **Objective 13 L** | Y / N | Y / N | Y / N | Y | Y / N | Y | Y | Y | Y / N | Y | Y | Y | |

Key: Y = Yes, compatible N = No, not compatible 0 = Neutral Y/N = May be compatible depending on how it is implemented

### 7.2.1.2 Compatibility with Plan Objectives

The compatibility of the environmental objectives and the Plan objectives was also examined using a compatibility matrix (see **Table 7.2)**. The Plan objectives are based on the objectives of the Water Framework Directive. The Plan objectives are broadly compatible with the environmental objectives. However, it is recognised that some Plan objectives may only be compatible with the SEA objectives depending on how they are implemented, e.g. impacts to protected landscapes or cultural heritage features may occur if new infrastructure is required to achieve the Plan objectives and environmental conflicts arise due to the sensitivity/ vulnerability of the proposed location.

**Table 7.2 Compatibility of Strategic Plan Objectives and Strategic Environmental Objectives**

| SEA / PLAN | Objective 1 BFF | Objective 2 P | Objective 3 HH | Objective 4 S | Objective 5 W | Objective 6 AQ | Objective 7 C | Objective 8 MA1 | Objective 9 MA2 | Objective 10 MA3 | Objective 11 MA4 | Objective 12 Cultural Heritage | Objective 13 Landscape |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Enable waters supporting protected areas* to achieve their stricter status standards | Y | Y | Y | Y | Y | Y / N | Y / N | Y / N | Y | Y / N | Y / N | Y / N | Y / N |
| Prevent deterioration, and in particular maintain high or good status (surface water) | Y | Y | Y | Y | Y | Y / N | Y / N | Y / N | Y | Y / N | Y / N | Y / N | Y / N |
| Improve waters where appropriate to achieve at least good standards (surface water) | Y | Y | Y | Y | Y | Y / N | Y / N | Y / N | Y | Y / N | Y / N | Y / N | Y / N |
| Progressively reduce chemical pollution (surface water) | Y | Y | Y | Y | Y | 0 | 0 | Y / N | Y | Y / N | Y / N | Y | 0 |
| Limit Pollution Inputs and prevent deterioration (groundwater) | Y | Y | Y | Y | Y | 0 | 0 | Y / N | Y | Y / N | Y / N | Y | 0 |
| Improve chemical quality and quantity where appropriate to achieve good status (groundwater) | Y | Y | Y | Y | Y | Y / N | Y / N | Y / N | Y | Y / N | Y / N | Y | 0 |
| Reverse increasing pollution trends (groundwater) | Y | Y | Y | Y | Y | 0 | 0 | Y / N | Y | Y / N | Y / N | Y | 0 |

Key: Y = Yes, compatible N = No, not compatible 0 = Neutral Y/N = May be compatible depending on how it is implemented

* *drinking, bathing, economically significant aquatic species, nutrient sensitive areas, protected habitats and species (including SPAs, SACs and designated salmonid and shellfish waters)*

### 7.2.2 Strategic Environmental Indicators and Targets

The overall purpose of environmental indicators in the SEA is to provide a way of measuring the environmental effect of implementing the Plan. Environmental indicators are also used to track the progress in achieving the targets set in the SEA as well as the Plan itself. The proposed indicators have been selected bearing in mind the availability of data and the feasibility of making direct links between any changes in the environment and the implementation of the Plan / POM.

Targets were considered over the duration of the baseline data collection and assessment, and throughout the consultation process, in order to meet the Strategic Environmental objectives as well as the objectives of the Plan. In each case, any target that is set must be attributable to the implementation of the Plan / POM.

The targets and indicators associated with each SEA Objective are presented in **Table 7.3**.

**Table 7.3 Strategic Environmental Objectives, Targets and Indicators**

| SEA Topic | SEA Objective | SEA Target | SEA Indicators | Data Source |
|---|---|---|---|---|
| Biodiversity, Flora & Fauna (BFF) | **Objective 1**<br>Prevent damage to terrestrial, aquatic and soil biodiversity, particularly EU designated sites and protected species. | Halt spread of Alien Species and their associated impact to the aquatic environment. | Interim Indicators: Geographical spread of Alien Species in the District. | Invasive Species Ireland (joint project, NPWS and NIEA) |
| | | | Number of *Margaritifera* Plans put in place. | NPWS |
| | | Halt deterioration of habitats or their associated species due to water quality related issues by 2015, in line with the Water Framework Directive. | Long term Indicators: The Status of EU Protected Habitats and Species in Ireland (reports due every 6 years, first report in 2007). | NPWS |
| | | | Condition of Selection Features in sites designated for nature conservation (SACs, SPAs, Ramsar and NHAs). | Not currently compiled |
| Population (P) | **Objective 2**<br>Contribute to sustainable development. | Provide adequate water and wastewater treatment infrastructure capacity to all urban and suburban areas (cities, towns and villages) within the District by 2015. | Number of Section 140 motions under the Planning and Development Act 2001 tabled and passed for development in urban and suburban areas where adequate water and wastewater treatment infrastructure capacity is not in place. | An Bord Pleanala |
| | | Strictly control rural development with the provision of individual wastewater treatment units in accordance with the EPA Guidelines Manual in relation to the provision of wastewater treatment to single houses. | Number of Section 140 motions under the Planning and Development Act 2001 tabled and passed for development in rural areas where individual wastewater treatment are not provided in accordance with the EPA Guidelines Manual in relation to the provision of wastewater treatment to single houses. | An Bord Pleanala |
| | | Carry out 100% inspection, of all individual septic tanks or any other privately owned treatment unit to identify those not functioning properly. | Number of inspections carried out. | Local Authorities (not currently compiled) |

| SEA Topic | SEA Objective | SEA Target | SEA Indicators | Data Source |
|---|---|---|---|---|
| Human Health (HH) | **Objective 3**<br>Protect and reduce risk to human health in undertaking water management activities. | All drinking water areas (including groundwater), as identified on the register of protected areas, to achieve good status, or maintain high status, by 2015. | Interim Indicators: Compliance with Drinking Water Standards. | EPA for all |
| | | All bathing waters, as identified on the register of protected areas, to achieve good status, or maintain high status, by 2015. | Compliance with Bathing Water Standards. | |
| | | All economic shellfish waters, as identified on the register of protected areas, to achieve good status, or maintain high status, by 2015. | Compliance with the Quality of Shellfish Waters Regulations. | |
| | | All water bodies designated for salmonids, as identified on the register of protected areas, to achieve good status, or maintain high status, by 2015. | Water quality in designated salmonid waters. | |
| | | | Long Term Indicator: Parameters to be measured in accordance with the environmental quality standards to determine Good Status. | |
| Soil (S) | **Objective 4**<br>Avoid damage to the function and quality of the soil resource in the River Basin District. | Interim Targets: Achieve soil phosphorus levels in line with Teagasc targets for agricultural land. | Interim Indicators: Soil phosphorus levels. | Teagasc |
| | | Long term Target: Achieve risk reduction targets as detailed in the Soil Directive for areas identified as at risk (not yet established). | Long Term Indicator: Monitoring programme as established under the requirements for the Soil Directive. (once established) | Not yet established |

| SEA Topic | SEA Objective | SEA Target | SEA Indicators | Data Source |
|---|---|---|---|---|
| **Water (W)** | **Objective 5**<br>Prevent deterioration of the status of water bodies with regard to quality and quantity and improve water body status* for rivers, lakes, transitional and coastal waters and groundwaters to at least good status, as appropriate to the WFD.<br>* Please note water quality status is based on chemical and biological data as well as morphology of the water body | No deterioration in status of waters currently with high or good status (WFD Objective).<br>Restoration to good status of waters currently at moderate, poor or bad status (WFD Objective).<br>Progressively reduce chemical pollution in waters (WFD Objective).<br>Limit pollution inputs to groundwaters and prevent deterioration (WFD Objective). | Interim Indicators: Interim Water status in 2011 report.<br>Long Term Indicator: Water status in 2015 report. | EPA<br>EPA |
| **Air Quality (AQ)** | **Objective 6**<br>Minimise emissions to air as a result of Plan activities. | Minimise total emissions to air associated with nutrient management.<br>Compliance with odour criteria to prevent deterioration in amenity beyond the site boundary as set out in license for new or upgraded wastewater infrastructure.<br>Compliance with odour criteria to prevent deterioration in amenity beyond the site boundary due to changes in industrial practices due to plan implementation. | Distance / number of vehicle trips used to transport nutrients; to be used as a proxy indicator for emissions associated with nutrient management activities, such as removal by tanker of slurry in areas of nutrient surplus. *<br>* The purpose of this indicator is to determine whether the measures aimed at reducing the input of nutrients to water result in indirect effects in emissions to air<br>Number of complaints received related to odour.<br>Number of complaints received related to odour. | Not currently compiled – monitoring of this would need to be integrated into the Waste Licences for operators of these activities<br>Monitored by the EPA as part of the IPPC licence process.<br>Monitored by the EPA as part of the IPPC licence process. |

| SEA Topic | SEA Objective | SEA Target | SEA Indicators | Data Source |
|---|---|---|---|---|
| Climatic Factors (C) | **Objective 7**<br>Minimise contribution to climate change by emission of greenhouse gasses associated with Plan implementation. | Use BAT, including renewable energy, to minimise GHG from new or upgraded wastewater infrastructure in line with Ireland's commitments to reduce GHG emissions under the Kyoto Protocol. | Calculated $CO_2$ equivalent in tonnes from new or upgraded water infrastructure, e.g. WWTP, including emissions associated with the digestion and / or incineration of sludge. | To be calculated based on changes in water infrastructure |
| | | Use BAT, including renewable energy, to minimise GHG from changes in industrial practices due to plan implementation in line with Ireland's commitments to reduce GHG emissions under the Kyoto Protocol. | Calculated $CO_2$ equivalent in tonnes due to changes in industrial practices. | To be calculated based on changes in industrial practices, records of which are held as part of the IPPC licence process by the EPA. |
| | | No net loss of $CO_2$ sequestering vegetation due to changes in forestry practices as a result of Plan activity. | Calculated $CO_2$ sequestering potential of forest vegetation based on forest cover. | National Council for Forest Research and Development for $CO_2$ sequestration potential. Corine Land Cover database. |
| Material Assets (MA1) | **Objective 8**<br>Maintain level of protection provided by existing morphological infrastructure, e.g. flood defences, coastal barriers, groynes, etc. | No increase in the amount of infrastructure at risk from flooding as a result of Plan activities. In this case the length of road and rail infrastructure at risk will be used as a proxy indicator for infrastructure in general. | Interim Indicator: Number of Flood Risk Management Plans prepared in accordance with the Floods Directive (2007/60/EC). | OPW |
| | | | Long Term Indicator: Length of road and rail infrastructure at risk from flooding. | OPW |
| Material Assets (MA2) | **Objective 9**<br>Provide new, and upgrade existing, water management infrastructure to protect human health and ecological status of water bodies. | Interim Target: Increase investment in water management infrastructure. | Interim Indicator: Water services investment expenditure per annum. | Finance Department |
| | | Long Term Target: Full compliance with the requirements of the Urban Wastewater Treatment Directive and its associated regulations. | Long Term Indicator: Number of exceedances of the standards contained in the Urban Wastewater Treatment Directive and its associated regulations. | EPA |

| SEA Topic | SEA Objective | SEA Target | SEA Indicators | Data Source |
|---|---|---|---|---|
| Material Assets (MA3) | **Objective 10**<br>Support economic activities within the District without conflicting with the objectives of the WFD. *<br>* This includes, but is not limited to consideration of land uses, such as agriculture and existing residential development, as well as industrial activities, fisheries, mineral extraction and commercial port activities. | Minimise impacts to economic activity due to Plan implementation without conflicting with the objectives of the WFD. | Percent change in land cover types due to Plan implementation. | Corine Land Cover Project |
| Material Assets (MA4) | **Objective 11**<br>Protect water as an economic resource. | Achieve sustainable use of water in the context of maintaining its economic benefit. | Change in economic value of water relative to the baseline report: Economic Analysis of Water Use in Ireland. | Economic studies carried out as a part of the plan making process during the second cycle of river basin management planning. |
| Cultural Heritage (CH) | **Objective 12**<br>Avoid damage to cultural heritage resources in the River Basin District. | No physical damage or alteration of the context of cultural heritage features due to Plan activities. | Changes in the condition of monuments on the RMP due to Plan implementation.<br>Number of listed structures at risk due to Plan implementation. | The Archaeological Survey monitoring programme, Ireland<br>Buildings at Risk Register, Heritage Council Ireland. |
| Landscape (L) | **Objective 13**<br>Avoid damage to designated landscapes in the River Basin District. | No damage to designated landscapes as a result of Plan implementation. | Number of wastewater treatment plants sited in landscapes with a high sensitivity to change.<br>Percentage changes in land cover types in areas with a high sensitivity to change. | Local Authorities (not currently compiled centrally)<br>Corine Land Cover Project |

# 8 ALTERNATIVES

Each of the River Basin Management Plans must include a set of management measures, entitled the Programme of Measures, aimed at achieving the objective of good status by 2015 under the WFD. Article 11 of the WFD sets out the types of measures that must be included in the Plan. Where application of these **required measures** will not be sufficient to achieve the default objective, **additional measures**, or actions, need to be identified and considered (see **Figure 8.1**).

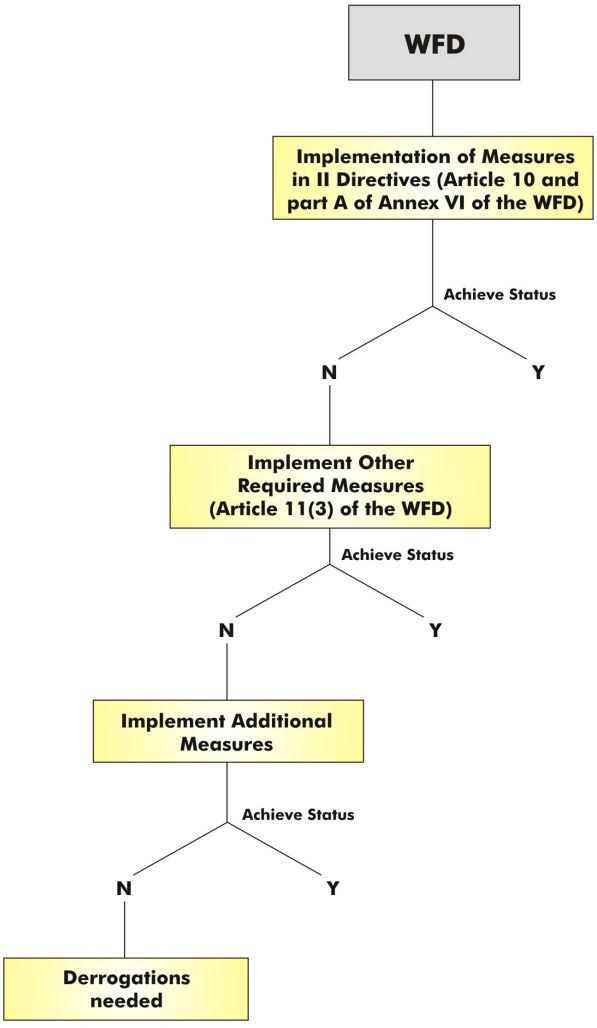


**Figure 8.1 Process to Determine what Measures are Required**

The terminology used to describe the measures included in the draft Plan differs slightly between the SEA and the draft Plan itself. Therefore, the following table is provided to assist the reader when comparing the SEA with the draft Plan.

| SEA Terminology | Ireland Plan Terminology |
|---|---|
| Required Measures Contained in Existing Water Protection Directives as listed Annex VI Part A of the WFD | Basic Measures |
| Other Required Measures as listed in Article 11(3) of the WFD | Other Basic Measures |
| Additional Measures | Supplementary Measures |

Based on discussion above it was determined that implementation of the legally required measures alone represented the 'business as usual' scenario, in that they would be required measures in the absence of any additional policy changes or improvements to infrastructure. Conversely, the additional measures / actions represent the **range of alternatives** that could form an element of the RBMP/ POM.

## 8.1 REQUIRED MEASURES

As stated above, each of the River Basin Management Plans must include a set of management measures aimed at achieving the objective of good status in all water bodies by 2015 under the WFD (some derogations are permitted).

Article 11 of the WFD sets out what must be covered by the POM for each (I) RBD. Fundamental to Article 11 are measures which implement 11 key existing European water protection directives, as laid out in Article 10 and part A of Annex VI of the WFD. These measures are mandatory and include the actions in **Table 8.1**.

In addition, Article 11(3) of the WFD proposes further measures be carried out. These further measures are also mandatory and include the actions outlined in **Table 8.2**.

**Table 8.1 Required Measures Contained in Existing Water Protection Directives as listed Annex VI Part A of the WFD**

| Associated Regulations | Key Authorities | Actions Required |
|---|---|---|
| The Bathing Water Directive (2006/7/EC) | | |
| Quality of Bathing Waters Regulations (SI 79 of 2008) | Local Authorities | Undertake comprehensive monitoring programmes, identify pollution sources and draw up management plans to minimise risks to bathers. |
| The Birds Directive (79/409/EEC) | | |
| European Union (Natural Habitats) Regulations (SI 94 of 1997 as amended) | Department of the Environment, Heritage & Local Government | Establish conservation measures for Natura 2000 sites in management plans. |
| The Drinking Water Directive (80/778/EEC) as amended by Directive (98/83/EC) | | |
| Drinking Water Regulations (SI 278 of 2007) | Local Authorities | Prepare Water Services Strategic Plans. |
| The Major Accidents (Seveso) Directive (96/82/EC) | | |
| European Communities (Control of Major Accident Hazards Involving Dangerous Substances Regulations (SI 74 of 2006) | Health and Safety Authority | Organise a system of inspections or other suitable control measures for relevant establishments. Internal and external emergency plans must be prepared by operators and by a nominated local competent authority. |
| The Environmental Impact Assessment Directive (85/337/EEC) | | |
| Planning and Development Regulations 2001 (SI 600 of 2001 as amended)<br>European Communities (Environmental Impact Assessment) Regulations (SI 349 of 1989 as amended) | Relevant Planning Authority<br>Relevant Planning Authority | Take account of the Water Framework Directive in regional planning guidelines, county development plans and local area plans during their review process to ensure that new projects will consider river basin management objectives. |
| The Sewage Sludge Directive (86/278/EEC) | | |
| Water Management (Use of Sewage Sludge in Agriculture) Regulations 1998 and 2001 (SI 148 of 1998 and Si 267 of 2001) | Local Authorities | Prepare Sludge Management Plans in line with Code of Good Practice for the Use of Biosolids in Agriculture, maintain a register of sludge/biosolids movement and provide advance notification of spreading in accordance with a nutrient management plan. |

| Associated Regulations | Key Authorities | Actions Required |
|---|---|---|
| The Urban Waste-water Treatment Directive (91/271/EEC) | | |
| Urban Waste Water Treatment Regulations 2001 (SI 254 of 2001) | Local Authorities | Undertake monitoring at treatment plants and make provision for pre-treatment requirements for industrial wastewater entering the collection systems and treatment plants. Prepare Water Services Strategic Plans. |
| The Plant Protection Products Directive (91/414/EEC) | | |
| The European Communities (Authorization, Placing on the Market, Use and Control of Plant Protection Products) Regulations (SI 83 of 2003) as amended SI 320 of 1981 as amended, SI 624 of 2001 as amended, and SI 565 of 2008 | Pesticides Control Service (Department of Agriculture, Fisheries and Food) | Authorise substances for use or marketing subject to rigid controls |
| The Nitrates Directive (91/676/EEC) | | |
| European Communities (Good Agricultural Practice for Protection of Waters) Regulations (SI 378 of 2006) | Local Authorities, EPA, Teagasc and the Department of Agriculture, Fisheries and Food Rural Development | Carry out monitoring surveys of water quality and agricultural practices, including studies of agricultural mini-catchments. Identify waters which are polluted or are liable to pollution and development and implement action programmes. |
| The Integrated Pollution Prevention Control Directive (96/61/EC) | | |
| Environmental Protection Agency Acts of 1992 and 2003 | Environmental Protection Agency | Ensure operators of certain industrial installations must obtain an IPPC permit. |
| The Habitats Directive (92/43/EEC) | | |
| European Union (Natural Habitats) Regulations (SI 94 of 1997 as amended) | Department of the Environment, Heritage and Local Government | Establish conservation measures for Natura 2000 sites in management plans. |

**Table 8.2 Other Required Measures as listed in Article 11(3) of the WFD**

| Implementation in Ireland | Actions Required | Assessed? |
|---|---|---|
| **WFD1:** Cost recovery for water use and promotion of efficient and sustainable water use | | |
| Ireland's National Water Pricing Policy Framework requires charging of non-domestic customers of water and wastewater services to recover the full costs of providing such services and provides for the recovery of domestic capital cost from the Exchequer and domestic operational costs through the Local Government Fund. Water meters will be installed on all non-domestic supplies by the end of 2008.<br><br>A national water leakage reduction programme is being implemented | Member States must adopt a cost recovery system to ensure that water pricing polices act as incentives towards efficient water usage.<br><br>The WFD also requires measures to promote efficient and sustainable water use. | See **Table 9.1** for assessment. |
| **WFD2:** Protection of drinking water sources | | |
| Ireland is considering making a policy in relation to using "safeguard zones" where there is an identified need to protect individual drinking water sources. | Protect all ground and surface waters that are used, or may be used in the future, as a source of drinking water for more than 50 people, or where the rate of abstraction is above $10m^3$ per day. | See **Table 9.1** for assessment. |
| **WFD3:** Abstraction and impoundment control | | |
| Ireland's abstraction laws need to be updated to protect waters adequately, with a modern system of registration and prior authorisation for significant water supplies. The DEHLG will propose new regulations creating a single registration and authorisation system. Authorisations would apply to surface water and groundwaters and may be risk-based including registration of all abstractions above threshold values, general binding rules, notification or licensing depending on the abstraction volume. | Member States must have controls for significant surface water and groundwater abstractions and surface water impoundments. | See **Table 9.1** for assessment. |

| Implementation in Ireland | Actions Required | Assessed? |
|---|---|---|
| **WFD4:** Point source and diffuse source discharges control | | |
| Point and diffuse source pollution controls are supported in Ireland through a series of pollution reduction plans and programmes that are either already in place, or will be introduced shortly to support the Water Framework Directive, these include:<br>• Pollution Reduction Programmes for Surface Water;<br>• Water Service Strategic Plans;<br>• National Action Programme under the Nitrates Directive;<br>• Integrated Pollution Prevention Control licensing programme;<br>• Local Authority Programmes of Discharge Authorisations;<br>• Pollution Reduction Programmes for Groundwater;<br>• Bathing Waters Management Plans; and<br>• Pollution Reduction Programmes for Shellfish Waters. | Prior regulation is required for point source discharges liable to cause pollution. For diffuse sources of pollution, measures to prevent or control pollutant input are also required. Controls may include: prohibition on the entry of pollutants into water; prior authorisation; or registration based on general binding rules, laying down pollutant emission controls. | See **Table 9.1** for assessment. |
| **WFD5:** Controls on physical modifications to surface waters | | |
| Ireland's existing planning and development controls and marine licensing systems provide a general level of control for new development. The DEHLG is considering the introduction of new regulations to control physical modifications to surface waters; these regulations may involve an authorisation system. The system may be risk-based: low-risk works may be simply registered while higher-risk works would be subjected to more detailed assessment and more prescriptive licences. | Member States must ensure that the physical condition of surface waters support required ecological standards. Controls can take the form of prior authorisation and/or registration based on general binding rules. | See **Table 9.1** for assessment. |
| **WFD6:** Prevention or reduction of the impact of accidental pollution incidents | | |
| Ireland's measures under the Major Accidents Directive include emergency plans for establishments. A "Framework for Major Emergency Management" was published by the Office of Emergency Planning in 2006. Major emergencies include, among other things, severe weather, flooding, chemical spills, transport accidents (air, sea, rail, road), accidents at sea and major pollution incidents at sea. | Measures must be in place to prevent significant losses of pollutants from technical installations, and to prevent and/or to reduce the impact of accidental pollution incidents. These measures include systems to detect or give warning of events and in the case of accidents include all appropriate measures to reduce the risk to aquatic ecosystems. | See **Table 9.1** for assessment. |

| Implementation in Ireland | Actions Required | Assessed? |
|---|---|---|
| **WFD7:** Authorisation of discharges to groundwater | | |
| Ireland's Wastewater Discharge Regulations prohibit discharge of certain dangerous substances to groundwater, and provide controls for discharges of other substances by water services authorities by way of EPA licences. Additional regulatory requirements and further guidance will be incorporated into Irish controls under groundwater environmental objectives regulations to be made in 2009 when transposing the Groundwater Directive. The new regulations will set criteria for status and trends and require measures to prevent or limit inputs of pollutants into groundwaters. | Prior authorisation is required for reinjection of waters for a number of specific activities (such as dewatering for mining or construction, exploration for oils and injection for storage of gas). Construction or civil engineering works, which could influence the water table, also require authorisation and general binding rules. | See **Table 9.1** for assessment. |
| **WFD8:** Priority substances control | | |
| Ireland transposed this requirement into regulations governing environmental objectives for priority substances in surface waters in 2008. These regulations require Local Authorities to establish inventories of emissions, discharges and losses of priority substances and to prepare pollution reduction plans which specify objectives, identify measures and make pollution reduction recommendations. Information is also being collected on the usage, loss and discharges of dangerous substances through compliance with initiatives such as Registration, Evaluation and Authorisation of Chemicals (REACH) and European Pollutant Release and Transfer Register (EPRTR). | Measures are required to eliminate pollution of surface waters by 33 priority substances and 8 other pollutants and must aim to progressively reduce pollution from priority substances and cease or phase out emissions, discharges and losses of priority hazardous substances. | See **Table 9.1** for assessment. |
| **WFD9:** Controls on other activities impacting on water status | | |
| Invasive alien species are non-native plants or animals that successfully establish themselves in aquatic and fringing habitats and damage the indigenous flora and fauna. The EPA has identified eight aquatic species of main concern in Ireland. The DEHLG is considering introducing regulations under the Wildlife Act to prohibit the possession or introduction of any species of wild bird, wild animal or wild flora, which may be detrimental to native species. | Measures must be put in place to deal with any other identified significant adverse impacts on water status. Controls can include prior authorisation or registration based on general binding rules. | See **Table 9.1** for assessment. |

## 8.2 ADDITIONAL MEASURES

Where application of the mandatory measures listed in **Tables 8.1** and **8.2** will not be sufficient to achieve the WFD objective of good status in all water bodies by 2015, **additional measures** need to be identified and considered (see **Figure 8.1**). The types of measures considered are at the discretion of the Member State; however, a non-exhaustive list of possible additional measures is provided for guidance in Annex VI Part B of the WFD and includes:

(i) Legislative instruments;

(ii) Administrative instruments;

(iii) Economic or fiscal instruments;

(iv) Negotiated environmental agreements;

(v) Emission controls;

(vi) Codes of good practice;

(vii) Recreation and restoration of wetlands areas;

(viii) Abstraction controls;

(ix) Demand management measures, inter alia, promotion of adapted agricultural production such as low water requiring crops in areas affected by drought;

(x) Efficiency and reuse measures, inter alia, promotion of water-efficient technologies in industry and water-saving irrigation techniques;

(xi) Construction projects;

(xii) Desalination plants;

(xiii) Rehabilitation projects;

(xiv) Artificial recharge of aquifers;

(xv) Educational projects;

(xvi) Research, development and demonstration projects; and

(xvii) Other relevant measures.

In Ireland, the additional measures under consideration were developed as a part of the Programme of Measures studies carried out by several of the RBD projects over the last year. In addition, the range of additional measures available for implementation in the Plan has been informed by the early stages of the SEA process as well as the Screening stage of the Article 6 Assessment carried out under the EU Habitats Directive (92/43/EEC).

The additional measures being considered for the Plan address the pressures described previously in **Chapter 5**. They have been set out below under each of the pressure topics and have been categorised broadly as measures that will either:

a) **reduce** the inputs of contaminants;

b) **replace or upgrade** infrastructure; or

c) **Relocate** the pressure to an alternative and less sensitive location.

The additional measures represent a range of options which can be selected for the Plan, with the option of choosing one, all or a combination of these, if appropriate. The range of additional measures that can be selected from is provided in **Tables 8.3 to 8.14**.

The preparation of the draft Plan for the SWRBD was carried out at the same time as the other seven plans for the island. Three of the draft Plans prepared during this time were for international RBDs (i.e. the North Western IRBD, Neagh Bann IRBD and the Shannon IRBD) and as such they include the suite of additional measures generated by both the Northern Ireland and Ireland plan processes. As most of the measures proposed could be useful in both jurisdictions, it is considered appropriate that all of the proposed measures be considered in the SEA to address relevant pressures in the SWRBD, regardless of the Plan in which they were originally proposed; therefore, **Tables 8.3 to 8.14** include measures considered in both the Northern Ireland and Ireland plan making processes. It is acknowledged that a few of the measures are only applicable in their specific jurisdiction, e.g. legislation; therefore, a reference to the source Plan for each measure is included on the left hand side of the table for clarity. Please see the appendix to this chapter for a breakdown (by pressure) of which measures are currently being considered in each jurisdiction as well as a summary of the measures originating from the Northern Ireland plan process.

Not all of these measures are suitable for assessment. Where a measure is unsuitable for assessment, an **X** has been shown on the left hand side of the table, with a commentary on why an assessment has not been carried out provided in the right hand column. Where a measure can be assessed, this is indicated by a check mark (√) in the left hand column, with the right hand column listing where the assessment can be found in **Chapter 9**.

It should be noted that the measures proposed in the draft Plan and POM have been developed to meet the objectives of the WFD (see **Section 1.1**) and as such will broadly have a positive impact on water quality and aquatic biodiversity, if implemented. While many of the measures proposed in the draft Plan have been fully assessed in the SEA there several that do not lend themselves to formal assessment, as stated above. Nonetheless these measures, if implemented, would be expected to contribute to the overall positive impact of the Plan/POM as they would be expected to: provide the tools, methodologies and controls to help inform key actions; allow for a more focussed response from those challenged with administration of the Plan; provide a coordinated approach to water management through the provision of standardised methodologies and controls; and increase public and industry awareness of water management issues.

It should be noted that the additional measures have been grouped by pressure. In order to maintain consistency between the 2007 *Water Matters – Have Your Say* document, the discussions in the SEA Scoping Document and the Environmental Report it was decided to use pressure headings similar to those included in the *Water Matters – Have Your Say* document for these groupings. It is acknowledged that these headings have evolved throughout the plan process and that differences,

though subtle, have arisen between the headings originally used in the *Water Matters – Have Your Say* and some of those now included in the Plan. Therefore, for clarity and ease of comparison between the Plan and the Environmental Report, the following table of terminology is provided. In addition, where the Plan terminology differs, the Plan heading is provided in brackets at the start of each table. It should also be noted that there are several new headings, for which there is no direct comparison to the *Water Matters – Have Your Say* document. These are also listed below.

| SEA Terminology | Northern Ireland Plan Terminology | Ireland Plan Terminology |
|---|---|---|
| Wastewater | Collection and Treatment of Sewage / Urban Development | Wastewater |
| Industrial Discharges | Industry and Other Businesses | Industrial Discharges |
| Other Point Sources (landfills, quarries, mines and contaminated lands) | Industry and Other Businesses / Waste | Landfills, quarries, mines and contaminated lands |
| Agriculture | Agriculture | Agriculture |
| Wastewater from unsewered properties | Collection and Treatment of Sewage | Wastewater from unsewered properties |
| Forestry | Forestry | Forestry |
| Usage and Discharge of Dangerous Substances | Included under key sectors under pollution | Dangerous substances and chemical pollution |
| Physical Modifications | Freshwater Morphology/ Marine Morphology | Physical Modifications |
| Abstractions | Abstraction and Flow Regulation | Abstractions |
| Local Issues | | Locally focussed and future issues |
| Alien Species | Alien Species | Alien Species |
| Cruising and Boating | N/A | Cruising and Boating |
| Aquaculture | Industry and Other Businesses | Aquaculture |
| Peat Extraction | Industry and Other Businesses | Peat Extraction |
| Protecting High Quality Areas | N/A | Protecting High Quality Areas |
| Shared Waters | N/A | Shared Waters |
| Fisheries* | Fisheries | N/A |
| Urban Development* | Urban Development | Wastewater / Industrial Discharges |

* *new heading*

**Table 8.3 Additional Measures for Point and Diffuse Sources: Wastewater (NI: Collection and Treatment of Sewage / Urban Development)**

| Source Plan | Assessed ? | Additional Measures | Comment |
|---|---|---|---|
| **Reduce** | | | |
| Ire | √ | WW1: Measures intended to reduce loading to the treatment plant:<br>- Limit or cease the direct importation of polluting matter (e.g. liquid wastes, landfill leachate)<br>- Investigate extent of use and impact of under-sink food waste disintegrators and take appropriate actions<br>- Investigate fats/oils/grease influent concentrations and take actions to reduce FOG entering the collection system<br>- Upgrade and rehabilitate Combined Sewer Overflows (CSOs) | See Table 9.3 for assessment |
| Ire | √ | WW2: Impose development controls using a common approach where there is, or is likely to be in the future, insufficient capacity at treatment plants | See Table 9.3 for assessment |
| Ire | X | WW3: Initiate investigations into characteristics of treated wastewater for parameters not presently required to be monitored under the urban wastewater treatment directive | These measures are directed at data gathering and while they provide the tools, methodologies and data required to inform key actions arising from the Plan, they are not suitable for SEA. |
| Ire | X | WW4: Initiate research to verify risk assessment results and determine the impact of the discharge, including impacts to groundwater | |
| Ire | X | WW5: Use decision-making tools in point source discharge management | This measure will ensure consistency of point discharge measure application through use of a set of consistent decision-making tools. While it is a valuable measure and will provide the required tools to inform key actions, it is not suitable for SEA |
| | √ | WW6: Reduction in pollution at source through education campaigns | See Table 9.3 for assessment |
| NI | √ | WW7: Reduce loading by introduction of phosphate free products | See Table 9.3 for assessment |

| | | | | |
|---|---|---|---|---|
| NI | X | WW8: | Review consent conditions to ensure adequate controls and emission limits are set to achieve new water quality standards in receiving waters. Further development of mathematical models to examine cumulative impacts of discharges at a catchment scale. Detailed analysis to support the review of the consents for sewer systems and to address the volume spilt from overflows in urban areas. | This type of measure is not expected to result in significant environmental impacts and as such has not been assessed. However, impacts could occur if systems are found to be in noncompliance, and thus require upgrade. Therefore, it is anticipated that this measure would be the first step in implementation of measures such as WW10 to WW14 which have been assessed (see Table 9.3). |
| NI | X | WW9: | Review the environmental investment required after 2015, prioritise environmental problems and develop indicative lists. | Development of lists is part of the information gathering stage of the planning process. This measure could be linked to other measures considered and will be informed by monitoring associated with the WFD and SEA process. Assessment of this measure would be premature prior to a decision being made on the specific projects to be implemented. It should be noted that some of the projects that could be chosen, e.g. installation of higher standards of treatment, are assessed under separate measures where these have been specifically called out (e.g. WW11). It is highly recommended that when specific proposals are chosen, that these be subject to environmental assessment to identify potential impacts. |
| **Replace / Upgrade** | | | | |
| Ire | √ | WW10: | Install secondary treatment at plants where this level of treatment is not required under the urban wastewater treatment directive | See Table 9.3 for assessment |
| Ire | √ | WW11: | Apply a higher standard of treatment (stricter emission controls) where necessary | See Table 9.3 for assessment |
| Ire | √ | WW12: | Upgrade the plant to remove specific substances known to impact on water quality status | See Table 9.3 for assessment |
| Ire | √ | WW13: | Install ultra-violet or similar type treatment | See Table 9.3 for assessment |
| **Relocate** | | | | |
| Ire | √ | WW14: | Relocate the point of discharge | See Table 9.3 for assessment |
| Ire | X | WW15: | Introduce design and construction codes for wastewater infrastructure in areas of groundwater vulnerability. These could include prioritisation of construction supervision and avoidance of Inner Source Protection Zones | The provision of design and construction codes would contribute to the overall positive impact of the POM as they provide the tools to inform key actions arising from the Plan. However, because the details of what these would include are not available at this time, it is not possible to assess the impacts associated with these. It is recommended that when the details of these are known, they are subject to an environmental assessment to identify potential impacts other than those related to water, e.g. population, etc. |
| Ire | √ | WW16: | Implement Community Digestors for Alternative Energy | See Table 9.3 for assessment. |

| | | | |
|---|---|---|---|
| Ire | **X** | WW17: Implement and audit performance management systems at all WWTPs | This type of measure is not expected to result in significant environmental impacts and as such has not been assessed. However, impacts could occur if systems are found to be performing below required thresholds. Therefore, it is anticipated that this measure would be the first step in implementation of measures such as WW10 to WW14, which have been assessed (see Table 9.3). |

*See the appendix to Chapter 8 for additional information on which measures are being considered in each jurisdiction.*

**Table 8.4 Additional Measures for Point and Diffuse Sources: Industrial Discharges (NI: Industry and Other Businesses)**

| Source Plan | Assessed ? | Additional Measure | | Comment |
|---|---|---|---|---|
| **Reduce** | | | | |
| NI | X | IND1: | Implement management controls as they become available, e.g. new or improved guidance, new or revised legislation or regulations, codes of practice<br><br>These may include: proposed Environmental Impact Assessment (Fish Farming in Marine Waters) Regulations (NI)<br><br>Introduction of codes of practice for potentially polluting activities and consideration of a system of Generally Binding Rules (GBR) | There are a number of management controls identified as potential measures, the details of which are not yet available. It is not possible to assess the impacts associated with these at this time; however, it is strongly recommended that when the details of these are known, they are subject to an environmental assessment to identify potential impacts other than those related to water, e.g. population, etc. The overall positive aspect of these measures should be noted as they provide the tools, methodologies and data required to inform key actions arising from the Plan. The positive effects are anticipated be to realised in the medium to long term as regulations will have to be drafted and agreed at government level following stakeholder consultation. |
| NI | √ | IND2: | Develop oil storage regulations to reduce pollution impacts | See Table 9.4 for assessment |
| NI | √ | IND3: | Achieve compliance with discharge consent / licence standards to reduce inputs at source | See Table 9.4 for assessment |
| NI | √ | IND4: | Compile an inventory of management best practice and reduce peat usage | See Table 9.4 for assessment |
| NI | X | IND5: | Further research into diffuse pollution modelling | This measure is directed at information / data gathering and as such is not suitable for SEA; however, the positive contribution of this measure to informing key actions arising from the Plan should be noted. |
| **Replace / Upgrade** | | | | |
| Ire | √ | IND6: | Introduce Best Available Techniques (BAT) for industrial discharges | See Table 9.4 for assessment |
| NI | √ | IND7: | Improve point source discharge controls after examination of the cumulative impact of discharge consents at a catchment scale | See Table 9.4 for assessment |
| **Relocate** | | | | |
| Ire | √ | IND8: | Relocate discharge point | See Table 9.4 for assessment |

*See the appendix to Chapter 8 for additional information on which measures are being considered in each jurisdiction.*

**Table 8.5 Additional Measures for Point and Diffuse Sources: Other Sources (landfills, quarries, mines & contaminated lands) (NI: Industry and Other Businesses / Waste)**

| Source Plan | Assessed ? | Additional Measure | Comment |
|---|---|---|---|
| **Reduce** | | | |
| NI | **X** | OP1: Implement management controls as they become available, e.g. new or improved guidance, new or revised legislation or regulations, codes of practice<br>These could include: EU Mining Waste Directive<br>Planning Policy Statement 19 on Planning Minerals (NI)<br>Contaminated Land Regulations and Associated Guidance (NI) | There are a number of management controls identified as potential measures, the details of which are not yet available. It is not possible to assess the impacts associated with these at this time; however, it is strongly recommended that when the details of these are known, they are subject to an environmental assessment to identify potential impacts other than those related to water, e.g. population, etc. The overall positive aspect of these measures should be noted as they provide the tools, methodologies and data required to inform key actions arising from the Plan. |
| NI | √ | OP2: Reduce pollution arising from waste management, e.g. use of Site Waste Management Plans, proper disposal of construction, demolition and electrical wastes, segregated collection | See Table 9.5 for assessment |
| NI | √ | OP3: Introduce a Quality Protocol for the production of aggregates from inert waste to prevent water pollution from contaminated material | See Table 9.5 for assessment |
| NI | √ | OP4: Reduce illegal disposal of waste | See Table 9.5 for assessment |
| **Replace / Upgrade** | | | |
| Ire | √ | OP5: Undertake remediation projects for prioritised landfills, quarries, mines and contaminated lands, e.g. pollution containment measures and monitoring requirements | See Table 9.5 for assessment |
| Ire | √ | OP6: Properly dispose of harbour dredgings | See Table 9.5 for assessment |
| Ire | X | OP7: Monitor shipping activities, including discharges | Monitoring of shipping activities is not expected to result in significant environmental impacts and as such has not been assessed. However, impacts could occur if monitoring results in actions being taken as a result of information gathered. Therefore, any actions arising from this measure should be subject to environmental assessment. It should be noted that the effectiveness of this measure might be limited by the willingness of operators to participate in the monitoring scheme. |

*See the appendix to Chapter 8 for additional information on which measures are being considered in each jurisdiction.*

**Table 8.6 Additional Measures Point and Diffuse Sources: Usage and Discharge of Dangerous Substances (NI: Included under key sectors under Pollution)**

| Source Plan | Assessed ? | Additional Measure | | Comment |
|---|---|---|---|---|
| **Reduce** | | | | |
| Ire | **X** | DS1: | Improve administration of dangerous substances through use of awareness campaigns, improvement in product labelling, support of auditing and reporting and improved information sharing | No environmental impacts would be expected to occur as a result of implementation of this measure, aside from the positive impacts to water quality. Of all of the measures proposed within the draft Plan, those aimed at education, awareness and information sharing are perhaps the most critical as they provide for direct engagement of stakeholders and the public by providing the tools to take ownership of the Plan and the proposed measures.. |
| Ire | X | DS2: | Review of wastewater and industrial licences | DS2 is directed at information gathering and, while an important step in the planning process, is not suitable for SEA. However, DS2 is the first step in the implementation of DS3, which is aimed at brining emissions in line with relevant standards and for which an assessment was carried out (see Table 9.6) |
| Ire | √ | DS3: | Reduction of pollution by control of point sources through use of pollution reduction programmes | |
| Ire | √ | DS4: | Reduce discharges, losses and emissions from diffuse sources, including in groundwater source protection zones | See Table 9.6 for assessment |
| **Replace / Upgrade** | | | | |
| Ire | √ | DS5: | Upgrade treatment to remove substances from effluent | See Table 9.6 for assessment |
| **Relocate** | | | | |
| Ire | √ | DS6: | Relocate discharge point | See Table 9.6 for assessment |

*See the appendix to Chapter 8 for additional information on which measures are being considered in each jurisdiction.*

**Table 8.7 Additional Measures for Point and Diffuse Sources: Agriculture**

| Source Plan | Assessed ? | Additional Measure | | Comment |
|---|---|---|---|---|
| **Reduce** | | | | |
| Ire | √ | AG1: | Creation of buffer strips around water bodies to prevent pollutant loss | See Table 9.7 for assessment |
| NI | √ | AG2: | Adoption of Best Management Practices to reduce phosphorus inputs, e.g. use of feedstuffs designed to minimise phosphorus in excreta | See Table 9.7 for assessment |
| Ire | √ | AG3: | Installation of fencing to prevent livestock access to watercourses | See Table 9.7 for assessment |
| Ire | √ | AG4: | Reduction of agricultural intensity, e.g. lower stocking density on land, land reclamation | See Table 9.7 for assessment |
| Ire | √ | AG5: | Require nutrient management planning | See Table 9.7 for assessment |
| Ire | √ | AG6: | Set aside of agricultural lands | See Table 9.7 for assessment |
| **Replace / Upgrade** | | | | |
| NI | X | AG7: | Identification of regions where diffuse pollution problems are most severe | This is an information gathering measure, which will allow other measures identified under this pressure heading to focus on areas where the pressure is most severe. However, while this is an important step in the planning process and will contribute to the overall positive impact of the Plan, this measure is not suitable for SEA. |
| Ire / NI | √ | AG8: | Increase participation in rural environmental protection schemes / other agri-environment schemes, e.g. NPWS farm plans, particularly in priority catchments (Ire) and focus advice and regulatory action in areas where there is a lower uptake in agri-environment schemes (NI) | See Table 9.7 for assessment |
| Ire | √ | AG9: | Upgrade farm management systems | See Table 9.7 for assessment |

| Source Plan | Assessed ? | Additional Measure | Comment |
|---|---|---|---|
| NI | X | AG10: Examine commercial/technical proposals that have the potential to bring about significant reduction in the phosphorus surplus | Examination of commercial/ technical proposals is part of the planning process and would contribute to achieving the overall positive impact of reducing phosphorus. However, assessment of this measure would be premature prior to a decision on which proposals will be implemented. Some of the technical proposals that could be chosen are assessed separately, where specified (e.g. AG12, AG13). It is highly recommended that when specific proposals are chosen, that these be subject to environmental assessment to identify potential impacts. |
| NI | √ | AG11: Phosphorus balances on individual holdings to be introduced on a phased basis | See Table 9.7 for assessment |
| **Relocate** | | | |
| Ire | √ | AG12: Removal by tanker in areas of nutrient surplus | See Table 9.7 for assessment |
| Ire | √ | AG13: Treatment by digestors in areas of nutrient surplus | See Table 9.7 for assessment |

*See the appendix to Chapter 8 for additional information on which measures are being considered in each jurisdiction.*

**Table 8.8 Additional Measures for Point and Diffuse Sources: Wastewater from Unsewered Properties (NI: Collection and Treatment of Sewage)**

| Source Plan | Assessed ? | Additional Measure | Comment |
|---|---|---|---|
| **Reduce** | | | |
| Ire | √ | UP1: Amend Building Regulations<br>- Code of Practice for single houses<br>- Code of Practice for large systems<br>- Certification of the construction of onsite wastewater treatment systems and percolation areas/polishing filters | See Table 9.8 for assessment |
| Ire | √ | UP2: Assess applications for new unsewered systems by applying risk mapping/decision support systems and codes of practice. Notice to planning authority required immediately prior to the installation of onsite effluent treatment systems including percolation areas and polishing filters. | See Table 9.8 for assessment |
| Ire | X | UP3: Establish:<br>- certified expert panels for site investigation and certification of installed systems. A second panel of hydrogeologists is required for clusters and large systems.<br>- National group for formulating polices and coordination of consistent approach.<br>-A technical advice section or advisory group to coordinate and give advice on emerging and innovative technologies<br>- Installation and maintenance training by FAS | This type of measure is not expected to result in significant environmental impacts and as such has not been assessed. However, impacts could occur if systems fail to achieve certification, and thus require upgrade. Therefore, it is anticipated that this measure would be the first step in implementation of measures such as UP8, which has been assessed (see Table 9.8). |
| NI | √ | UP4: Change current policy and guidance to improve existing controls and modify development control and enforcement practices to reflect restrictions if required. | See Table 9.8 for assessment |
| NI | √ | UP5: Reduce loading by introduction of phosphate free detergents | See Table 9.8 for assessment |
| **Replace / Upgrade** | | | |
| Ire | X | UP6: Carry out an inspection programme in prioritised locations for existing systems and record results in an action tracking system | UP6 is directed at information gathering and is not suitable for SEA. It should be noted that this measure would be an important step in the planning process with a potential to be a significant mechanism in contributing to reducing pollution |

| Source Plan | Assessed ? | Additional Measure | Comment |
|---|---|---|---|
| | | | potential from on-site wastewater treatment systems. However, UP6 is part of the implementation of UP7, for which an assessment was carried out (see Table 9.8) |
| NI | √ | UP7: Following mapping of vulnerable areas, where water quality is threatened alternate treatment options, such as providing mains sewers or tank maintenance programmes, may be investigated | See Table 9.8 for assessment |
| Ire | √ | UP8: Enforce requirements for de-sludging and codes of practice | See Table 9.8 for assessment |
| NI | X | UP9: Consideration of grants to improve private sewage discharges | UP9 is not expected to result in significant environmental impacts, aside from positive impacts to water quality due to improvements in private sewage discharges. As such, it does not require SEA. |
| **Relocate** | | | |
| NI | **X** | UP10: Identify areas where there are potential constraints on development and address these | Development of constraints mapping is part of the information gathering stage of the planning process. Assessment of this measure would be premature prior to a decision being made on the specific projects to be implemented. This measure could also be the first step in ensuring the zoning of lands is directly linked to the provision of adequate and appropriate wastewater treatment infrastructure.<br><br>It should be noted that some of the projects that could be chosen, e.g. connection to municipal systems, are assessed under separate measures where specifically noted (e.g. UP11). It is highly recommended that when specific proposals are chosen, that these be subject to environmental assessment, where required, and Appropriate Assessment to identify potential impacts. |
| Ire | √ | UP11: Consider connection to municipal systems | See Table 9.8 for assessment |

*See the appendix to Chapter 8 for additional information on which measures are being considered in each jurisdiction.*

## Table 8.9 Additional Measures for Point and Diffuse Sources: Forestry

| Source Plan | Assessed ? | Additional Measures | | Comment |
|---|---|---|---|---|
| **Reduce** | | | | |
| NI / Ire<br>NI<br>Ire<br>NI | **X** | F1: | Implement management controls as they become available, e.g. new or improved guidance, new or revised legislation or regulations, codes of practice<br>These could include: Improved guidance based on scientific research for highly sensitive areas (e.g. Pearl Mussels)<br>Ensuring regulations and guidance are cross referenced and revised to incorporate proposed measures<br>Development of maps indicating where forests should be developed taking account of sensitive and protected areas | There are a number of management controls identified as potential measures, the details of which are not yet available. It is not possible to assess the impacts associated with these at this time; however, as they are likely to require some changes to forestry practices e.g. reduced coup sizes or reduced harvest, it is strongly recommended that when the details of these are known, they are subject to an environmental assessment, and where required, an Appropriate Assessment to identify potential impacts other than those related to water, e.g. population, etc. |
| Ire | √ | F2: | Acidification - Avoid or limit (to below critical thresholds) afforestation on 1st and 2nd order stream catchments in acid sensitive catchments | See Table 9.9 for assessment |
| Ire | √ | F3: | Acidification - Restructure existing forests to include open space and structural diversity through age classes and species mix, including broadleaves | See Table 9.9 for assessment |
| Ire | √ | F4: | Acidification - Revise the Acidification Protocol to ensure actual minimum alkalinities are detected (that is ensure sampling under high flow conditions) and revise boundary conditions for afforestation in acid sensitive areas. | See Table 9.9 for assessment |
| Ire | √ | F5: | Eutrophication and Sedimentation - Avoid or limit forest cover on peat sites | See Table 9.9 for assessment |
| Ire | √ | F6: | Eutrophication and Sedimentation -Change the tree species mix (for example broadleaves) on replanting | See Table 9.9 for assessment |
| Ire | √ | F7: | Eutrophication and Sedimentation - Limiting felling coup size | See Table 9.9 for assessment |
| Ire | √ | F8: | Eutrophication and Sedimentation - Establish new forest structures on older plantation sites (including riparian zones, drainage layouts, species mix, open areas) | See Table 9.9 for assessment |

| Source Plan | Assessed ? | Additional Measures | Comment |
|---|---|---|---|
| Ire | **X** | F9: Hydromorphology - Audit existing drainage networks in forest catchments | F9 is directed at information / data gathering. As such this measure is an important part of the planning process as it will inform other measures/actions under the Plan; however, this measure is not suitable for SEA. It is anticipated that F9 would be an initial step in implementation of other measures, such as F18, which have been assessed (see Table 9.9). |
| Ire | **X** | F10: Pesticide Use - Maintain registers of pesticide use | F10 is directed at information / data gathering, and while an important part of the planning process, as it will inform other measures/actions under the Plan, it is not suitable for SEA. It is anticipated that F10 would be a first step in implementation of other measures, such as F11 and F12, which have been assessed (see Table 9.9). |
| Ire | √ | F11: Pesticide Use - Reduce pesticide usage | See Table 9.9 for assessment |
| Ire | √ | F12: Pesticide Use - Pre-dip trees in nurseries prior to planting out | See Table 9.9 for assessment |
| **Replace / Upgrade** | | | |
| Ire | √ | F13: Acidification - Mitigate acid impacts symptomatically using basic material (e.g. limestone or sand liming) | See Table 9.9 for assessment |
| Ire | √ | F14: Acidification - Manage catchment drainage to increase residence times and soil wetting, including no drainage installation in some areas | See Table 9.9 for assessment |
| Ire | √ | F15: Acidification - Implement measures to increase stream production – for example with native woodland in riparian zones. | See Table 9.9 for assessment |
| Ire | √ | F16: Eutrophication and Sedimentation - Establish riparian zone management prior to clearfelling | See Table 9.9 for assessment |
| Ire | √ | F17: Eutrophication and Sedimentation - Enhance sediment control | See Table 9.9 for assessment |
| Ire | √ | F18: Hydromorphology - Enhance drainage network management – minimise drainage in peat soils | See Table 9.9 for assessment |
| Ire | √ | F19: Pesticide Use - Develop biological control methods | See Table 9.9 for assessment |

| Source Plan | Assessed ? | Additional Measures | Comment |
|---|---|---|---|
| NI | **X** | F20: Assessment – Assess operations posing a significant threat to water quality on a whole catchment basis | These measures are directed at information / data gathering, and while an important part of the planning process, are not suitable for SEA. A determination with regard to the requirement for SEA for Forestry practices under the provisions of the SEA Directive should be made. A mitigation measure recommending this has been brought forward to Chapter 10 of this report. |
| Ire | **X** | F21: Institute a public awareness campaign in order to raise awareness of the interaction of forestry and water. | No environmental impacts would be expected to occur as a result of implementation of this measure, aside from the positive impacts to water quality. Of all of the measures proposed within the draft Plan, those aimed at education and awareness are perhaps the most critical as they provide for direct engagement of stakeholders and the public. |

*See the appendix to Chapter 8 for additional information on which measures are being considered in each jurisdiction.*

**Table 8.10 Additional Measures for Physical Modifications (NI: Freshwater Morphology/ Marine Morphology)**

| Source Plan | Assessed ? | Additional Measure | Comment |
|---|---|---|---|
| **Reduce** | | | |
| NI / Ire<br><br>Ire<br><br>NI<br><br>NI<br>NI<br><br>NI<br>Ire | X | PM1: Implement management controls as they become available, e.g. new or improved guidance, new or revised legislation or regulations, codes of practice<br>These could include: A code of practice for morphology<br>Introduction of a culverting policy<br>Review of existing legislative controls on physical modifications to surface waters<br>Development of a protocol for maintenance dredging<br>Implementation of a new marine licencing regime and marine planning system under the (draft) UK Marine Bill<br>Adoption of operational protocols for impoundments<br>Increased emphasis in EIA on morphology impacts from new development or cumulative pressures | There are a number of management controls identified as potential measures, the details of which are not yet available. It is not possible to assess the impacts associated with these at this time; however, it is strongly recommended that when the details of these are known, they are subject to an environmental assessment, where required, and Appropriate Assessment to identify potential impacts other than those related to water, e.g. population, etc. |
| Ire | √ | PM2: Support voluntary initiatives, such as wetlands and Integrated Coastal Zone Management schemes, including through awareness campaigns | See Table 9.10 for assessment |
| NI | X | PM3: Complete further surveys on all water bodies following review of morphology classification results | PM3 is directed at information / data gathering, and while an important part of the planning process, is not suitable for SEA |
| NI | X | PM4: Carry out SEA of tidal energy reserves | If a plan or programme to develop tidal energy reserves is proposed, a determination with regard to the requirement for SEA under the provisions of the SEA Directive should be made as well as the requirement for Appropriate Assessment. A mitigation measure recommending this has been brought forward to Chapter 10 of this report. |
| **Replace / Upgrade** | | | |
| Ire | X | PM5: Channelisation investigation | PM5 is directed at further data gathering as part of the planning process and is not suitable for SEA. |

| Source Plan | Assessed ? | Additional Measure | | Comment |
|---|---|---|---|---|
| Ire / NI | √ | PM6: | Channelisation impact remediation schemes, such as re-meandering of straightened channels, reconstruction of pools, substrate enhancement, removal of hard bank reinforcement/revetment or replacement with soft engineering solution | See Table 9.10 for assessment |
| Ire / NI | √ | PM7: | Over-grazing remediation, such as stabilisation of river banks | See Table 9.10 for assessment |
| Ire | X | PM8: | Impassable barriers investigation | PM8 is directed at further data gathering as part of the planning process and is not suitable for SEA. |
| Ire / NI | √ | PM9: | Strategically appraise significant barriers to fish movement and introduce impassable barriers remediation schemes, such as fisheries enhancement schemes, reopening of existing culverts, removal of impoundment and de-silting of impounded reach, desiliting of affected river reaches, removal of barriers to fish migration, updating of existing fish passes and construction of new fish passes | See Table 9.10 for assessment |

*See the appendix to Chapter 8 for additional information on which measures are being considered in each jurisdiction.*

**Table 8.11 Additional Measures for Abstractions (NI: Abstraction and Flow Regulation)**

| Source Plan | Assessed ? | Additional Measure | Comment |
|---|---|---|---|
| **Reduce** | | | |
| Ire | X | AB1: Assess water resource availability and target management priorities through modernisation of statutes and regulatory practices and policies, e.g. assigning responsibility for compiling and maintaining a comprehensive, national register of abstractions | The potential for this measure to result in significant environmental impacts depends on the actions involved. In this case, the example provided, e.g. maintaining a register of abstractions, is primarily concerned with information gathering and is not suitable for SEA though it is anticipated that it would be a first step in implementation of other measures, such as AB4, 5 and 6, which have been (see Table 9.11). The maintenance of a register would also facilitate identification of risk from cumulative impacts and the need for sub threshold SEA or EIA to address the impacts from these as well as the need for Appropriate Assessment.<br>It is highly recommended that when the specific details as to the types of changes to statutes and regulations are proposed, that these be subject to environmental assessment to identify potential impacts. |
| Ire | X | AB2: Support water conservation measures, e.g. rainwater harvesting schemes, awareness campaigns, introduce best practice guidance, install appropriate devices and standards to prevent waste and misuse of water | These measures are primarily directed education and awareness, and while these are extremely valuable measures in the conservation of water resources and should be encouraged, are not suitable for SEA. |
| Ire / NI | X | AB3: Address data limitations and additional monitoring needs, e.g. monitor abstraction and compensation flows, assess ecology impacts associated with hydrologic changes, improve abstractions register, improve discharge register, validate and develop habitat suitability curves, improve hydrometric data, collect bathymetry data for lakes | AB3 is directed at information / data gathering, and while this measure would be essential to managing abstractions on a catchment basis as well as reducing impacts on protected habitats and species, it is not suitable for SEA |
| Ire | √ | AB4: Examine compensation flow requirements on regulated rives and maintain minimum flow or flow variability, where applicable, to maintain good hydrological status and support ecology | See Table 9.11 for assessment |
| NI | √ | AB5: Assess compliance of monitored abstractions and compensation flows with licence conditions | See Table 9.11 for assessment |
| Ire | √ | AB6: Develop water budgets | See Table 9.11 for assessment |

| Source Plan | Assessed ? | Additional Measure | | Comment |
|---|---|---|---|---|
| **Replace / Upgrade** | | | | |
| Ire | √ | AB7: | Reduce abstraction demand, e.g. reduce leakage and unaccounted water, modify plumbing codes to support conservation, daily metering of abstracted volumes, implement small schemes with smaller demand | See Table 9.11 for assessment |
| Ire | √ | AB8: | Increase available water, e.g. promote infiltration of runoff, reuse of grey water or treated wastewater, identify and build infrastructure for alternate sources | See Table 9.11 for assessment |
| Ire | √ | AB9: | Water metering and charging programmes for residential users | See Table 9.11 for assessment |
| Ire | √ | AB10: | Reduce abstraction volumes | See Table 9.11 for assessment |
| Ire | √ | AB11: | Altered abstraction timing | See Table 9.11 for assessment |
| Ire | √ | AB12: | Conjunctive use | See Table 9.11 for assessment |
| Ire | √ | AB13: | Provision of additional storage | See Table 9.11 for assessment |
| **Relocate** | | | | |
| Ire | √ | AB14: | Direct development to areas where capacity exists and restrict development if abstraction already at capacity | See Table 9.11 for assessment |

*See the appendix to Chapter 8 for additional information on which measures are being considered in each jurisdiction.*

**Table 8.12 Additional Measures for Urban Development (Ire: Wastewater / Industrial Discharges)**

| Source Plan | Assessed ? | Additional Measure | Comment |
|---|---|---|---|
| **Reduce** | | | |
| NI | **X** | UB1: Development of draft strategy Managing Stormwater | Development of strategies is part of the planning process. Assessment of these measures would be premature prior to a decision on what the strategies would involve. |
| NI | **X** | UB2: Manage misconnections through development of a strategy | |
| NI | **X** | UB3: Education and awareness on applicability of SUDs | These measures are aimed at education and awareness, and while these are valuable measures and should be encouraged, they are not suitable for SEA. |
| | **X** | UB4: Introduce school education programme | |
| NI | **X** | UB5: Develop an extended regulatory tool kit | The details as to the management controls to be included in the regulatory toolkit are not yet available. It is not possible to assess the impacts associated with these at this time; however, it is strongly recommended that when the details of these are known, they are subject to an environmental assessment to identify potential impacts other than those related to water, e.g. population, etc. |
| Ire | **X** | UB6: Prepare urban asset management plans, which should include surveys, mapping, and research; codes of best practice or legislation; groundwater quality monitoring and risk assessment; improved infrastructure, including implementation of SuDS; and planning | There are a number of items identified as potential components of the urban assessment management plans, most of which are aimed at data and information gathering. The only piece of the measure, which could be suitable for SEA, is the provision for 'improved infrastructure'. However, the details as to what this would involve in the individual plans are not yet available. It is strongly recommended that when the details of these are known, the determination with regard to the requirement for a SEA is made. If an SEA is not required under the provisions of the Directive it is recommended that a focussed environmental assessment be carried out to identify potential impacts other than those related to water, e.g. population, etc. |
| **Replace / Upgrade** | | | |
| NI | **X** | UB7: Develop a diffuse pollution screening and modelling tool to assess diffuse loads and allow for prioritisation of new actions | Development of a screening tool is part of the information gathering stage of the planning process. Assessment of this measure would be premature prior to a decision being made on the specific actions to be implemented. It is highly recommended that when specific proposals are chosen, that these be subject to environmental assessment to identify potential impacts. |
| NI | **X** | UB8: Promote and adopt good practice with respect to storage, use and disposal of hazardous chemicals | This measure is aimed at education and awareness, and while it is an extremely valuable measure and should be encouraged, it is not suitable for SEA. |

*See the appendix to Chapter 8 for additional information on which measures are being considered in each jurisdiction.*

**Table 8.13 Additional Measures for Local Issues**

| Source Plan | Issue | Additional Measure | Comment |
|---|---|---|---|
| Ire | **Protecting High Quality Areas:** | Develop national guidance and introduce a web-based register<br>Support nature conservation projects | The development of national guidance relating to the protection of high status sites, along with the development of a web-based register, would not be expected to result in result in significant adverse environmental impacts and therefore does not require SEA.<br>In addition, the support of nature conservation projects would not be expected to result in significant adverse environmental impacts and therefore does not require SEA. |
| Ire | **Aquaculture (NI: Industry and Other Businesses):** | Propose national standards<br>Develop Shellfish Management Plans<br>Designate additional sites | Without the detail as to what the national standards for aquaculture would contain it is not possible to assess these at this time; however it is recommended when these details are known an environmental assessment is carried out to ensure that these standards give consideration to impacts other than those related to water.<br>The designation of additional aquaculture sites would not be expected to result in significant adverse environmental impacts in and of themselves; however, the management plans associated with these would require SEA. Specifically, the designation of Shellfish Growing Areas, currently underway in Ireland, will be subject to a separate SEA. |
| Ire | **Peat extraction (NI: Industry and Other Businesses):** | Enforce licensing controls<br>Implement rehabilitation plans | The enforcement of licensing controls involves implementation of existing regulations and as such is not suitable for SEA. The implementation of rehabilitation plans on peat extraction sites should be encouraged and be subject to environmental assessment at the time the individual details of these are known to ensure that they are carried out in a holistic fashion and give consideration to impacts other than those related to water. |
| Ire | **Cruising and boating:** | Enforce pump out controls<br>Enforce speed restrictions | The enforcement of existing pump out controls and speed restrictions involves the implementation of rules and regulations that are currently in place. As such they are not suitable for SEA |
| Ire | **Shared waters:** | Increased transboundary coordination | A continuation of, and increase in, the ongoing coordination between Northern Ireland and Ireland in the area of water management is a critical step in the implementation of the RBMP and should be encouraged. However, the administrative nature of these activities would not be expected to result in significant adverse environmental impacts, aside from the positive impacts to water quality resulting from effective implementation of the RBMP, and as such do not require SEA. |

| | | | |
|---|---|---|---|
| NI | **Alien Species:** | Amendments to the Wildlife Order (NI) 1985<br>Maritime Ballast Water Convention<br>NIEA Natural Heritage Grant Aid Programme<br>Develop risk assessments and contingency and management plans for species that are established or are likely to become established<br>Develop sectoral codes of practice<br>Education and awareness programmes | Several of these measures are aimed at education, developing best practice and information gathering, and while valuable, are not suitable for SEA.<br>The remaining measures are primarily planning related, e.g. amendments to the Wildlife Order, and without the specific details it is not possible to assess the impacts of these at this time. However, it is highly recommended that these be subject to an environmental assessment and Appropriate Assessment once the details are available. |
| NI | **Fisheries:** | Commercial Fishing Regulations, e.g. further restrictions on licensed commercial salmon fishermen, prohibition of the sale of rod caught salmon<br>Angling Regulations, e.g. catch and release, use of barbless hooks, early closures and shortened season<br>European Fisheries Fund Grants<br>Advice, education and training<br>Protection and restoration of salmon habitats, e.g. develop further conservation and management targets and CMPs for specific rivers, complete DNA based study to determine genetic structure of salmon populations | For the most part these measures are concerned with data gathering and education and awareness. For those measures, which involve other types of actions, e.g. angling regulations, these are not expected to result in significant environmental impacts, aside from positive impacts to water quality. |

*See the appendix to Chapter 8 for additional information on which measures are being considered in each jurisdiction.*

### Table 8.14 Measures for Freshwater Pearl Mussel

These are a generalised set of measures, based on a pilot plan. It is intended that a detailed plan for each Freshwater Peal Mussel catchment will be completed and alternatives considered at that stage will be catchment specific. All of the catchments identified to date are within Ireland; therefore, these measures originate from the Ireland planning process.

| Source Plan | Assessed ? | Additional Measure | Comment |
|---|---|---|---|
| **Reduce** | | | |
| Ire | X | FPM 2 – Hot Fish<br>A survey of the locations of 0+ fish during July to September, and a survey of 1+ fish in June shall be undertaken within mussel habitats. The conservation of fish passage shall be reviewed as per FPM1 to find a regime that does not interfere with mussel reproduction. | The action from FPM2 will be determined by the outcome of FPM1 therefore it is not possible to assess this alternative at this time. |
| Ire | √ | FPM 3 – Lack of Riparian Buffer Zone<br>A survey shall be undertaken to map the areas where a riparian buffer does not exist. A plan shall subsequently be produced to provide effective buffers in these areas either by fencing off a 5 to 10m strip of rank grassland (and eventual scrub), or native woodland at a distance that will not cause tunnelled shade. | See Table 9.12 for assessment |
| Ire | √ | FPM 4 - Peat Cutting Perpendicular to the River<br>A review of peatland ownership, management and drainage shall be undertaken where appropriate. All drains from peatland will be filled or effectively silt trapped, and an effective buffer zone established to trap any overland peat silt before it reaches the rivers. | See Table 9.12 for assessment |
| Ire | X | FPM 5 - Road and Bridge Construction Adjacent to River<br>All access roads or bridges of any size have a pollution risk that can cause damage to mussel populations during construction and operation. Any future roads or bridges of any size should be subject to an impact assessment for potential damage to the mussel population alone or in conjunction with other effects. | FPM5 requires additional assessment at the project stage. While not assessable, it is considered to be mitigation and has been included in Chapter 10. |
| Ire | √ | FPM 6 - Road and Bridge Construction Adjacent to River<br>A survey of current damage caused by temporary of permanent road and bridge building shall be carried out and recommendations for retrofitting construction through silt trapping, resurfacing and other works that could minimise ongoing damage. | See Table 9.12 for assessment |
| Ire | √ | FPM 7 - Road and Bridge Construction Adjacent to River | See Table 9.12 for assessment |

| Source Plan | Assessed ? | Additional Measure | Comment |
|---|---|---|---|
| | | During the above surveys, the material of road and path surfacing shall be examined. Any hardcore or surfacing that includes substantial limestone content will be removed and replaced by non-alkaline material, following an impact assessment as to what methodology and mitigation measures shall be employed. | |
| Ire | X | FPM 8<br>A clear instruction to ensure lime is not used in catchment roads or hard surfaces shall be incorporated into local authority plans and operation organisation. | While not assessable, FPM8 is considered to be mitigation and has been included in Chapter 10. |
| Ire | √ | FPM 10 - Forestry<br>Develop specific Forestry Management Plans with key stakeholders to address the key pressures identified in each catchment. The plan will include a suite of measures adopted from the following:<br>• All coniferous plantations within the Catchment shall be subject to final felling and replacement with either continuous cover native woodland or semi-natural bog/moor;<br>• Establish riparian zone management prior to clearfelling with sufficient time to allow vegetative cover to develop;<br>• Change the tree species mix (e.g. broadleaves) on replanting;<br>• Limit felling coup size to reduce potential sediment and nutrient load pressure;<br>• Remove bankside trees by hand as whole trees where feasible;<br>• Enhance sediment control through increased numbers and locations of sediment traps;<br>• Main Silt traps will be large enough for *Margaritifera* conservation purposes (Altmüller & Dettmer, 2006);<br>• Prohibition of aerial fertilisation on sensitive/ protected sites;<br>• No replanting on certain hydro geological settings (peat soils) on sensitive sites;<br>• Auditing of existing drainage networks prior to clearfelling ;<br>• Enhanced drainage network management – minimise drainage in peat soils;<br>• Reduction or no pesticide usage – allow clearfelled areas to lay fallow for prolonged periods;<br>• Pre-dipping of trees in nurseries prior to planting out;<br>• Use biological control methods; and<br>• Maintaining registers of pesticide use in the catchment. | See Table 9.12 for assessment |

| Source Plan | Assessed ? | Additional Measure | Comment |
|---|---|---|---|
| Ire | √ | FPM 11 - Forestry<br>Final felling shall be subject to an impact assessment, felling management plan, and monitoring plan including continuous turbidity meters, carried out in agreed small coupes, using strictly best practice according to the Forestry and *Margaritifera* requirements, with, felling away from the river. | See Table 9.12 for assessment |
| Ire | √ | FPM 12 - Forestry<br>A system of monitoring and management of continuous cover bankside trees shall be initiated, whereby a habitat of dappled shade with no tunnelling is provided for the river. Trees that are at risk of falling into the river shall be removed or partly removed (e.g. where some boughs are falling into the river) by qualified and experienced tree surgeons. Replacement, where necessary shall be by appropriate native species. | See Table 9.12 for assessment |
| Ire | √ | FPM 13 REPS Plans<br>All farms within designated catchments should adhere to a nutrient management plan. | See Table 9.12 for assessment |
| Ire | X | FPM 14 NPWS Farm Plans<br>NPWS shall reassess measures in NPWS Farm Plans to ensure they are sufficient to promote sustainable pearl mussel populations. Current farm plan guidelines for other species and habitats should not conflict with *Margaritifera* requirements. | FPM14 will require further action on foot of an NPWS review and is not assessable at this time. |
| Ire | √ | FPM 15 Ditch Management<br>Ditches leading to *Margaritifera* Rivers should not be directly connected to such rivers without effective silt and nutrient trapping. A management plan for ditches needs to include large enough silt trap sizes for effective trapping (Altmueller & Dettmer, 2006), and include an integrated wetland system where appropriate. | See Table 9.12 for assessment |
| Ire | √ | FPM 16 Animal Watering<br>All grazing animals within any designated catchments should be fenced away from the river or connective waterways. Suitable watering troughs should be made available for the animals instead. | See Table 9.12 for assessment |
| Ire | √ | FPM 17 Septic tank survey, database and remediation<br>A survey of septic tanks and small effluent systems and databasing of results shall be established by the local authority.<br>Each system will be graded as to its age, suitability and effectiveness. Systems that are releasing excessive nutrients shall be upgraded either through tank replacement or integrated wetland systems, where appropriate. Instream dataloggers for turbidity and regular water sampling will be required for this and other monitoring. | See Table 9.12 for assessment |

| Source Plan | Assessed ? | Additional Measure | Comment |
|---|---|---|---|
| Ire | √ | FPM 18 Washing machine plumbing<br>The survey of septic tanks should include a check on household plumbing to ensure that all sources of detergent and other nutrients are plumbed to waste water systems. | See Table 9.12 for assessment |
| Ire | √ | FPM 19 Municipal and Industrial Discharge survey, database and remediation<br>The provision of municipal and industrial outfall discharge surveys carried out as part of the River Basin Management Plan shall be prioritised from local authorities to NPWS.<br>The provision of combined sewer overflow details shall be prioritised from local authorities to NPWS.<br>Each system will be graded as to its age, suitability and effectiveness of function. Systems that are releasing excessive nutrients will be upgraded either through improved or enlarged load capability. Emphasis should be given to phosphorus stripping. Instream dataloggers for turbidity and regular water sampling will be required for this and other monitoring. An assessment of the impact from the application of salt to road surfaces, where surface water flow has direct connectivity to the river shall be put in place and mitigation measures proposed where necessary. | See Table 9.12 for assessment |
| Ire | X | FPM 20 Catchment Flow Database<br>A flow modelling survey for the designated Freshwater Pearl Mussel catchments shall be undertaken as appropriate. An analysis of flow, mussel distribution, fisheries and silt distribution shall contribute to a plan for remedial action where needed. The study shall result in recommendations for improvement to flow as per FPM 1, and through other measures such as leakage reduction. | FPM20 requires further study to establish a flow database and as such is not assessable. |
| Ire | √ | FPM 21 Catchment Awareness Campaign<br>A campaign of awareness and education shall include talks through schools and public meetings and leaflets on pearl mussels and problems caused to them by direct damage, silt and nutrient enrichment. Measures above shall be explained. Litter prevention, low phosphate detergent usage, correct plumbing of washing machines and disposal of oil shall be included in the campaign. | See Table 9.12 for assessment |
| Ire | √ | FPM 22 Catchment Stakeholders Group<br>A committee of stake holder interests shall be facilitated by the RBD projects in consultation with NPWS. In order to promote the conservation of the pearl mussel population and to provide a forum by which progress on all measures can be discussed. Local authority representatives, NPWS, fisheries, angling groups, schools, forestry and farm managers and NGOs should all be represented where possible. | See Table 9.12 for assessment |

| Source Plan | Assessed ? | Additional Measure | Comment |
|---|---|---|---|
| Ire | √ | FPM 23 Leisure management<br>Angling rights holders and angling clubs shall provide managed walkways and control access to unstable river banks. | See Table 9.12 for assessment |
| Ire | X | FPM 24 Fish poaching<br>Liaison with Fisheries Board with regard to assessment of fish poaching problems should be undertaken, and where possible rectified. | No specific actions are required for FPM24 therefore this measure is not assessable however; continued liaison with the fisheries Board on this matter is welcomed. |
| Ire | X | FPM 25 River bed or bank works<br>Any works in the river bed or bank either for fisheries management, pipeline laying or other purposes shall be subject to an ecological impact assessment. Weirs, croys and stone bank reinforcement are unsuitable for freshwater pearl mussel SACs and alternatives should be found. | While not assessable, FPM25 is considered to be mitigation and has been included in Chapter 10. |
| **Replace / Upgrade** | | | |
| Ire | √ | FPM1 Unnatural flows<br>An analysis of flow in managed rivers will be undertaken where necessary. Following the analysis, a plan should be made and implemented in order to control flows in a more natural manner, and one that is suitable for the sustainable reproduction of the pearl mussel. Monitoring of the success of changes implemented should be carried out. | See Table 9.12 for assessment |
| Ire | √ | FPM 9 Channelisation<br>An assessment of channelisation shall be undertaken. A recommendation on the potential improvement in morphology through river restoration shall be made, and implemented if considered to be necessary to the function of the mussel population. | See Table 9.12 for assessment |
| **Relocate** | | | |
| Ire | √ | FPM 26 River bed or bank works survey<br>A survey of current weirs, croys, and river bank reinforcement shall be carried out and recommendations made for their removal if necessary. | See Table 9.12 for assessment |
| Ire | √ | FPM 27 Sand and gravel extraction<br>No sand, gravel or stone shall be removed from rivers designated for Freshwater Pearl Mussel. | See Table 9.12 for assessment |

## 8.3 ALTERNATIVES CONSIDERED FOR SEA

The following scenarios have been assessed in this SEA:

(i) Business as Usual;

(ii) Business as Usual plus Other Required Measures; and

(iii) Individual Additional Measures.

In most cases a do nothing option is one of the alternatives considered as part of the environmental assessment process. However, in this case the do nothing option, i.e. no change in current practices, is not a realistic alternative as the WFD reinforces the requirement to implement the provisions of existing water protection directives, as mentioned above. The implementation of these 11 Directives is considered the **Business as Usual** scenario.

A second scenario is also assessed which includes implementation of the 11 existing Directives plus implementation of the further water protection measures listed under Article 11(3). This is termed the **Business as Usual plus Other Required Measures** scenario, i.e. the scenario in which these are the only measures required to achieve the 2015 good status objective. Consideration was given to including the further Article 11(3) measures in the Business As Usual scenario, as these measures would be required under the WFD in the absence of any additional policy changes and/or improvements included in the Plan. However, implementation of these measures is not currently required under any European based legislation other than the WFD. Therefore, as the Plan and POM are the instruments through which the WFD is to be implemented, it could be argued that without the Plan the Article 11(3) measures would not be carried out. As such, they do not form part of the business as usual scenario but instead represent new measures requiring assessment.

The third scenario assessed relates to **individual Additional Measures**. These measures are required where the implementation of the 11 Directives or the other water protection measures listed in Article 11(3) would not be sufficient to achieve 'good status' by 2015. The range of Additional Measures (**Table 8.3**) is the subject of the main assessment of this SEA.

# 9 ASSESSMENT

As discussed above the following scenarios have been assessed in this SEA:

(i) Business as Usual;

(ii) Business as Usual plus Other Required Measures; and

(iii) Individual Additional Measures.

The approach used for assessing the scenarios/alternatives for the draft Plan was an objectives led assessment. Each assessable alternative has been assessed against each of the objectives in terms of how it achieves the objective. The alternative is then allotted an assessment rating for the purposes of comparison. The assessment carried out was primarily qualitative in nature, with some based on expert judgement. This qualitative assessment compares the likely impacts against the Strategic Environmental Objectives to see which alternatives meet the Strategic Environmental Objectives and which, if any, contradict these. For the purposes of these assessment plus (+) indicates a potential positive impact, minus (-) indicates a potential negative impact, plus/minus (+/-) indicates that both positive and negative impacts are likely or that in the absence of further detail the impact is unclear, and a neutral or no impact is indicated by 0.

## 9.1 BUSINESS AS USUAL SCENARIO

As discussed in Chapter 8, the Plan / POM includes measures required under 11 existing water protection directives, for whose implementation the Plan gives added impetus (**Table 8.1**); these are described as the **Business as Usual** scenario. While many of these measures are expected to result in improved water quality, some of the actions do not lend themselves to environmental assessment. The types of measures required under each of the 11 Directives have been grouped into themes (e.g. education and awareness, monitoring and identification); for example, the Nitrates Directive actions require monitoring to be carried out (DIR2), and the implementation of action programmes (DIR3). An explanation is provided below as to whether or not assessment of these in the context of the Strategic Environmental Objectives is practicable at this time.

| | |
|---|---|
| **DIR1: Education and Awareness Programmes** | Perhaps the most important of all the measures suggested these types of initiatives and programmes are expected to result in improved water quality through increased public and industry awareness. However, due to their intangible nature, assessment of these with regard to the SEA Objectives will not be included. |
| **DIR2: Monitoring and Identification of Sources of Pressure** | These types of measures continue to build a picture of the baseline environment begun during the Article 5 Characterisation process. As such these measures are concerned with information gathering rather than the taking of any concrete actions and as such will not be assessed. They will however ensure water management actions are fully informed and based on scientific data. |

| | |
|---|---|
| **DIR3: Introduction of Plans, Programmes, Schemes, Codes of Practice, etc.** | There are a number of plans, programmes, schemes, etc. identified as actions as part of the River Basin Management Plan in order to address specific issues or pressures. These include Sludge Management Plans, *Margaritifera* Plans and Mini-Catchment Plans, the details of which are not yet available; therefore, it is not possible to assess the impacts associated with these at this time. However, it is strongly recommended that at the time the details of these are known that they are subject to an environmental assessment under the SEA and Appropriate Assessment processes in order to identify any potential impacts other than those related to water, e.g. material assets, biodiversity, population, etc. The purpose of this would be to identify focussed mitigation measures aimed at offsetting or reducing any identified negative impacts. |
| **DIR4: Review of Licensing and Introduction of Controls (DIR 1)** | These measures may result in impacts on the operations of the industries affected. While specific details of any changes will be at the local level, a general assessment of these types of measures using the Strategic Environmental Objectives can be carried out at this time. |
| **DIR5: Changes to Land Use Planning (DIR 2)** | These measures may result in impacts on land use planning at the national, regional and local level, potentially resulting in impacts. A general assessment of these types of measures using the Strategic Environmental Objectives can be carried out at this time. |
| **DIR6: Introduction of Specific Infrastructural Requirements, e.g. pre-treatment facilities (DIR 3)** | These types of measures require the installation of specific types of infrastructure. Though specific information is not available, there is sufficient detail available at this time to carry out a general assessment of these types of measures using the Strategic Environmental Objectives. |

## 9.2 BUSINESS AND USUAL PLUS OTHER REQUIRED MEASURES

In addition to the Business as Usual scenario discussed above, the WFD lists other minimum requirements to be met with under Article 11(3) that must be implemented by member states (**Table 8.2**). These are referred to in this SEA as the **Business as Usual Plus** scenario. The requirements are based on broad themes, many of which are directly tackled by the additional individual measures developed by each RBD. However, the broad themes have been assessed in the SEA as they will involve substantially new actions not currently covered by the business as usual scenario alone. As they relate to themes rather than specific actions the assessment is qualitative.

**Table 9.1 Assessment of Measures under the Existing 11 Directives and the Other Required Article 11(3) Measures**

| SEA Objectives | Review of Licensing Controls (DIR 4) | Changes in Land Use Planning (DIR 5) | Infrastructural Requirements (DIR 6) | Cost recovery for water use & promotion of sustainable water use (WFD 1) | Protection of Drinking Water Sources (WFD 2) | Abstraction and impoundment control (WFD 3) | Point source and diffuse source discharge (WFD 4) | Controls on physical modifications to surface waters (WFD 5) | Prevention or reduction of the impact of accidental pollution incidents (WFD 6) | Authorisation of discharges to groundwater (WFD7) | Priority substance control (WFD 8) | Controls on other activities impacting water status (WFD 9) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Objective 1 (BFF)** | + / - | +/- | +/- | + | + | +/- | +/- | +/- | +/- | + | +/- | +/- |
| **Objective 2 (P)** | + | + | + | + | + | + | + | +/- | + | + | + | + |
| **Objective 3 (HH)** | + | + | + | + | + | + | +/- | +/- | + | + | +/- | + |
| **Objective 4 (S)** | + / - | +/- | +/- | + | + | +/- | +/- | +/- | +/- | 0 | +/- | + |
| **Objective 5 (W)** | + | + | + | + | + | + | + | +/- | + | + | +/- | + |
| **Objective 6 (AQ)** | + / - | +/- | +/- | 0 | 0 | - | 0/- | +/- | + | 0 | +/- | 0 |
| **Objective 7 (C)** | + / - | +/- | +/- | + | 0 | - | 0/- | +/- | 0 | 0 | +/- | 0 |
| **Objective 8 (MA1)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | +/- | + | 0 | 0 | 0 |
| **Objective 9 (MA2)** | + | +/0 | + | + | 0 | + | + | +/- | + | 0 | + | 0 |
| **Objective 10 (MA3)** | +/- | +/- | - | - | +/- | +/- | - | +/- | + | +/- | +/- | - |
| **Objective 11 (MA4)** | + | + | + | + | + | + | + | +/- | + | + | + | + |
| **Objective 12 (CH)** | 0 | 0 | +/- | + | 0 | +/- | +/- | +/- | +/- | 0 | +/- | 0 |
| **Objective 13 (L)** | 0 | 0 | +/- | 0 | 0 | +/- | +/- | +/- | +/- | 0 | +/- | 0 |
| ***Key:*** *See Section 9.1 for further detail on what is included in DIR4 to 6 and Table 8.2 for further detail on measures WFD1 to 9* | | | | | | | | | | | | |
| **Discussion of Assessment** | | | | | | | | | | | | |
| DIR4 will result in overall positive impacts to the environment. However specific measures may result in impacts on the operations of the industries affected and as such will have potential negative impacts on economic development. Indirect negative impacts are also possible for other environmental receptors but the extent of these impacts will be dependent on required changes e.g. new infrastructure which could impact on biodiversity and soils or changes to existing practices that could impact on air quality or climate from transport or alternate treatment and disposal. | | | | | | | | | | | | |

Broadly speaking DIR5 has the potential to have positive impacts on the environment generally although it is likely that changes to land use planning will impact negatively on economic activities in the district through restrictions or limits on specific development types. Conversely, changes in land use planning that protect the economic water resource will contribute to long-term sustainability.

Potential negative impacts could occur from DIR6 depending on the siting of new infrastructure. Poorly placed infrastructure has the potential to negatively impact on biodiversity, soils, cultural heritage and landscape. Negative impacts could also be experienced by industry for installation of and operation of new infrastructure.

WFD1: This alternative focuses on conservation and sustainable water use. Lower overall requirement for water has many positive knock-on effects for the environment. Water availability is a key driver of development and economies therefore strategies to reduce consumption would result in less water requiring treatment and consequently less waste water requiring treatment. This would have indirect positive impacts on climate change as less energy will be required and lower CO2 outputs will result from such changes. Also, with lower consumption there will be reduced need to improve and provide more water management infrastructure allowing funds to be redirected to other areas. In the longer term, reduced consumption will improve capacity overall and facilitate continued growth and development in line with government policies i.e. spatial strategy. The success of such measures will be closely related to education and awareness. Cost recovery is a controversial measure. It has the potentially to significantly reduce the volumes of water used and wastewater produced. The main negative impact relates to the financial implications for economic activity. The acceptance cost recovery will be dependent on proper education and awareness to demonstrate how water can be conserved and also on the manner in recovery is rolled out.

WFD2: This alternative focuses on protection of drinking water sources. Protecting drinking water sources from pollution through the use of Water Safety Plans and/or designation of Source Protection Zones would have overall positive impacts on water quality as well as biodiversity, soil, human health and economic activities reliant on good water quality, e.g. tourism, water supply. However, specific measures may result in impacts on the operations of the commercial/industrial sectors affected and as such could have potential negative impacts on economic development.

WFD3: This alternative deals with abstraction and impoundment controls. Reducing the volume of abstractions or altering the timing of abstractions is anticipated to have positive impacts on water quality. Reduced volumes will have positive impacts for biodiversity by reducing the risk to flora and fauna from eutrophication or high levels of dangerous substances in a waterbody. Altering timing also has positive benefits for biodiversity by reducing the risk of low flows or lowering of marginal water levels where spawning takes place. This measure will also have positive impacts for human health and economic activities reliant on good water quality e.g. tourism, water supply etc.

WFD4: Details of the types of controls proposed is not available at this time however it is likely to include prevention and reduction programmes arising out of existing directives such as the Nitrates, Dangerous Substances, Groundwater, Shellfish and Bathing Water Directives. In addition, programmes focusing on IPPC and discharge authorizations are also likely. These measures are anticipated to have a positive impact on the environment through improved water quality with indirect benefit for biodiversity, soils and human health. Negative impacts are also anticipated for economic activities such as farming, forestry and industry where changes arising from prevention and reduction programmes may result in management changes or reduced productivity. In certain cases this may result in a need to import products with resulting negative impacts for air quality and climate. Negative impacts may also occur if alternate treatment / disposal result in the need for additional landfill capacity or similar.

WFD5: This alternative may include prior authorisation or registration schemes, new regulations to control physical modifications to surface waters and risk based approvals where low risk works may be simply registered while higher risk works subjected to more detailed assessment and issued more prescriptive licences. These measures have the potential to positively impact on water quality and biodiversity in particular. By introducing the need for more detailed assessment of higher risk works this will provide further protection of the environment with benefit for the environment generally if environmental

considerations (based on EIA guidance) are a required part of the assessment.

WFD6: This alternative includes for appropriate measures to reduce the risk of accidental pollution incidents. This has the potential to positively impact on water quality and also on biodiversity, human health, soils, population etc. The types of measures under consideration are not developed at this time however there is potential to negatively impact on the environment as a result of measures such as flood defence, which could impact on cultural heritage, landscape and biodiversity. It is recommended that further environmental assessment is undertaken once measures are defined.

WFD7: This alternative requires prior authorisation to be received for reinjection of waters for a number of specific activities in order to prevent discharge of certain substances to groundwater. Protecting groundwaters from pollution would have overall positive impacts on water quality as well as biodiversity, soil, human health and economic activities reliant on good water quality, e.g. tourism, water supply. However, specific measures may result in impacts on the operations of the commercial/industrial sectors affected and as such could have potential negative impacts on economic development.

WFD8: Increased awareness of the impacts of using priority dangerous substances will be essential to not only the reduction of use but also prevention of use in the first place. The measures for priority substance will include creation of inventories and collection of data on emissions, discharges and losses of the priority substances. This will provide a better understanding of the scale and extent of the issue. In addition reduction plans will be developed. Plans that target improved prevention and reduction of priority substance will result in fewer emissions to the environment and consequent positive impacts on the environment in particular water quality, biodiversity, soils and human health. In addition, they would contribute to the protection of the water as a resource for all. Plans may however, negatively impact on industries which current use or generate priority substance as part of their processes. Changes to how emissions, discharges and losses are dealt with by industry may result in additional costs for alternative treatment or disposal or costs associated with change of practice altogether. Changes in treatment or disposal options may require additional transport with associated air quality and climate impacts. It may also include other processes for treatment or disposal with the potential to impact on biodiversity, human health, soils, cultural heritage and landscape. Without further detail it is not possible to elaborate on these potential impacts.

WFD9: One of the major issues for water status is invasive alien species, which successfully establish themselves in aquatic and fringing habitats and damage natural flora and fauna. This measure may include introduction of regulations to prohibit the possession or introduction of any species of wild bird, wild animal or wild flora, which may be detrimental to native species. This is anticipated to result in positive impacts to the environment generally however negative impacts will be experienced by retail sectors which trade in non-native species e.g. garden centres and also individual and commercial bodies that use marine transport as this has the potential to transport alien species.

**Mitigation**

**WFD4:** Detailed assessment of higher risk works will include environmental considerations (based on EIA guidance). It is also recommended that lower risk work should be compelled to consider environmental issues as part of the registration process.

**WFD5:** It is recommended that further environmental assessment is undertaken once measures are defined.

## 9.3 ALTERNATIVES: ADDITIONAL MEASURES

### 9.3.1 Integration with the Plan Team

To assist the Plan Team in selecting from the proposed range of alternatives to apply to its RBD, a preliminary review of the proposed Additional Measures was carried in out in September 2008 to highlight potential environmental issues associated with the various measures and to identify interrelationships between issue areas. It was intended that this initial, high-level environmental review would assist the Plan Team in choosing combinations of measures for the Plan. By providing environmental review as the measures were developed, the SEA aimed to assist in the overall plan making process by ensuring environmental matters were taken into account at the earliest possible opportunity.

### 9.3.2 Assessments of Additional Measures by Pressure Type

The assessment of the individual Additional Measure has been grouped by pressure. Please note that the pressure headings included in the plans prepared for Ireland and those prepared for Northern Ireland differ slightly. Therefore, for clarity and ease of comparison between the Plan and the Environmental Report, where the Plan terminology differs, the Plan heading is provided in brackets at the start of each table. Please see section 8.2 for a direct comparison between the headings used in the SEA and the headings in the individual plans.

### 9.3.3 Assessment Parameters

Within the current scope of this SEA, temporary impacts have not been assessed. *Temporary impacts* arising from the Plan and proposals contained therein would be associated with construction phase, however, no specific location or design parameters are addressed at this strategic level. It is therefore considered that the scope of the Plan does not lend itself to an assessment of such impacts but such impacts will be addressed at the EIA level in relation to project specific details. *Permanent effects* are addressed in **Tables 9.3 to 9.12**.

The RBMP and POM will cover the period from 2009 up to 2015, with an interim review after three years. In line with the SEA Directive, *short, medium and long-term impacts* must be considered during the assessment. However, it is considered that short-term assessment may not be very constructive as implementation of the RBMP, and the associated POM, will take time to show effect; therefore, the results of such an assessment are likely to be similar to a 'business as usual' scenario for the short-term. As such, assessments have been made for 2015 (as a medium term horizon) and 2030 (as a

long term horizon), which is beyond the end of the third RBMP cycle. Short, medium and long-term impacts are addressed in **Tables 9.3 to 9.12**.

*Cumulative effects* arise for instance where several developments may each have an insignificant effect but together have a significant effect or where several individual effects of the Plan have a combined effect. *Synergistic effects* interact to produce a total effect greater than the sum of the individual effects so that the nature of the final impact is different to the nature of the individual impact. Cumulative / synergistic assessment is addressed in **Tables 9.3 to 9.12**.

The primary effect of the RBMP and POM is to improve water quality and ensure good ecological status by 2015 and beyond. Many of the alternatives under consideration will have *direct* impacts on water and aquatic biodiversity as a result. However, a number of the alternatives also have the potential to directly and indirectly impact on other environmental receptors as a consequence of the alternatives in this draft Plan and POM. These *secondary and indirect* effects have been taken into account in **Tables 9.3 to 9.12**. A summary of the main secondary effects is presented in **Table 9.2.**

**Table 9.2 Summary of Secondary Effects**

| Secondary Effects |
|---|
| **Biodiversity:** |
| Physical and / or chemical alteration of habitats resulting in loss or change to flora and fauna currently present. This is particularly important for birds that may feed on biomass generated by nutrient output from wastewater treatment facilities, industry or farming. Changing the nutrient output or the physical setting may cause a change in available food sources, ultimately leading to the loss of the bird species from the area. |
| Changing the management of land through fencing, set-aside or buffer strips may indirectly impact on protected flora and fauna dependent on the current regime. This would be true for corncrakes, which are ground nesting birds that rely on winter flooding and a mowing regime for survival, or meadow barley which is a plant that relies on a level of grazing in order to outcompete other non-native species. |
| Indirect positive impacts may occur in relation to soil biodiversity, particularly with alternatives that limit erosion, soil loss and remediate land contamination. |
| **Population:** |
| A number of alternatives will guide land use planning, thereby contributing to sustainable development. All of the measures are designed to improve water quality, which also contributes to sustainable development. |
| **Human Health:** |
| Improvements to water quality will indirectly impact on human health in relation to protection of drinking waters, bathing waters and shellfish waters. Improvements in septic tank management and upgrades to treatment facilities will also indirectly impact on human health through reduced odour nuisance. |
| **Soil:** |
| Soils are one of the pathways for movement of water and as such they can be indirectly impacted by many of the alternatives discussed. Indirect positive impacts to soils are likely from measures designed to reduce farming pressures, improve nutrient balances and prevent erosion. Measures to |

prevent pollution of waters by chemicals will also improve soil quality and function.

**Air Quality and Climate:**

Air quality has the potential to interact with other environmental receptors, principally human health and climate. Increased treatment requirements may increase emissions to air from treatment and disposal facilities locally, e.g. dioxins from incineration; however air quality emissions would be subject to Emission Limit Values (ELVs) set out in IPPC and/or Waste licenses.

Emissions to air from transport also have the potential to impact on air quality and climate through release of GHG.

**Material Assets:**

Alternatives directed at improving water quality through upgrade of wastewater treatment infrastructure or reducing loading can indirectly impact on material assets by improving efficiency of existing infrastructure and providing new infrastructure. Indirect impacts are likely (negative) for some economic activities currently using or discharging to water but positive impacts will also be experienced by other economic activities dependent on clean water, e.g. angling, tourism etc.

**Table 9.3 Assessment: Wastewater (NI: Collection and Treatment of Sewage / Urban Development)**

| | WW1 | WW2 | WW6 | WW7 | WW10 | WW11 | WW12 | WW13 | WW14 | WW16 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Overall Impact** | + | + | + | + | + | + | + | + | + | + |
| **Direct Impacts** | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| **Indirect / Secondary Impacts** | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| **Short-term Impacts** | | √ | √ | √ | | | | | | |
| **Medium-term Impacts** | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| **Long-term Impacts** | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| **Mitigation Measure Recommended** | √ | √ | | | √ | √ | √ | √ | √ | √ |

*See **Table 8.3** for further details on the contents of these alternatives*

*See the Appendix to Chapter 9 for the detailed environmental assessment of each of these alternatives*

**Table 9.4 Assessment: Other Sources (Industry and Other Businesses and Waste)**

| | IND2 | IND3 | IND4 | IND6 | IND7 | IND8 |
|---|---|---|---|---|---|---|
| **Overall Impact** | + | + | + | + | + | + |
| **Direct Impacts** | √ | √ | √ | √ | √ | √ |
| **Indirect / Secondary Impacts** | √ | √ | √ | √ | √ | √ |
| **Short-term Impacts** | | √ | | | | √ |
| **Medium-term Impacts** | √ | √ | √ | √ | √ | √ |
| **Long-term Impacts** | √ | √ | √ | √ | √ | √ |
| **Mitigation Measures Recommended** | | √ | | √ | √ | √ |

*See **Table 8.4** for further details on the contents of these alternatives*

*See the Appendix to Chapter 9 for the detailed environmental assessment of each of these alternatives*

**Table 9.5 Assessment: Other Point Sources (landfills, quarries, mines and contaminated lands) (NI: Industry and Other Businesses / Waste)**

| | OP2 / OP4 | OP3 | OP5 | OP6 |
|---|---|---|---|---|
| **Overall Impact** | + | + | + | + |
| **Direct Impacts** | √ | √ | √ | √ |
| **Indirect / Secondary Impacts** | √ | √ | √ | √ |
| **Short-term Impacts** | √ | √ | √ | √ |
| **Medium-term Impacts** | √ | √ | √ | √ |
| **Long-term Impacts** | √ | √ | √ | √ |
| **Mitigation Measures Recommended** | √ | | √ | √ |

*See **Table 8.5** for further details on the contents of these alternatives*

*See the Appendix to Chapter 9 for the detailed environmental assessment of each of these alternatives*

**Table 9.6 Assessment: Usage and Discharge of Dangerous Substances (NI: Included in key sectors under Pollution)**

| | DS3 | DS4 | DS5 | DS6 |
|---|---|---|---|---|
| **Overall Impact** | + | + | + | + |
| **Direct impact** | √ | √ | √ | √ |
| **Indirect / Secondary Impacts** | √ | √ | √ | √ |
| **Short-term Impact** | | | | √ |
| **Medium-term Impact** | √ | √ | √ | √ |
| **Long-term Impact** | √ | √ | √ | √ |
| **Mitigation Measures Recommended** | √ | √ | √ | √ |

*See **Table 8.6** for further details on the contents of these alternatives*

*See the Appendix to Chapter 9 for the detailed environmental assessment of each of these alternatives*

**Table 9.7 Assessment: Agriculture**

| | AG1 / AG3 | AG2 | AG4 / AG6 | AG5 | AG8 | AG9 | AG11 | AG12 / AG13 |
|---|---|---|---|---|---|---|---|---|
| **Overall Impact** | + | + | + | + | + | + | + | - |
| **Direct Impacts** | √ | √ | √ | √ | √ | √ | √ | √ |
| **Indirect / Secondary Impacts** | √ | √ | √ | √ | √ | √ | √ | √ |
| **Short-term Impacts** | √ | | √ | | | | | |
| **Medium-term Impacts** | √ | √ | √ | √ | √ | √ | √ | √ |
| **Long-term Impacts** | √ | √ | √ | √ | √ | √ | √ | √ |
| **Mitigation Measures Recommended** | √ | | √ | | √ | | | √ |

*See **Table 8.7** for further details on the contents of these alternatives*

*See the Appendix to Chapter 9 for the detailed environmental assessment of each of these alternatives*

**Table 9.8 Assessment: Wastewater from Unsewered Properties (NI: Collection and Treatment of Sewage)**

| | UP1 | UP2 | UP4 | UP5 | UP7 | UP8 | UP11 |
|---|---|---|---|---|---|---|---|
| **Overall Impact** | + | + | + | + | + / - | + / - | + / - |
| **Direct Impacts** | √ | √ | √ | √ | √ | √ | √ |
| **Indirect / Secondary Impacts** | √ | √ | √ | √ | √ | √ | √ |
| **Short-term Impacts** | | | | √ | | √ | |
| **Medium-term Impacts** | √ | √ | √ | √ | √ | √ | √ |
| **Long-term Impacts** | √ | √ | √ | √ | √ | √ | √ |
| **Mitigation Measures Recommended** | | √ | | | √ | √ | √ |

*See **Table 8.8** for further details on the contents of these alternatives*

*See the Appendix to Chapter 9 for the detailed environmental assessment of each of these alternatives*

**Table 9.9 Assessment: Forestry**

| | F2 | F3 | F4 | F5 | F6 | F8 | F11 | F12 | F13 | F14 | F15 | F16 | F17 | F18 | F19 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Overall Impact** | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Direct Impacts** | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| **Indirect / Secondary Impacts** | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| **Short-term Impacts** | | | | | | | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| **Medium-term Impacts** | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| **Long-term Impacts** | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| **Mitigation Measures Recommended** | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |

*See **Table 8.9** for further details on the contents of these alternatives*

*See the Appendix to Chapter 9 for the detailed environmental assessment of each of these alternatives*

**Table 9.10 Assessment: Physical Modifications (NI: Freshwater Morphology/ Marine Morphology)**

| | PM2 | PM6 | PM7 | PM9 |
|---|---|---|---|---|
| **Overall Impact** | **+** | **-** | **+/-** | **-** |
| **Direct impact** | √ | √ | √ | √ |
| **Indirect / Secondary Impacts** | √ | √ | √ | √ |
| **Short-term Impact** | | | √ | |
| **Medium-term Impact** | √ | √ | √ | √ |
| **Long-term Impact** | √ | √ | √ | √ |
| **Mitigation Measures Recommended** | √ | √ | √ | √ |

*See **Table 8.10** for further details on the contents of these alternatives*

*See the Appendix to Chapter 9 for the detailed environmental assessment of each of these alternatives*

**Table 9.11 Assessment: Abstractions (NI: Abstraction and Flow Regulation)**

| | AB4 / AB5 | AB6 / AB7 / AB8 | AB9 | AB10 / AB11 / AB12 / AB13 | AB14 |
|---|---|---|---|---|---|
| **Overall Impact** | **+** | **+** | **+** | **+** | **+/-** |
| **Direct impact** | √ | √ | √ | √ | √ |
| **Indirect / Secondary Impacts** | √ | √ | √ | √ | √ |
| **Short-term Impact** | | √ | | | √ |
| **Medium-term Impact** | √ | √ | √ | √ | √ |
| **Long-term Impact** | √ | √ | √ | √ | √ |
| **Mitigation Measures Recommended** | √ | √ | √ | √ | √ |

*See **Table 8.11** for further details on the contents of these alternatives*

*See the Appendix to Chapter 9 for the detailed environmental assessment of each of these alternatives*

**Table 9.12 Assessment: Freshwater Pearl Mussel**

| | FPM1 | FPM3 | FPM4 | FPM6 / FPM7 | FPM9 | FPM10/ FPM11/ FPM12 | FPM13/ FPM15/ FPM16 | FPM17/ FPM18 | FPM19 | FPM21/ FPM22 | FPM23 | FPM26/ FPM27 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Overall Impact** | + | + | + | + | - | + | + | + | + | + | + | - |
| **Direct Impacts** | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| **Indirect / Secondary Impacts** | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| **Short-term Impacts** | | | √ | √ | | | √ | | | √ | | |
| **Medium-term Impacts** | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| **Long-term Impacts** | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| **Mitigation Measures Recommended** | √ | √ | | √ | √ | √ | | √ | √ | | | √ |

*See **Table 8.14** for further details on the contents of these alternatives*

*See the Appendix to Chapter 9 for the detailed environmental assessment of each of these alternatives*

# 10 MITIGATION AND MONITORING

## 10.1 INTRODUCTION

Article 10 of the SEA Directive requires that monitoring should be carried out in order to identify at an early stage any unforeseen adverse effects due to implementation of the Plan, with the view to taking remedial action where adverse effects are identified through monitoring. A monitoring programme is developed based on the indicators selected to track progress towards achieving strategic environmental objectives and reaching targets, enabling positive and negative impacts on the environment to be measured. The environmental indicators have been developed to show changes that would be attributable to implementation of the Plan. It is useful to note here that the monitoring programme currently being carried out under the WFD will form a substantial element of the monitoring programme required under the SEA. See **Section 7.2.2** for targets and indicators.

It should be noted that the success of the Plan in moving water bodies toward achieving the objectives of the WFD, including achieving good status by 2015, will be related to the speed at which the alternatives considered are implemented as well as choosing as a priority alternatives which result in the greatest benefit in the shortest time frame. For example, education and awareness campaigns, when implemented correctly, can provide good results, within short-time frames, for minimal relative monetary investment.

## 10.2 SOURCES OF INFORMATION FOR MONITORING

Monitoring will focus on aspects of the environment that are likely to be significantly impacted by the Plan. Where possible indicators have been chosen based on the availability of the necessary information and the degree to which the data will allow the target to be linked directly with the implementation of the Plan. **Table 10.1** presents the Environmental Monitoring Programme to track progress towards achieving strategic environmental objectives and reaching targets, and includes sources of relevant information. This follows on from the objectives, targets and indicators presented in **Table 7.3**.

From **Table 10.1**, it can be seen that the majority of information required is already being actively collected (under the WFD and other programmes), but not all of this is being gathered and reported on at a national level.

## Table 10.1 Environmental Monitoring Programme

| Strategic Environmental Objectives | | |
|---|---|---|
| **Objective 1 (BFF):** Prevent damage to terrestrial, aquatic and soil biodiversity, particularly EU designated sites and protected species. | | |
| **Objective 2 (P):** Contribute to sustainable development. | | |
| **Objective 3 (HH):** Protect and reduce risk to human health in undertaking water management activities. | | |
| **Objective 4 (S):** Avoid damage to the function and quality of the soil resource in the River Basin District. | | |
| **Objective 5 (W):** Prevent deterioration of the status of water bodies with regard to quality and quantity and improve water body status for rivers, lakes, transitional and coastal waters and groundwaters to at least good status, as appropriate to the WFD. | | |
| **Objective 6 (AQ):** Minimise emissions to air as a result of Plan activities | | |
| **Objective 7 (C):** Minimise contribution to climate change by emission of greenhouse gasses associated with Plan implementation. | | |
| **Objective 8 (MA1):** Maintain level of protection provided by existing morphological infrastructure, e.g. flood defences, coastal barriers, groynes, etc. | | |
| **Objective 9 (MA2):** Provide new, and upgrade existing, water and wastewater management infrastructure to protect human health and ecological status of water bodies | | |
| **Objective 10 (MA3):** Support economic activities within the District without conflicting with the objectives of the WFD. | | |
| **Objective 11 (MA4):** Protect water as an economic resource | | |
| **Objective 12 (CH):** Avoid damage to cultural heritage resources in the River Basin District. | | |
| **Objective 13 (L):** Avoid damage to designated landscapes in the River Basin District. | | |
| **Target** | **Indicator** | **Data Availability, Source and Frequency** |
| **BFF:** Halt spread of Alien Species and their associated impact to the aquatic environment. | Geographical spread of Alien Species in the District. | National Invasive Species Database from Invasive Species Ireland (joint project between NPWS and NIEA). Compilation is ongoing. |
| **BFF:** Halt deterioration of habitats or their associated species due to water quality related issues by 2015, in line with the Water Framework Directive. | Interim Indicator: Number of *Margaritifera* Plans put in place. | Species Action Plan. NPWS (in preparation) |
| | Long Term Indicator: Status of EU Protected Habitats and Species. | The Status of EU Protected Habitats and Species in Ireland report. NPWS. Published every 6 years. |
| | Long Term Indicator: Condition of Selection Features in sites designated for nature conservation (SACs, SPAs, Ramsar and NHAs). | Not currently compiled |

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| **P:** Provide adequate water and wastewater treatment infrastructure capacity to all urban and suburban areas (cities, towns and villages) within the District by 2015. | Number of Section 140 motions under the Planning and Development Act 2001 tabled and passed for development in urban and suburban areas where adequate water and wastewater treatment infrastructure capacity is not in place. | Summary of Annual Planning Statistics. An Bord Pleanála. Published annually |
| **P:** Strictly control rural development with the provision of individual wastewater treatment units in accordance with the EPA Guidelines Manual in relation to the provision of wastewater treatment to single houses. | Number of Section 140 motions under the Planning and Development Act 2001 tabled and passed for development in rural areas where individual wastewater treatment are not provided in accordance with the EPA Guidelines Manual in relation to the provision wastewater treatment to single houses. | Summary of Annual Planning Statistics. An Bord Pleanála. Published annually |
| **P:** Carry out 100% inspection, of all individual septic tanks or any other privately owned treatment unit to identify those not functioning properly. | Number of inspections carried out. | Not currently compiled. Likely would be carried out by Local Authorities. |
| **HH:** All drinking water areas (including groundwater), as identified on the register of protected areas, to achieve good status, or maintain high status, by 2015. | Interim Indicator: Compliance with Drinking Water Standards.<br>Long Term Indicator: Parameters to be measured in accordance with the environmental quality standards to determine Good Status. | The Provision and Quality of Drinking Water in Ireland Report. EPA. Published every 1 to 2 years. |
| **HH:** All bathing waters, as identified on the register of protected areas, to achieve good status, or maintain high status, by 2015. | Interim Indicator: Compliance with Bathing Water Standards.<br>Long Term Indicator: Parameters to be measured in accordance with the environmental quality standards to determine Good Status. | The Quality of Bathing Water in Ireland. EPA. Published annually |
| **HH:** All economic shellfish waters, as identified on the register of protected areas, to achieve good status, or maintain high status, by 2015. | Interim Indicator: Compliance with the Quality of Shellfish Water Regulations.<br>Long Term Indicator: Parameters to be measured in accordance with the environmental quality standards to determine Good Status. | Water Quality in Ireland report. EPA. Published every 1 to 2 years. |
| **HH:** All water bodies designated for salmonids, as identified on the register of protected areas, to achieve good status, or maintain high status, by 2015. | Interim Indicator: Water quality in designated salmonid waters.<br>Long Term Indicator: Parameters to be measured in accordance with the environmental quality standards to determine Good Status. | Water Quality in Ireland report. EPA. Published every 1 to 2 years. |
| **S:** Achieve soil phosphorus levels in line with Teagasc targets for agricultural land. (Ire) | Interim Indicator: Soil Phosphorus levels. (Ire) | National Soils Database. Teagasc and EPA. Updated as data becomes available |

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| **S:** Achieve risk reduction targets as detailed in the Soil Directive for areas identified as at risk (not yet established). | Long Term Indicator: Monitoring programme as established under the requirements for the Soil Directive (once established). | Not yet established. |
| **W:** No deterioration in status of waters currently with high or good status (WFD Objective). | Interim Indicators: Interim Water status. (Ire)<br>Long Term Indicator: Water status in 2015 report | Interim Water Status in 2011 Report. EPA<br>Water Status Report to be published in 2015 as part of second RBMP cycle. EPA |
| **W:** Restoration to good status of waters currently at moderate, poor or bad status (WFD Objective). | Interim Indicators: Interim Water status. (Ire)<br>Long Term Indicator: Water status in 2015 report | Interim Water Status in 2011 Report. EPA<br>Water Status Report to be published in 2015 as part of second RBMP cycle. EPA |
| **W:** Progressively reduce chemical pollution in waters (WFD Objective). | Interim Indicators: Interim Water status. (Ire)<br>Long Term Indicator: Water status in 2015 report | Interim Water Status in 2011 Report. EPA<br>Water Status Report to be published in 2015 as part of second RBMP cycle. EPA |
| **W:** Limit pollution inputs to groundwaters and prevent deterioration (WFD Objective). | Interim Indicators: Interim Water status. (Ire)<br>Long Term Indicator: Water status in 2015 report | Interim Water Status in 2011 Report. EPA<br>Water Status Report to be published in 2015 as part of second RBMP cycle. EPA |
| **AQ:** Minimise total emissions to air associated with nutrient management. | Distance / number of vehicle trips used to transport nutrients; to be used as a proxy indicator for emissions associated with nutrient management activities, such as removal by tanker of slurry in areas of nutrient surplus. | Not currently compiled – monitoring of this would need to be integrated into the Waste Licences for operators of these activities. This information could be included in the Annual Environmental Report for each licensed facility. |
| **AQ:** Compliance with odour criteria to prevent deterioration in amenity beyond the site boundary as set out in license for new or upgraded wastewater infrastructure. | Number of complaints received related to odour. | Monitored by the EPA as part of the IPPC license process. This information is usually included in the Annual Environmental Report for each licensed facility. |
| **AQ:** Compliance with odour criteria to prevent deterioration in amenity beyond the site boundary due to changes in industrial practices due to plan implementation. | Number of complaints received related to odour. | Monitored by the EPA as part of the IPPC license process. This information is usually included in the Annual Environmental Report for each licensed facility. |
| **C:** Use BAT, including renewable energy, to minimise GHG from new or upgraded wastewater infrastructure in line with Ireland's commitments to reduce GHG emissions under the Kyoto Protocol. | Calculated $CO_2$ equivalent in tonnes from new or upgraded water infrastructure, e.g. WWTP / WWTW, including emissions associated with the digestion and / or incineration of sludge. | To be calculated based on changes in water infrastructure at the interim review in 2011 and the second RBMP cycle in 2015. |

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|---|---|---|
| **C:** Use BAT, including renewable energy, to minimise GHG from changes in industrial practices due to plan implementation in line with Ireland's commitments to reduce GHG emissions under the Kyoto Protocol. | Calculated $CO_2$ equivalent in tonnes due to changes in industrial practices. | To be calculated at the interim review in 2011 and the second RBMP cycle in 2015 based on changes in industrial practices, records of which are held as part of the IPPC licence process by the EPA |
| **C:** No net loss of $CO_2$ sequestering vegetation due to changes in forestry practices as a result of Plan activity. | Calculated $CO_2$ sequestering potential of forest vegetation based on forest cover. | $CO_2$ sequestration potential could be sourced from the National Council for Forest Research and Development or similar source. Land cover information to be sourced from the Ireland's Corine Land Cover 2000 (CLC2000) project |
| **MA1:** No increase in the amount of infrastructure at risk from flooding as a result of Plan activities. In this case the length of road and rail infrastructure at risk will be used as a proxy indicator for infrastructure in general. | Interim indicator: Number of Flood Risk Management Plans prepared in accordance with the Floods Directive (2007/60/EC).<br>Long Term Indicator: Length of road and rail infrastructure at risk from flooding. | Information on number prepared to be sourced from the OPW.<br>Information flood risk to be sourced from the OPW |
| **MA2:** Increase investment in water management infrastructure. | Water services investment expenditure per annum. | To be sourced from the Finance Department annual expenditure figures. |
| **MA2**: Full compliance with the requirements of the Urban Wastewater Treatment Directive and its associated regulations. | Number of exceedances of the standards contained in the Urban Wastewater Treatment Directive and its associated regulations. | Urban Waste Water Discharges In Ireland Reports. EPA. Published every two years. |
| **MA3:** Minimise impacts to economic activity due to Plan implementation without conflicting with the objectives of the WFD. | Percent change in land cover types due to Plan implementation. | Land cover information to be sourced from Ireland's Corine Land Cover 2000 (CLC2000) project |
| **MA4:** Achieve sustainable use of water in the context of maintaining its economic benefit. | Change in economic value of water relative to the baseline report: Economic Analysis of Water Use in Ireland. | Economic studies carried out as a part of the plan making process during the second cycle of river basin management planning. |
| **CH:** No physical damage or alteration of the context of cultural heritage features due to Plan activities. | Changes in the condition of monuments on the RMP (Ireland) due to Plan implementation. | The Archaeological Survey monitoring programme, Ireland. DoEHLG. Updated on an ongoing basis. |
| | Number of listed structures at risk due to Plan implementation. | Buildings at Risk Register. Heritage Council Ireland. Updated on an ongoing basis. |
| **L:** No damage to designated landscapes as a result of Plan implementation. | Number of water and wastewater treatment plants sited in landscapes with a high sensitivity to change. | Data on number of new wastewater treatment plants to be sourced from Local Authorities (not currently compiled centrally) |
| | Percentage changes in land cover types in areas with a high sensitivity to change. | Ireland's Corine Land Cover 2000 (CLC2000) project. |

## 10.3 MITIGATION (RECOMMENDATIONS FROM THE SEA TO FEED INTO THE PLAN)

The Environmental Report has highlighted the more significant potential positive and negative environmental impacts from the implementation of the draft Plan (including cumulative impacts). The following mitigation measures have been identified to reduce the negative impacts identified. It is recommended that the corresponding mitigation measure (as listed in **Table 10.2**) for any alternative brought forward into the final Plan, also be incorporated into the Plan. Mitigation measures required for alternatives following the Habitats Directive Article 6 report (the Appropriate Assessment) are noted in red. Please see the Appendix to Chapter 9, which provides the detailed assessment of alternatives and the rationale behind the development of these mitigation measures.

**Table 10.2 Mitigation Measures**

| Additional Measure | Mitigation Measure |
|---|---|
| **WW1** | This alternative should be accompanied by an education and awareness campaign for householders and commercial premises dealing with under-sink disintegration and FOG. |
| **WW1** | This alternative will require project level Appropriate Assessment* if alternative facilities for treatment of waste are constructed e.g. incinerator. |
| **WW2** | This alternative will need to link to the development planning process, e.g. by including a requirement to address wastewater capacity as part of the scope in any accompanying SEA for a Development Plan. |
| **WW2** | This alternative will need to consider whole catchment loading. |
| **WW10/ WW11, WW12/ WW13** | Negative impacts on climate associated with GHG emissions related to additional energy requirements should be offset by use of renewable energy sources or similar. |
| **WW10 / WW11/ WW12** | If these alternatives involve the building of a new plant or an extension to an existing plant an Appropriate Assessment* will be required. Prior to any proposals for a new plant, further investigation will be required to show that a new plant will have the desired improvements in water quality for which it is being built. |
| **WW10/ WW11/ WW12/ WW16** | If additional landtake is required for these alternatives, environmental studies will be undertaken to assess the impact on the environment. |
| **WW14** | An Appropriate Assessment* will be required to demonstrate that the relocation will not negatively impact on protected areas. |
| **WW16** | An Appropriate Assessment* will be required for WW16 to demonstrate that any new infrastructure will not negatively impact on protected areas. |
| **IND3** | It is important to ensure the environmental quality standards that are set for receiving waters are achieved. Particular attention should be placed on discharges to EU protected areas in case a licence requires more stringent standards. |
| **IND6** | Once clarified, BAT should be reviewed in the context of impacts to air quality and GHG emissions. |
| **IND7** | Catchment nutrient budgets should be prepared and limits set according. |
| **IND8** | A cultural heritage assessment will be required for all proposed relocation options. |

| Additional Measure | Mitigation Measure |
|---|---|
| **IND8** | Areas containing sensitive habitats and species should be avoided. An Appropriate Assessment* will be required to determine impacts on protected areas resulting from relocation. |
| **OP2 / OP4** | A programme of education and awareness is needed to tackle improper and illegal disposal of waste to support these alternatives. The Appropriate Assessment* has recommended a campaign to reduce the illegal disposal of waste, as this would have particular benefit for protected areas, which tend to be remote rural areas, e.g. bogs, used for illegal disposal of unwanted materials. |
| **OP5** | Remediation of site and containment options will need to be inclusive and linked to risk assessment to look at all pathways for contamination, not just water. |
| **OP5** | Remediation needs to look at the whole receiving environment, not just water. Remediation projects will need to work with Biodiversity Action Plans (national and local). Local projects could work with other similar habitat types in an area to create ecological networks to the benefit of flora and fauna. |
| **OP5** | Project level Appropriate Assessments* will be required for activities under this alternative. |
| **OP5** | On-site treatment of contaminated soils should be considered to reduce negative impacts to air quality and climate from transport related emissions. |
| **OP6** | Appropriate Assessment will be required for activities under this alternative |
| **DS3 / DS4** | Sector specific targeted pollution reduction programmes will need to be developed in the early stages to ensure maximum medium to long-term gains can be achieved. |
| **DS5** | An Appropriate Assessment* will be required if this alternative would involve the building of a new plant or an extension to an existing plant. |
| **DS6** | An ecological impact assessment, human health impact assessment and a cultural heritage assessment will be required for all proposed relocation options. Sensitive areas should be avoided. |
| **DS6** | An Appropriate Assessment* will be required. |
| **AG1 / AG3** | It is recommended that compensation be linked to annual upkeep of fences and management of buffers to ensure the ongoing benefit of these alternatives. |
| **AG1 / AG3** | Appropriate guidance is required for implementation of these alternatives to prevent indirect impacts to biodiversity. |
| **AG1 / AG3** | An Appropriate Assessment will be required. |
| **AG3** | A management plan for buffer strips and set aside will be required to ensure there are no detrimental impacts on locally important flora and fauna. These plans should be farm specific to take account of the locally sensitive biodiversity. |
| **AG4** | An Appropriate Assessment* will be required if a land use change is proposed in a protected area. |
| **AG6** | An Appropriate Assessment will be required. |
| **AG6** | Set aside of lands shall only be implemented in combination with appropriate guidance for agricultural lands within or adjacent to protected areas (spraying of pesticides is the key concern). |
| **AG8** | It is recommended that an information and advice campaign targeted at farmers should be implemented on a national scale. This should focus on prevention first followed by BMP as core themes. It will be important that adequate consideration is given not just to water and biodiversity but also soils and cultural heritage, as a narrowly focussed approach may lead to indirect negative impacts on these areas. It is also recommended that information campaigns highlight best practice in the sector in order to demonstrate that an economically viable farming operation is possible within such schemes. Opportunities for agri-tourism should also be highlighted as a way to supplement farm income while protecting the environment. This guidance shall also include information relating to implementation in areas protected for biodiversity. |
| **AG10** | An Appropriate Assessment* is required for any new facility. This alternative should only be implemented in areas when the intensity of farming is currently high, and should not be used as |

| Additional Measure | Mitigation Measure |
|---|---|
| | a reason to further intensify farming in protected areas. |
| **AG12** | A system of cooperation between farms at the local level would mitigate some of the impacts associated with tankering**,** including the need to move material over a large area (mitigation of air quality and climate impacts) and provision of numerous small storage areas (mitigation of landloss). |
| **AG12** | This alternative should be qualified and should only be considered as a short-term alternative as this does not resolve the issue with the pressure. An Appropriate Assessment* is also recommended for the relocation area. |
| **AG13** | Methane gas, resulting from use of digestors to treat nutrient surplus, should be captured and re-used as a fuel source to offset impacts to climate associated with generation of greenhouse gas. The resultant digestate should only be disposed of in licensed landfill facilities. Should new landfill facilities be required, the siting of these should be subject to environmental impact assessment. |
| **AG13** | An Appropriate Assessment* will be required for any new facility. This alternative should only be implemented in areas when the intensity of farming is currently high, and should not be used as a method to allow further intensification of farming in protected areas. |
| **UP2** | The pre-planning process should assess whether an Appropriate Assessment* would be required for new development within or adjacent to a protected area. |
| **UP7 / UP8** | An education programme should be carried out in tandem with new requirements for tank maintenance, including guidance on disposal of sludges. |
| **UP8** | Intelligent transport programmes should be put in place to minimise the amount of emissions associated with movement of sludges from on-site treatment systems. |
| **UP11** | Upgraded treatment works should be required to introduce BAT, including the use of renewable energy sources, in order to reduce GHG emissions and others resulting from increased demand for treatment. |
| **UP7/ UP8/ UP11** | New wastewater treatment infrastructure, including sludge disposal infrastructure, will be subject to environmental assessment at the project level to reduce indirect impacts to biodiversity, landscape, cultural heritage, air quality and climate |
| **UP7 / UP11** | An Appropriate Assessment* will be required for new structures. |
| **F ALL** | Future guidelines for forestry should be developed through a steering group represented by bodies such as Coillte, the Forest Service (Northern Ireland), the Forest Service (Ireland), National Parks and Wildlife Service, the Central Fisheries Board (Ireland), the Fisheries Conservancy Board (Northern Ireland) the Northern Ireland Environment Agency, and representatives from the relevant planning authorities to ensure that the final guidelines take a holistic approach to the environment which includes biodiversity, landscape, climate and cultural heritage interests. Consideration should be given to identifying and implementing as a priority those alternatives that can be applied to forests only starting or midway through the growth cycle. |
| **F2-F8** | It is recommended that prior to any changes in forest size or species mix, a study is carried out to determine the change, if any, in the carbon dioxide sequestering capacity of the forest. Should sequestering capacity be reduced, compensation measures will be required to offset these. |
| **F2** | The following change to the language in the Draft POM is required: Avoid afforestation on 1st and 2nd order stream catchments in acid sensitive catchments and in protected areas. |
| **F3** | An Appropriate Assessment* will be required. |
| **F5** | Change to the Draft POMs recommended: Eutrophication and Sedimentation - Avoid or limit forest cover on peat sites and on errodable soils. |
| **F5** | An Appropriate Assessment* will be required if a new plantation is proposed to be developed on peat sites or erodible soils in areas or catchments in areas protected for biodiversity (i.e. an SAC, SPA or Ramsar). |
| **F13** | The following change to the language in the Draft POM is required: Avoid the use of basic material in protected areas, particularly in sensitive freshwater pearl mussel catchments. |
| **F13 / F14** | An Appropriate Assessment* will be required. |

| Additional Measure | Mitigation Measure |
|---|---|
| **F19** | Detailed studies should be carried out prior to the introduction of any non-native species to be used as a biological control method. |
| **F19** | An Appropriate Assessment will be required. |
| **F20** | A determination with regard to the requirement for SEA for Forestry practices under the provisions of the SEA Directive and Appropriate Assessment under the Habitats Directive should be made. |
| **PM2** | An Appropriate Assessment will be required. |
| **PM4** | A determination with regard to the requirement for SEA for tidal energy schemes under the provisions of the SEA Directive and Appropriate Assessment under the Habitats Directive should be made. |
| **PM6/ PM7** | An Appropriate Assessment* will be required for remediation schemes. |
| **PM6/ PM9** | An archaeology, architecture and cultural heritage assessment will be required before removal of any physical modifications with potential for cultural heritage value. Mitigation measures will be in agreement with the relevant authority. This assessment should include reference to cultural heritage in the context of the existing landscape. |
| **PM6** | A flood impact assessment should be carried out for all channelisation and barrier remediation schemes to determine whether an increased risk of flooding would occur as a result. |
| **PM7** | Any voluntary schemes and/or overgrazing remediation schemes should be rolled out in tandem with an education and guidance programme to ensure that the schemes are carried out in a holistic manner. |
| **PM9** | An Appropriate Assessment* will be required for impassable barrier remediation schemes. |
| **AB4** | The assessment shall determine whether compensation flow is sufficient to meet the needs of in stream flora and fauna. |
| **AB5** | This alternative should take account of the results from AB4. |
| **AB6/ AB7/ AB8** | Although water conservation awareness campaigns have been implemented the message has not hit home for many people. It is therefore recommended that a working group be established to develop tools to promote water awareness and these tools are included in future water awareness campaigns. |
| **AB8** | An Appropriate Assessment* should be undertaken for any new infrastructure. |
| **AB9** | Suitable education and awareness campaigns are recommended to provide residential users with the tools / knowledge to reduce water consumption. It is also strongly recommended that water metering schemes promote conservation. |
| **AB10** | An Appropriate Assessment* should be carried out. |
| **AB13** | Possible storage sites should not impact negatively on sensitive habitats and species. Good quality agricultural land should also be avoided where alternatives exist. Storage options will include proposals for biodiversity enhancement and opportunities for economic benefit e.g. tourism, angling without compromising environmental sustainability. Energy required for pumping stations should be sourced from renewable sources. |
| **AB13** | A protocol for prevention of the spread of any alien species shall be developed and agreed with the relevant authority and the relevant fisheries board in advance of any inter-catchment transfers. |
| **AB12** | An Appropriate Assessment* should be carried out. |
| **AB13** | An Appropriate Assessment* should be undertaken for any proposed storage facility. |
| **AB14** | It is recommended that the Planning Authority, in directing or restricting development take account not only of the water capacity of an area but its wider capacity in terms of cultural heritage, biodiversity and landscape, etc. |
| **AB14** | An Appropriate Assessment* should be considered for new abstractions in line with the requirements of the Habitats Directive. |

| Additional Measure | Mitigation Measure |
|---|---|
| **AB All** | A focussed awareness campaign on water use will be implemented to reduce the volumes of water used / wasted, followed by leakage improvement and only then new infrastructure. Any new infrastructure e.g. storage should source its fuel from renewable sources. |
| **FPM1** | This will require monitoring of the success of changes implemented to ascertain if modification to a natural flow benefits FPM. |
| **FPM3** | It is recommended that compensation be linked to annual upkeep of fences and management of buffers to ensure the ongoing benefit of this alternative. |
| **FPM5** | All access roads or bridges of any size have a pollution risk that can cause damage to mussel populations during construction and operation. Any future roads or bridges of any size should be subject to an impact assessment for potential damage to the mussel population alone or in conjunction with other effects. |
| **FPM6/ FPM7** | An impact assessment will be required for future roads and brides of any size to ascertain the potential of damage to the mussel population alone or in conjunction with other effects. |
| **FPM 8** | A clear instruction to ensure lime is not used in catchment roads or hard surfaces shall be incorporated into local authority plans and operation organisation. |
| **FPM9** | Flood and ecological impact assessments will be required prior to any remediation works. There is a need for a holistic approach to be applied so that implementation does not result in indirect negative impacts in other issue areas. |
| **FPM10 / FPM11 / FPM12** | It is recommended that prior to any changes in forest size or species mix a study is carried out to determine the change in the carbon dioxide sequestering capacity of the forest. Should sequestering capacity be reduced, compensation measures will be required to offset these. |
| **FPM17/ FPM18 / FPM19** | In-stream data loggers for turbidity and regular water sampling will be required as part of these alternatives. |
| **FM25** | Any works in the river bed or bank either for fisheries management, pipeline laying or other purposes shall be subject to an ecological impact assessment. Weirs, croys and stone bank reinforcement are unsuitable for freshwater pearl mussel SACs and alternatives should be found. |
| **FPM26 / FPM27** | There is a need for a holistic approach to be applied so that implementation does not result in indirect negative impacts in other issue areas. Flood and aquatic impact assessments will be required prior to any river bed or bank works. |

**Note: It should be noted that in this case the term Appropriate Assessment refers to the assessment process as specified in Article 6 of the Habitats Directive. This starts with screening to determine whether a likely significant impact from the plan/programme is expected to occur to a Natura 2000/Ramsar site as a result of activities in/adjacent to/in the catchment of a Natura 2000/Ramsar site. If, in accordance with AA guidance (guidance produced by the EU, DEHLG in Ireland, and NIEA in Northern Ireland), it can be shown that there is no potential for impact at the screening stage, no further assessment may be required. However when the plan/programme being screened lies within or adjacent to a Natura 2000/Ramsar site then such a determination must be made in consultation with NPWS/NIEA. If the plan/programme is within the catchment (surface and groundwater) of a Natura 2000/Ramsar site, such consultation with NPWS/NIEA is only necessary for those water dependent Natura 2000 sites which are listed in the WFD Register of Protected Areas.*

## 10.4 SUMMARY OF MONITORING AND MITIGATION

The Strategic Environmental Assessment carried out on the draft Plan and POMs has ensured that any potential significant environmental impacts have been identified and given due consideration, and taken into account in the development of the Plan and POM. The proposed monitoring programme will be carried out as implementation of the Plan progresses and, depending on monitoring results, adjustments to targets and indicators may be made to ensure the continued effectiveness of the monitoring programme in the interest of optimal environmental protection.

# 11 NEXT STEPS

There is still some important work to complete before this river basin management plan is adopted. This will include some further technical and scientific planning work as well as recording, assessing and, where appropriate, taking on board comments received during consultations on the draft Plan / POMs and Strategic Environmental Assessment. The next step in the SEA and RBMP/ POM process will be a six-month consultation period. During this time comment on the findings of the Environmental Report, the Habitats Directive Assessment and the content of the draft Plan may be submitted for consideration. **Table 11.1** outlines the remaining steps in this RBMP/ POM and SEA process.

**Table 11.1 Remaining Steps in the RBMP and SEA processes**

| Date | Milestone | |
|---|---|---|
| | **River Basin Management Plan** | **Strategic Environmental Assessment** |
| 22 December 2008 | Publication of draft River Basin Management Plan | Publication of Environmental Report |
| 22 June 2009 | End of statutory consultation | End of consultation |
| 16 October 2009 | Making of river basin management plan by reserve function | Compilation of consultation report and SEA Statement |
| 30 October 2009 | Making of river basin management plan by executive function | |
| 30 November 2009 | Environmental Protection Agency report to Environment Minister | |
| 11 December 2009 | Minister's amendments | |
| 22 December 2009 | Publication of final River Basin Management Plan | Publication of SEA Statement |
| December 2009 to 2015 | First six year planning cycle | |

Written submissions or observations are now invited with respect to the draft South Western River Basin Management Plan, associated Environmental Report and Habitats Directive Assessment. Written submissions should be forwarded for the attention of Mr. Seán O'Breasail on or before 22nd June 2009 (contact details below). These submissions / observations will be taken into consideration before finalisation of the Plan. Early responses would be appreciated to allow more time to clarify and resolve issues that may arise.

Mr. Seán O'Breasail

Cork County Council

South Western River Basin District Office

Inniscarra

Co. Cork

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# 12 ACRONYMS

| | |
|---|---|
| **AQMA** | Air Quality Management Area |
| **ASSI** | Areas of Special Scientific Interest |
| **AWB** | Artificial Water Body |
| **BAP** | Biodiversity Action Plan |
| **BAT** | Best Available Techniques |
| **BATNEEC** | Best Available Techniques Not Entailing Excessive Cost |
| **BMP** | Best Management Practice |
| **CAFÉ** | Clean Air For Europe |
| **$CH_4$** | Methane |
| **CMP** | Conservation Management Plan |
| **CO** | Carbon Monoxide |
| **DAFF** | Department of Agriculture, Fisheries and Food |
| **DARD** | Department of Agriculture and Rural Development |
| **DCENR** | Department of Communications, Energy and Natural Resources |
| **DoE** | Department of Environment (Northern Ireland) |
| **DoEHLG** | Department of Environment, Heritage and Local Government |
| **EAP** | Environment Action Programme |
| **EIA** | Environment Impact Assessment |
| **ELVs** | Emission Limit Values |
| **EPA** | Environmental Protection Agency |
| **EPRTR** | European Pollutant Release and Transfer Register |
| **ERBD** | Eastern River Basin District |
| **ESB** | Electrical Supply Board |
| **EU** | European Union |
| **FOG** | Fats, Oils and Greases |
| **GBR** | Generally Binding Rules |
| **GHG** | Greenhouse Gas |
| **GSI** | Geological Survey of Ireland |
| **HMWB** | Heavily Modified Water Body |
| **HSE** | Health Services Executive |
| **ILWG** | Irish Landslides Working Group |
| **IPCC** | Intergovernmental Panel on Climate Change |
| **IPPC** | Integrated Pollution Prevention and Control |
| **IRBD** | International River Basin District |
| **JNCC** | Joint Nature Conservation Committee |
| **LNR** | Local Nature Reserve |
| **MNR** | Marine Nature Reserve |

| | |
|---|---|
| **NBIRBD** | Neagh Bann International River Basin District |
| **NDP** | National Development Plan |
| **NERBD** | North East River Basin District |
| **NHA** | Natural Heritage Area |
| **NIAH** | National Inventory of Architectural Heritage |
| **NIBG** | Northern Ireland Biodiversity Group |
| **NIEA** | Northern Ireland Environment Agency |
| **NIEH** | National Industrial Engineering Heritage |
| **NISRA** | Northern Ireland Statistics and Research Agency |
| **NNR** | National Nature Reserve |
| **$NO_2$** | Nitrogen Dioxide |
| **NPWS** | National Parks and Wildlife Service |
| **NSS** | National Spatial Strategy |
| **NWIRBD** | North Western International River Basin District |
| **OPW** | Office of Public Works |
| **$PM_{2.5}$** | Particulate Matter less than 2.5 micrometers in size |
| **$PM_{10}$** | Particulate Matter less than 10 micrometers in size |
| **POM** | Programme of Measures |
| **POPs** | Persistent Organic Pollutants |
| **RAL** | Remedial Action List |
| **RBD** | River Basin District |
| **RBMP** | River Basin Management Plan |
| **REACH** | Registration, Evaluation, Authorisation of Chemicals (EU REACH Initiative) |
| **RMP** | Records of Monuments and Places |
| **SAC** | Special Area of Conservation |
| **SEA** | Strategic Environmental Assessment |
| **SERBD** | South Eastern River Basin District |
| **ShIRBD** | Shannon International River Basin District |
| **SOCC** | Species of Conservation Concern |
| **SPA** | Special Protection Area |
| **SWMI** | Significant Water Management Issues |
| **SWRBD** | South Western River Basin District |
| **UNESCO** | United Nations Educational, Scientific and Cultural Organisation |
| **UNFCCC** | United Nations Framework Convention on Climate Change |
| **WFD** | Water Framework Directive |
| **WHO** | World Health Organisation |
| **WRBD** | Western River Basin District |
| **WSIP** | Water Services Investment Programme |
| **WWTP** | Waste Water Treatment Plants |

**WWTW** Waste Water Treatment Works

# 13 GLOSSARY

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| Acidification | The rough canopies of mature evergreen forests are efficient scavengers of particulate and gaseous contaminants in polluted air. This results in a more acidic deposition under the forest canopies than in open land. Chemical processes at the roots of trees, evergreens in particular, further acidify the soil and soil water in forest catchments. When the forests are located on poorly buffered soils, these processes can lead to a significant acidification of the run-off water and consequent damage to associated streams and lakes. |
| Alien species | Invasive alien species are non-native plants or animals that successfully establish themselves in aquatic and fringing habitats and damage our natural flora and fauna. |
| Appropriate Assessment | An assessment of the effects of a plan or project on the Natura 2000 network. The Natura 2000 network comprises Special Protection Areas under the Birds Directive, Special Areas of Conservation under the Habitats Directive and Ramsar sites designated under the Ramsar Convention (collectively referred to as European sites). |
| Aquifers: | A water bearing rock which readily transmits water to wells and springs. |
| Artificial water body: | A body of surface water created by human activity. It is known as a heavily modified water body if, as a result of physical alterations by human activity, it is changed substantially in character as designated by an individual Member State and in accordance with the provisions of Annex II of the Water Framework Directive. |
| Baseline environment**:** | A description of the present state of the environment of the P/P area. |
| Biodiversity: | Word commonly used for biological diversity and defined as assemblage of living organisms from all habitats including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part. |
| Birds Directive: | Council Directive of 2nd April 1979 on the conservation of wild birds (79/409/EEC). |
| Brine: | Concentrated salt water |
| Business as Usual Scenario: | The Business as Usual scenario is a conceptual baseline which projects what would happen in an area if there were no changes. It assumes current land use and other policies that guide or shape development remains the same, that current market-based trends continue, and that anticipated development projects occur as planned. This scenario also assumes that current demographic trends will continue as expected and future trends in urbanization and land consumption follow past patterns. |
| Coastal Waters: | Is that area of surface water on the landward side of a line, every point of which is at a distance of one nautical mile on the seaward |

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| | side from the nearest point of the baseline from which the breadth of territorial waters is measured, extending where appropriate up to the outer limit of transitional waters. |
| Carbon Dioxide ($CO_2$)**:** | A naturally occurring gas which is also a by-product of burning fossil fuels and biomass, land-use changes and industrial processes. It is the principal anthropogenic greenhouse gas that affects the earth's radiative balance. It is the reference gas against which other greenhouse gases are measured and therefore has a Global Warming Potential of 1. |
| Cumulative effects: | Effects on the environment that result from incremental changes caused by the strategic action together with other past, present, and reasonably foreseeable future actions. These effects can result from individually minor but collectively significant actions taking place over time or space. |
| Designated authority: | An organisation that must be consulted in accordance with the SEA Regulations. |
| Diffuse sources (of pollution)**:** | These are primarily associated with run-off and other discharges related to different land uses such as agriculture and forestry, from septic tanks associated with rural dwellings and from the land spreading of industrial, municipal and agricultural wastes. |
| Dinantian: | Name of the Lower Carboniferous period and specifically a series of rocks in Europe which were deposited during the period. |
| Dystrophic: | Having brownish acidic waters, a high concentration of humic matter, and a small plant population. |
| Ecology: | The study of the relationship among organisms and between those organisms and their non-living environment. |
| Ecosystem: | A community of interdependent organisms together with the environment they inhabit and with which they interact, and which is distinct from adjacent communities and environments |
| Ecological status**:** | **I**s an expression of the structure and functioning of aquatic ecosystems associated with surface waters. Such waters are classified as being of good ecological status when they meet the requirements of the Directive. |
| Environmental assessment: | The preparation of an environmental report, the carrying out of consultations, the taking into account of the environmental report and the results of the consultations in decision-making and the provision of information on the decision (in accordance with Articles 4 to 9 of the SEA Directive). |
| Environmental indicator: | An environmental indicator is a measure of an environmental variable over time, used to measure achievements of environmental objectives and targets. |

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| Environmental objective: | Environmental objectives are broad, overarching principles which should specify a desired direction of environmental change. |
| Environmental receptors: | Include biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage (including architectural and archaeological) and landscape as listed in the SEA Directive. This list is not exhaustive, and can include other receptors which may arise for a particular P/P. |
| Environmental report (ER): | A document required by the SEA Directive as part of a strategic environmental assessment which identifies, describes and evaluates the likely significant effects on the environment of implementing a plan or programme. |
| Eutrophic: | A eutrophic lake is a lake with high primary productivity, the result of high nutrient content. |
| Eutrophication: | Enrichment of water by nutrients (phosphorus and nitrogen). The nutrients accelerate plant growth, which disturbs the balance of aquatic plants and animals and affects water quality. |
| Fulachta fiadh: | Also called burnt mounds. They consist of horseshoe shaped heaps of heat-fractured stone mixed with charcoal and dark soil, associated with lined rectangular water troughs and hearths. |
| Good status: | Is a general term meaning the status achieved by a surface water body when both the ecological status and its chemical status are at least good or, for groundwater, and when both its quantitative status and chemical status are at least good. |
| Groundwater: | All water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil. This zone is commonly referred to as an aquifer which is a subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow a significant flow of groundwater or the abstraction of significant quantities of groundwater. |
| Greenhouse Gas**:** | Gaseous constituents of the atmosphere that absorb/trap infrared (thermal) radiation which is mainly emitted by the earth's surface and thereby influence the earth's temperature. |
| Habitats Directive: | Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna. |
| Hierarchy of plans: | Both higher and lower level P/P relevant to the P/P being assessed. |
| Hydromorphology: | A study of the quantity and dynamics of water flow within a river/channel that has variations in its width, depth, structure and substrate of bed and riparian zone |
| Inland Surface Waters: | All standing or flowing water on the surface of the land (such reservoirs, lakes, rivers and coastal waters) and all groundwater on the landward side of the baseline from which the breadth of territorial waters is measured. |

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| Interrelationships: | Associations or linkages, related to environmental impact of the proposed P/P usually on environmental receptors. |
| Key environmental issues: | Those significant environmental issues, which are of particular relevance and significance within a P/P area and/or the zone of influence of that P/P. These issues should be identified during SEA Scoping process. |
| Kyoto Protocol**:** | The 1997 protocol to the Convention on Climate Change under which industrialised countries will reduce their combined greenhouse gas emissions by at least 5 per cent compared to 1990 levels by 2008–2012. |
| Leachate**:** | **T**he liquid produced when water percolates through any permeable material. It can contain either dissolved or suspended material, or usually both |
| Management Measures: | Procedures that are introduced from a management plan to mitigate against any impacts that occur from the implementation of project development |
| Material Assets: | Critical infrastructure essential for the functioning of society such as: electricity generation and distribution, water supply, wastewater treatment, transportation etc |
| Mitigation measures: | Measures to avoid/prevent, minimise/reduce, or as fully as possible, offset/compensate for any significant adverse effects on the environment, as a result of implementing a P/P. |
| Monitoring: | A continuing assessment of environmental conditions at, and surrounding, the plan or programme. This determines if effects occur as predicted or if operations remain within acceptable limits, and if mitigation measures are as effective as predicted. The primary purpose of monitoring is to identify significant environmental effects which arise during the implementation stage against those predicted during the plan preparation stage. |
| Natural Heritage Area (NHA): | An area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection. |
| Non-technical summary: | A summary of the findings of the ER, summarised under the headings listed in Annex 1 of the SEA Directive that can be readily understood by decision-makers and by the general public. It should accurately reflect the findings of the ER. |
| Oligotrophic: | Term applied to water bodies that are poorly nourished, unproductive. |
| Otter Trawling**:** | Otter trawling derives its name from the large rectangular otter boards which are used to keep the mouth of the trawl net open. Otter boards are made of timber or steel and are positioned in such a way that the hydrodynamic forces, acting on them when the net is towed along the seabed, pushes them outwards and prevents the mouth of the net from closing. |

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| Ooycysts: | An oocyst is the thick-walled spore phase of certain protists, such as *Cryptosporidium* and *Toxoplasma* |
| Percolation: | Concerns the movement and filtering of fluids through porous materials |
| Polluter Pays Principle: | An environmental policy principle which requires that the cost of pollution be borne by those who cause it. |
| Plan or Programme: | Including those co-financed by the European Community as well as any modifications to them:<br>- which are subject to preparation and/or adoption by an authority at national, regional or local level or which are prepared by an authority for adoption, through a legislative procedure by Parliament or Government, and<br>- which are required by legislative, regulatory or administrative provisions.<br>In accordance with the SEA Directive, P/P that require SEA are those that fulfill the conditions listed in Article 2(a) and Article 3 of the SEA Directive. |
| Programme of measure: | Defines in detail those actions which are required to achieve the environmental objectives of the Directive within a river basin district. |
| Quantitative status**:** | An expression of the degree to which a body of groundwater is affected by direct and indirect abstractions. If this complies with Directive requirements the status is good. |
| Ramsar sites**:** | Sites designated as internationally important wetland habitats under the International Convention on Wetlands of International Importance (1976) (Ramsar Convention). |
| Reasonable alternatives: | Alternatives should take into account the objectives and geographical scope of the P/P. There can be different ways of fulfilling the P/P objectives, or of dealing with environmental problems. The alternatives should be realistic, capable of implementation and should fall within the legal and geographical competence of the authority concerned. |
| Reverse osmosis: | A separation process that uses pressure to force a solution through a membrane that retains the solute on one side and allows the pure solvent to pass to the other side. |
| River Basin**:** | Means the area of land from which all surface water run-off flows, through a sequence of streams, rivers and lakes into the sea at a single river mouth, estuary or delta. |
| River Basin Districts (RBD): | administrative areas for coordinated water management and are comprised of multiple river basins (or catchments), with cross-border |

basins (i.e. those covering the territory of more than one Member State) assigned to an international RBD.

Scoping: the process of deciding the content and level of detail of an SEA, including the key environmental issues, likely significant environmental effects and alternatives which need to be considered, the assessment methods to be employed, and the structure and contents of the Environmental Report

Screening: The determination of whether implementation of a P/P would be likely to have significant environmental effects on the environment. The process of deciding whether a P/P requires an SEA.

SEA Directive: Directive 2001/42/EC 'on the assessment of the effects of certain plans and programmes on the environment'.

SEA Statement: A statement summarising:

- how environmental considerations have been integrated into the P/P
- how the ER, the opinions of the public, and designated authorities, and the results of transboundary consultations have been taken into account
- the reasons for choosing the P/P as adopted in the light of other reasonable alternatives.

Sedimentation: The deposition by settling of a suspended material

Significant effects: Effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors.

Special Area of Conservation (SAC): Site designated according to the habitats directive.

Special Protection Area (SPA): An area designated under the European Directive on the Conservation of Wild Birds.

Statutory authority: The authority by which or on whose behalf the plan or programme is prepared.

Statutory Instrument: Any order, regulation, rule, scheme or byelaw made in exercise of a power conferred by statute.

Surface water**:** Means inland waters, except groundwater, which are on the land surface (such as reservoirs, lakes, rivers, transitional waters, coastal waters and, under some circumstances, territorial waters) which occur within a river basin.

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| Taxa: | A name designating an organism or a group of organisms. |
| Transboundary Consultation: | If a plan or programme is being prepared that is likely to have significant effects on the environment in another Member State, or where a Member State likely to be significantly affected so requests, the Member State in whose territory the plan or programme is being prepared shall, before the plan or programmes adoption or submission to the legislative procedure, forward a copy of the draft plan or programme and the relevant environmental report to the other Member State. |
| Transitional waters: | Bodies of surface water in the vicinity of river mouths which are partly saline in character as a result of their vicinity to coastal waters, but which are substantially influenced by freshwater flows. |
| Water body: | A discrete and significant element of surface water such as a river, lake or reservoir, or a distinct volume of groundwater within an aquifer. |
| Water Framework Directive: | The Water Framework Directive is a new piece of European legislation that promotes a new approach to water management through river basin planning. The legislation addresses inland surface waters, estuarine waters, coastal waters and groundwater. |

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# APPENDIX to CHAPTER 5

# Additional Information on the Baseline Environment

**Additional Information on the Pearl Mussel (*Margaritifera margaritifera*)**

*Margaritifera margaritifera* is found in pristine, well-oxygenated rivers which flow over non-calcareous rock. These waters have little calcium and are very low in nutrients. In contrast the rare form *Margaritifera margaritifera durrovensis*, which is unique to Ireland, is found in calcareous hard water areas.

The crucial water quality parameters in relation to *Margaritifera* are BOD, calcium and phosphate levels (Bauer 1988). Most molluscs are sensitive to toxic chemicals, and there is evidence that sheep dip can have an immediate effect on *Margaritifera*. The degree of impact depends on the time of year, duration and severity of the pollution incident. It may result in a stress situation under conditions of oxygen depletion, or it may lead to death if a release of toxic chemicals occurs.

**Main Cities and Towns within the SWRBD**

**Table 1 Overview of City and Town Populations in the South Western RBD**

| Towns | 1996 | 2002 | 2006 | % Change 1996-2002 | % Change 2002-2006 |
|---|---|---|---|---|---|
| Killarney | 8,809 | 12,087 | 13,497 | 37.2 | 11.7 |
| Bandon Town | 1,697 | 1,578 | 1,721 | -7.0 | 9.1 |
| Carrigaline | 7,827 | 11,191 | 1 | 43.0 | 14.7 |
| Midleton | 2,943 | 4,159 | 6,114 | 41.3 | 47.0 |
| Youghal | 5,630 | 6,203 | 6,393 | 10.2 | 3.1 |
| Fermoy Urban | 2,310 | 2,270 | 2,275 | -1.7 | 0.2 |
| Mallow | 6,434 | 7,091 | 7,864 | 10.2 | 10.9 |
| Mitchelstown | 3,123 | 3,300 | 3,365 | 5.7 | 2.0 |
| Clonakilty | 2,724 | 3,432 | 3,745 | 26.0 | 9.1 |
| Cobh | 6,468 | 6,767 | 6,541 | 4.6 | -3.3 |
| Passage West | 3,638 | 4,184 | 4,818 | 15.0 | 15.2 |
| Kinsale Urban | 2,007 | 2,257 | 2,298 | 12.5 | 1.8 |
| Macroom Urban | 2,457 | 2,836 | 3,407 | 15.4 | 20.1 |
| Tower | 1,841 | 3,032 | 3,102 | 64.7 | 2.3 |
| Bantry | 2,936 | 3,150 | 3.309 | 7.3 | 5.0 |
| Cork City | 127,187 | 123,062 | 119,418 | -3.2 | -3.0 |
| Cork Suburbs Total | 52,767 | 63,177 | 70,966 | 19.7 | 12.3 |

Source: Census of Population Republic of Ireland 1996, 2002 and 2006

**Drinking and Bathing Water Quality Information**

**Table 2 Microbiological and Chemical Compliance of Drinking Water**

| County | Overall Compliance Rate of Drinking Water | Compliance with E-Coli standard | Compliance with Chemical and indicator parametric values | Issue of Directions from EPA 2006-2007 |
|---|---|---|---|---|
| Cork City Council | The overall compliance rate was 97.9%, above the national average. | Compliance with e-coli standards was excellent with none of the samples analysed for either parameters detecting *E.coli* or Enterococci. | The overall compliance rate with the Chemical Parametric Values was "Excellent" with no non compliances of the 26 samples taken.<br><br>Compliance with Indicator Parametric values was above the national average of 97.3%. There were however iron non compliances and coliform bacteria (17 of 223 samples analysed) | None |
| Cork (North) County Council | The overall compliance rate was 97.1%, which was close to the national average figure for 2006. | There were 6 incidences of E coli contamination of public water supplies in Burnfoot, Bartlemy, Doneraile, Glenduff, Rahan and Mitchelstown Galtee public water supply, with the latter being serious (>20 cfu/100ml)<br><br>All as a result of failure of the chlorine dosing equipment at the treatment plants.<br><br>E-coli was detected in 3 of 14 private group water schemes. | The overall compliance rate with the Chemical Parametric Values was "Satisfactory" though the exceedances of the lead, nitrate & tetrachloroethene/trichloroethane standards were recorded in a small number of supplies.<br><br>Compliance with Indicator Parametric values was less than satisfactory in the public water supplies in North Cork. Although compliance with the aluminium standard improved from 89% in 2005 to 99% in 2006.<br><br>Compliance with Indicator Parametric values was poor for private group schemes due to a very low level of compliance with the pH and coliform bacteria standards. | None |
| Cork South | The overall compliance rate was 98.4%, which was above the national average figure for | There were 5 incidents of E-coli contamination | The overall compliance rate with the Chemical Parametric Values for the public water supply was "Excellent" with no non | Drimoleague PWS E.coli 30.07.07 and Dromore |

| County | Overall Compliance Rate of Drinking Water | Compliance with E-Coli standard | Compliance with Chemical and indicator parametric values | Issue of Directions from EPA 2006-2007 |
|---|---|---|---|---|
| | 2006. | in public water supplies in Ballingeary, Ballincurrig/Lisgould, Donaghmore, Kilbrittain and Walshtown Beg supplies due to breakdowns in chlorination equipment.<br><br>E-coli was detected in 4 of 12 private group water schemes monitored. | compliances of the 26 samples taken.<br><br>Walterstown private group scheme failed to comply with the nitrate standards.<br><br>Compliance with Indicator Parametric values in public water supplies was above the national average however compliance with the aluminium parametric value was problematic in Youghal<br><br>Compliance with the coliform bacteria standard in private group water schemes in South Cork in 2006 was poor with half of the samples analysed for coliforms bacteria failing to meet the standard. | PWS for E.coli 30.07.07 |
| Cork West | The overall compliance rate was 96.7%, which was below the national average figure for 2006 and was due to a lower rate of compliance across all three categories of parameters in both public water supplies and private group schemes. | The rate of compliance with E.coli standards was low though there was a rise from 93.2% in public water supplies.<br><br>There were 6 incidences of of E.coli contamination of public water supplies in Coppeen, Castletownbere New, Dunmore Public (Bantry) (2 incidents), Kealkill and Snave supplies. | The overall compliance rate with the Chemical Parametric Values was “Acceptable” in all but two samples- Castletownkinnagh and Kealkill.<br><br>Compliance with Indicator Parametric values in public water supplies was marginally below the national average due to a small number of exceedances with several of the parametric values, although there was a large number of coliform bacteria and colour exceedances (92% and 93% compliance respectively). | None |
| Kerry County Council | The overall compliance rate in Kerry was 96.0% below the national average figure for 2006, though marginally up from 96.5% in 2005 | There were 12 incidences of E.coli contamination in 10 public water supplies in Kerry during 2006 in Baile Breach, Ballinskelligs, Caragh Lake (2 incidents), Feoghanagh, Gearrha, Glenbeigh (2 incidents), | The overall compliance rate with the Chemical Parametric Values was “Satisfactory” and the proportion of fluoride exceedances reduced significantly with 99.3% of samples analysed compliant compared to 91% in 2005.<br><br>Trihalomethanes were non compliant in Dingle and the Glen supplies.<br><br>There was a slight drop in compliance with the Indicator Parametric values in all categories of supplies. Compliance with the | None |

| County | Overall Compliance Rate of Drinking Water | Compliance with E-Coli standard | Compliance with Chemical and indicator parametric values | Issue of Directions from EPA 2006-2007 |
|---|---|---|---|---|
| | | Lauragh, Liscarney, Murreigh Ballydavid and sneem supplies. Five of these supplies were also contaminated in 2005.<br><br>Nine of Fifteen private group schemes surveyed were non compliant.<br><br>22 public water supplies originate from surface water which do not have any treatment other than chlorination. Therefore, these supplies have no treatment barrier to remove Cryptosporidium. | coliform bacteria (89%), colour (88%) and pH (84%) were unacceptably low in public water supplies. Turbidity levels at the water treatment plants were also poor with almost 40% of treatment plants reporting turbidity levels in excess of 1.0 NTU indicating potential vulnerability to contamination from Cryptosporidium.<br><br>13 out of 14 private group schemes tested positive for coliform bacteria and there has been no improvement in private group water schemes in Kerry.<br><br>Overall, the microbial quality of both public water supplies and private group schemes in Kerry is low. | |
| Waterford County | The overall compliance rate in County Waterford was 94.2.% below the national average figure for 2006, and dropped marginally from 94.7% in 2005 | There were 6 incidences of E.coli contamination in 6 public water supplies- Ballyshunnock, Graiguenageeha, Inchileamy, Kilnafrehan, Rathgormuck and Tinkock/Tinnabinna supplies.<br><br>An outbreak of Cryptosporidium occurred at the Portlaw supply in December 2006. A total of 8 cases of the disease were reported and remedial action | Full compliance was achieved for the Chemical Parametric Values, though there was a small number of marginal fluoride exceedances.<br><br>There was however exceedances of nitrate level in five public water supplies – Adramore, Geoish, Kilmore-Kilbeg, Lismore/Cappaquin/Ballyduff and Shancoole. Elevated nitrate levels was also detected in one private group scheme.<br><br>Compliance with Indicator Parametric Values was below the national average in 2006 at 93.8%. This was primarily due to failure of 2/3 of the supplies to comply with pH standard.<br><br>All private group schemes monitored failed to comply with coliform bacteria standards. | Deelish/Ballinacourty PWS – Turbidity 28.06.07 |

| County | Overall Compliance Rate of Drinking Water | Compliance with E-Coli standard | Compliance with Chemical and indicator parametric values | Issue of Directions from EPA 2006-2007 |
|---|---|---|---|---|
| | | has been undertaken to reduce the likelihood of re-occurrence (*within SERBD)<br><br>Three of the five private group schemes and three of the eight private water supplies monitored were found to be contaminated with E.coli. | | |
| Limerick County | The overall rate of compliance in County Limerick was 96.6% which was below the national average in 2006 and dropped from 98.6% in 2005 | There were 3 incidences of E.coli contamination reported in the Adare, Foyne/Shannon Regional and Oola supplies. All three exceedances were moderate (<20 cfu/100ml). Otherwise the microbial quality of public water supplies and public group water schemes was Good.<br><br>While above the national average, compliance with the microbial standards in private group water schemes in County Limerick was poor with 9 of 53 schemes monitoring contaminated during 2006. | Overall compliance rate of 25 of the 26 chemical parameters was excellent. However there was significant difficulty in complying with the fluoride standard, with 13 supplies monitored reporting exceedances and an overall compliance rate of 80%.<br><br>A large number of these exceedances were reported in Abbeyfeale, Adare and the South West Regional supply.<br><br>There was also a number of fluoride exceedances in several of the public group water schemes (19 of 42 monitored).<br><br>Compliance with the Indicator Parametric Indicator Values was “Less than Satisfactory” with a poor rate of compliance with the aluminium standard (77% compliance rate).<br><br>The public group water schemes were of similar quality to the public water supplies. Elevated levels of turbidity were recorded in 7 of the 9 supplies monitored. There is a risk that some treatment plants are operating under conditions of high risk such that if Cryptosporidium is present in the source water of the supply then the treatment process may not be adequate at removing it.<br><br>The compliance of Indicator Parametric Values for private group | Ballinagarry WS- Nitrate 04.04.07 |

| County | Overall Compliance Rate of Drinking Water | Compliance with E-Coli standard | Compliance with Chemical and indicator parametric values | Issue of Directions from EPA 2006-2007 |
|---|---|---|---|---|
| | | | schemes was above the national average however compliance was poor for coliform bacteria (82%). | |
| South Tipperary | The overall rate of compliance was 97.4%, above the national average and due to above average compliance with the microbial and chemical parametric values. | There were no incidents of E.coli or enteroccoci contamination in public water supplies. Thus microbial quality of public water supplies was excellent.<br><br>Cryptosporidium was present in the Clonmel Glenary supply in 2007- resulting in boil notice been placed on the water supply. (*within SERBD)<br><br>One of the three private group water schemes and one of the 12 private water supplies monitored contained E.coli in 2006. | Compliance with the chemical parametric values was good (99.4%), although there was some marginal exceedances of the fluoride standard particularly in the Clonmel Glenary supply and one trihalomethane exceedance in the Killurney Supply.<br><br>Though there were a limited number of samples analysed for the chemical parameters in the private group water schemes all were compliant.<br><br>Compliance values for parametric indicator values improved from 2005 to 2006 from 96.1% to 96.1%, there were however still problems with certain standards. In particular aluminium exceedances at Ardfinnan Regional, Dundrum Regional and Galtee Regional. Compliance values for parametric indicator values in private group schemes increased from 95.1% in 2005 to 96.3% in 2006 and apart from a single coliform bacteria, pH and odour exceedance full compliance was achieved. | Tipperary UDC PWS –E.coli 23.07.07<br><br>Killurney PWS-E.coli Coliforms 20.06.07 |

**Table 3 Bathing Water Quality in the SWRBD**

| County<br>Bathing Water Quality Areas | Beach | Compliance<br>EU Mandatory (Acceptable) | Compliance<br>EU Guide Values (Good Quality | Compliance NLV (National Limit Value) |
|---|---|---|---|---|
| Cork | Barley Cove | ✓ | ✓ | ✓ |
| | Tragumna | ✓ | ✓ | ✓ |
| | Warren | ✓ | ✓ | ✓ |
| | Owenahincha | ✓ | ✓ | ✓ |

| County Bathing Water Quality Areas | Beach | Compliance EU Mandatory (Acceptable) | Compliance EU Guide Values (Good Quality | Compliance NLV (National Limit Value) |
|---|---|---|---|---|
| | Inchydoney | ✓ | ✓ | ✓ |
| | Coolmaine | ✓ | ✓ | ✓ |
| | Garretstown | ✓ | ✓ | ✓ |
| | Garrylucus, White Strand | ✓ | ✓ | ✓ |
| | Fountainstown | ✓ | ✓ | X |
| | Garryvoe | ✓ | ✓ | ✓ |
| | Redbarn | ✓ | ✓ | ✓ |
| | Claycastle, Youghal | ✓ | ✓ | X |
| | Youghal, Main Beach | X | X | X |
| Kerry | Derrynane | ✓ | ✓ | ✓ |
| | Ballinskelligs | ✓ | ✓ | ✓ |
| | Inny, Waterville | ✓ | ✓ | ✓ |
| | White Strand, Caherciveen | ✓ | ✓ | ✓ |
| | Kells | ✓ | ✓ | ✓ |
| | Rossbeigh White Strand | ✓ | ✓ | ✓ |
| | Inch | ✓ | ✓ | ✓ |
| | Ventry | ✓ | ✓ | ✓ |

*Source: The Quality of Bathing Water in Ireland: A Report for the year 2006*

## Baseline Landscape Information

### Table 4 Landscape Character of Counties within the SWRBD

| County | General Landscape Character |
|---|---|
| County Cork | County Cork supports a wide diversity of natural and semi natural habitats that have survived in part because of the sympathetic manner in which they have been managed over time. These include marine, coastal, wetland, woodland, lake, river and upland habitats that support a wide range of wild plant and animal species. The landscape character of the District varies from the fertile plains in the north to the rugged peninsulas in the south west. |
| County Kerry | The landscape of County Kerry can be divided geographically into low-lands and gentle hills in the North and rugged hills and mountains in the South and West. The Dingle, Iveragh and Beara Peninsulas are primarily mountainous in nature. Over 41% of County Kerry is 500 feet above sea level. This contrasts with the national situation where only 22% of the Country is above this elevation. Kerry contains Irelands highest mountain, Carrauntuohill. |
| County Limerick | The landscape in County Limerick varies from a flat topography to one with prominent hills and ridges. The northern part of the county is bounded on one side by the Shannon Estuary. There is also the presence of blanket bog at the Limerick, Cork and Kerry boundaries. |

**Table 5 Landscape Designations in County Cork**

| Type of Designation | Location |
|---|---|
| Scenic Routes- Views and Prospects | Mitchelstown - Kilbeheny Road to County Boundary<br>National Primary Route between Moorepark and Mitchelstown<br>Road adjoining Kilworth Mountains<br>Road from Ballynamuddagh overlooking Araglin River & Banduff over the river<br>Road between Fermoy and Kilworth<br>Road between Bellvue Cross and Kilbarry overlooking Blackwater Valley<br>Road to Coolbaun<br>Castlehyde to Fermoy Bridge<br>Road over Hollymount<br>Road at Cregg Castle - South view of river, castle and mountains<br>Road adjoining Ballyhooly with view to Philip Wood, Johnston Wood and Gurteen Wood<br>Road at Nagle Mountains and Ross River Valley<br>Road between Knuttery and Daly's Cross Roads<br>Kilfinnan - Shanballymore Road<br>Road between Mallow and Roskeen Bridge<br>Road North of Meelin<br>Mullaghareik overlooking mountains<br>Road northwards from Meelin to Rockchapel to County Boundary<br>Road at Taur<br>Road West of Newmarket<br>Mountain roads between Seefin and Nad<br>Roads at Mushera in the boggeragh Mountains and roads from Mushera to Ballynagree, Lackdoha and Rylane Cross<br>Road from Glenaknockane towards Donoughmore<br>Road at Carriganima<br>Road from Ballyvourney to Mullaghanish to Caherdowney<br>Road between Macroom and Derrynasaggart Mountains<br>Road between Coolea and Coom<br>Road between Lissacresig and the Mouth of the Glen<br>Road between Gougane Barra and the Mouth of the Glen<br>Road between Inchigeela and Ballingeary to Keimaneigh<br>Road between Inchigeela and Rossmore<br>Road between Dromcarra and Rossmore<br>Road between Leemount and Macroom via Coachford<br>Road between Classis, Curraghbeg and Coachford<br>Road between Clogheen, Tower and Blarney and the road to Blarney Lake<br>Road between Blarney and Grenagh<br>Road from Dunkettle to Glanmire and eastwards to Caherlag and Glounthane<br>Road at Cashnagarriffe, N.W.Carrigtwohill and Westwards to Caherlag<br>Road between Leamlara and Midleton<br>Road between Ardglass and Monaleen Bridge<br>Road between Youghal and Tallow<br>Road between Youghal and Ballyvergan<br>Road between Cloyne and Ballycotton (back road)<br>Road between Inch and Ballycotton via Ballybranagan<br>Road between Inch and Aghada<br>Road from Ballynacorra via East Ferry to Whitegate and Roche's Point<br>Road at N.E. Great Island<br>Road between Cobh and Belvelly<br>Road between Passage West and Ringaskiddy<br>Road between Frankfield and Ballygarvan Townland<br>Road from Carrigaline to Crosshaven<br>Roads between Crosshaven and Myrtleville, Church Bay, |

| Type of Designation | Location |
|---|---|
| | Camden, Weavers Point and Fountainstown<br>Road from Kinsale to Ringville and to Ballinaclashet and Oysterhaven<br>Road between Kinsale and Clonleigh via Summercove<br>Road between Kinsale and Ballythomas (Coast Road)<br>Road between Innishannon and Kinsale via Shippool<br>Road between Bandon and Inishannon<br>Road between Innishannon to Ballinadee to Kinsale Western Bridge<br>Road between Barrel Cross and the Old Head of Kinsale<br>Road from Old Head to Timoleague via Garrettstown, Coolmaine and Harbour<br>Road between Timoleague and Courtmacsherry<br>Scenic road at the Pass of Keimaneig to Gougane Barra<br>Road to Kealkill via Cousane Gap to Togher<br>Road between Ballingeary - branch off S. Lake Road – and Kealvaugh<br>South Lake Road - Inchigeela and Ballingeary to Keimaneigh<br>Roads adjoining Tarelton - scenic views<br>Road between Ballineen and Ballincarriga to Dunmanway<br>Road between Dunmanway and Coolkellure, Castledonovan and Bantry<br>Same as Record A66<br>Roads at Butlerstown and Coolbaun<br>Road between Timoleague and Clonakilty via North Ring<br>Road between Barry's Cove and Lehenagh to Dunworley to North Ring<br>Coastal Road from Clonakilty to Inchydoney and Ardfield<br>Road at Red Strand<br>Road at Galley Head<br>Portion of road between Rosscarbery and Reenascreena<br>Roads on both sides of Rosscarbery Bay<br>Road between Rosscarbery and Leap via Glandore<br>Road between Roury Bridge and Kilbeg<br>Roads from Kilfinnan to Cregg to Drombeg<br>Road between Leap and Skibbereen<br>Road between Castletownsend and Rinneen to Union Hall<br>Roads between Union Hall and Reen<br>Road between Castletownsend and Tragumna to Lough Hyne to Baltimore<br>Road between Pookeen and Rathmore<br>Roads at Baltimore<br>Road between Baltimore via Old Court and Skibbereen<br>Road between Skibbereen and Ballydehob<br>Road between Aghadown and Turk head<br>Roads near Bealaclara Bridge<br>Road Between Kissaclarig and Ballybane to Barnaghegeeha and Ardrah<br>Road between Ballydehob and Parkana<br>Road between Lahern and Coolconlaghta<br>Road between Ballydehob and Drishane Bridge<br>Road between Schull and Mount Gabriel<br>Road between Ballydehob and Schull<br>Roads at Rossbrin and Dereenatra<br>Road along Ballea Woods and the river, Carrigaline<br>Road between Schull and Colla<br>Road between Garrtvoe and Knockadoon<br>Road between Schull, Lowertown and Gurranes<br>Road along wooded stretch to Rochestown<br>Road From Schull via Derryleary to Toormore Goleen and Crookhaven<br>Road from Lissagriffin by Barleycove, to Brow Head<br>Road between Lissagriffin and Mizen Head<br>Road between Lissagriffin and Three Castle Head<br>Road between Dunmanus and Lisagriffin |

| Type of Designation | Location |
|---|---|
| | Winding road joining Coolea - Coom road to Lissacresig road<br>Road between Toormore and Durrus<br>Road from Bantry via Durrus and Ahakista to Kilcrohane<br>Road from Kilbrittain to the junction with Kinsale - Courtmacsherry Road<br>Roads around Cahermoutain and to Sheep's Head<br>Roads from Bantry via Gerahies to Kilcrohane<br>Road from Bantry, Snave, Ballylickey and Glengariff<br>Road from Glengarriff to Kenmare (County Bounds)<br>Road between Glengariff, Trafresk, Ardrigole and Castletownbere<br>Road from Ardrigole to and including Tim Healy Pass<br>Road between Castletownbere, Eyeries, Kilcatherine and Ardgroom<br>Road between Eyeries, Kilcatherine and Ardgroom<br>Road between Cahermore, Allihies and Eyeries<br>Road from Castletownbere via Cahermore to Garnish Point |

*Source: Cork County Development Plan 2003-2009*

### Table 6 Landscape Designations in County Limerick

| Type of Designation | Location |
|---|---|
| Landscape character areas | Slieve Felim Uplands<br>Shannon Integrated Coastal Management Zone<br>Western Hills/Barnagh Gap/Sugar Hill<br>Southern Uplands<br>Knockfierna Hill<br>Agricultural Lowlands<br>Ballyhoura /Slieve Reagh<br>Galtee Uplands<br>Lough Gur<br>Tory Hill |
| Views and Prospects | Shannon estuary from Foynes to Glin, this is incorporated into the Shannon Estuary Integrated Coastal Management Zone.<br>The Galty and Ballyhoura Mountains which has been incorporated into the Ballyhoura/Slieve Reagh and Galtee Uplands.<br>Sugar Hill, which has been incorporated into the Western Hills Landscape Character Area.<br>Clare Glens which now lie within the Agricultural Lowlands.<br>The route south of Ballylanders to the county boundary, which lies within the Ballyhoura Slieve Reagh Landscape Character Area.<br>Barnagh Gap which has been included in the Western Hills Landscape Character Area.<br>Lough Gur has been included as its own Landscape Character Area<br>Tory Hill has been included as its own Landscape Character Area. |

*Source: Limerick County Development Plan 200-2011*

### Table 7 Landscape Designations in South County Tipperary

| Type of Designation | Location |
|---|---|
| Protected Views | View towards the Rock of Cashel from Dundrum Road.<br>V003 View towards the Rock of Cashel from Ardmayle Road.<br>V004 View towards the Rock of Cashel from Boherlahan Road.<br>V005 View towards the Rock of Cashel from Dublin Road.<br>V006 View towards the Rock of Cashel from Dualla Road.<br>V007 View towards the Rock of Cashel from Clonmel Road.<br>V008 View towards the Rock of Cashel from Golden Road. |

| Type of Designation | Location |
|---|---|
| | V009 Views east on Pond Road over Marlfield Lake and south from Mountain View and north from Sandybanks.<br>V011 Views over River Suir Valley along Clonmel - Carrick-on-Suir road (N24)<br>V012 Views to Slievenamon along Clonmel – Kilkenny<br>Views to Slievenamon along Seskin - Killusty road (R706 )<br>V015 Views to Slievenamon along Cloneen - Mullinahone road (R692 )<br>V017 Views to Galtees along Cahir - Kilbehenny road (N8)<br>V018 Views to Galtees along Bansha - Lisvernane road (R663)<br>V020 Views to Galtees along Ballyglass - Newtown road (R664)<br>V021 Views west along Cahir - New Inn road (N8)<br>V026 Views south along Ardfinnan - Clogheen road (R665)<br>V029 Views along Clogheen - Mount Mellerary road (R668)<br>V034 Views along road from Tipperary Town - Bansha (N24)<br>V035 Views south to Knockmealdown Mountains from Kilcoran.<br>V036 Views in all directions from Ironmills to Milestone Road (R497).<br>V037 Views south to Comeragh foothills from Kilsheelan north to Slievenamon from Kilsheelan.<br>V039 Views south across the Suir to the Comeraghs from Ballingarrane.<br>V040 Views north to Slievenamon and south to the Comeraghs, east of Kilsheelan (N24).<br>V041 Excellent views to Slievenamon and the Comeraghs.<br>V043 Views south to the Galtees.<br>V044 Views south to the Galtees.<br>V046 War House Hill, views east and west.<br>V050 Views south to Slievenamon along R690.<br>V051 Superb views to the south along road R691.<br>*V052 Superb views to the west and south along road R691.*<br>V055 Views to the west between Glengoole and Ballysloe, along road R689.<br>V061 Views north at junction of N76 and R690.<br>V076 Views south along road R505 at Drehideenglashanatooha Bridge.<br>V077 Views to the south and south-east from Shronell Crossroads (R515).<br>V082 Views of the Comeragh Mountains looking south on the approach road (R688) from Cashel<br>V083 Views of the Comeragh Mountains looking south on the approach R689 from Fethard<br>V085 Views south over River Suir valley from Marlfield-Knocklofty road.<br>V086 View on the Cahir approach road to Clonmel looking southeast to lands north of Marlfield and west of the town.<br>V087 View over Clashawley River to the south from quay west of Watergate Street, Fethard.<br>V088 Views north-west and south-east from bridge at west end of Main Street, Fethard.<br>V090 Views to the south and to the west at the junction of Old Church Street and Market Street, Cahir.<br>V091 View to the west up Castle Street from The Square, Cahir.<br>V092 Views to the north and south from Bridge Street, Cahir. |

*Source: South County Tipperary Development Plan 2009-2015*

### Table 8 Landscape Designations in County Waterford

| Type of Designation | Location |
|---|---|
| Protected Views | The R666 heading west from the County border to Cappoquin<br>The R668 north from Lismore and R669 north from Cappoquin<br>Various third class routes heading north from R666 through the Comeragh Mountains<br>Third class route from the mouth of the Glendine River, crossing the River Bride and following the Blackwater North, turning west to Lismore.<br>From Youghal Bridge east along the N25 to Dungarvan.<br>North from Kinsalebeg to Clashmore on the R671, east at Clashmore along third class route to N25 at Gorteen. |

| Type of Designation | Location |
|---|---|
| | East from Gorteen along third class route via Monamhraher to the R674. East to Helvick (Heilbhic) Head, west to N25<br>Northwest from Dungarvan to Tooraneena on the R672. Thir dclass north to Ballymacarbry. Join R671 to Clonmel takin the R678 and turning south for third class route through the Comeraghs.<br>Third class route east off the R671 at Ballymacarbry along the banks of the Nire, joining with route<br>Third class route through the Monvullagh Mountains from the R672 to Lemybrien<br>Third class circular route off R672 to Kilgobnet.<br>R680 east from Clonmel to Carrick-on-Suir. Turn south onto third class route R678 or through Coolnamuck Wood onto R676<br>R676 south from Clonmel to Lemybrien. N25 south to the pike.<br>Circular route along third class road south to R675, crossing<br>N25 via Garrynageragh, east along R675 and north via Garranbaun and third class road returning to the Pike.<br>From Ballyvoyle Head east on the R675 to the junction with the R677.<br>Continuing south along the R675 to Bunmahon , east via Kilmurrin and Annestown and north-east to Fenor. East onto Tramore and north onto Wareford city.<br>South-east from Waterford City on the R683 to Mount Druid<br>South along the R684 TO Belle Lake and east on third class road via Woodstown to Waterford Harbour.<br>North to passage east along the harbour contiunuing with north towards Cheek Point South at junction to R683 and west to Waterford City. |

*Source: Waterford County Development Plan 2005-2011*

# APPENDIX to CHAPTER 6

# Other Plans, Programmes and Policies of Relevance to the SW RBD RBMP AND POM

**Table 1 Other Legislations, Plans, Policies and Programmes of Relevance – International**

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan? |
|---|---|---|---|---|
| **Cultural Heritage** | Convention for the Protection of the Archaeological Heritage of Europe (revised) (Valletta 1992) | Objective is to protect the archaeological heritage as a source of the European collective memory and as an instrument for historical and scientific study. | The impacts of the Plan on archaeological heritage are largely expected to be associated with site level impacts (e.g. change in hydrologic regime, construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to archaeological heritage could be emphasised in the Plan. | The requirement to carry out environmental impact assessment, including archaeological, architectural and cultural heritage assessments prior to implementation of specific items in the POM is aimed at addressing the objectives of this Convention. |
| | Convention for the Protection of the Architectural Heritage of Europe (Granada 1985) | Objectives seek to provide a basis for protection of architectural heritage and are a means for proclaiming conservation principles, including a definition of what is meant by architectural heritage, such as monuments, groups of buildings and sites. The Convention also seeks to define a European standard of protection for architectural heritage and to create legal obligations that the signatories undertake to implement. | The impacts of the Plan on architectural heritage are largely expected to be associated with site level impacts (e.g. change in hydrologic regime, construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to architectural heritage could be emphasised in the Plan. | See Above. |
| | The World Heritage Convention United Nations Convention Concerning the Protection of the World Cultural and Natural Heritage (Paris 1972) | Objectives seek to ensure the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage and ensure that effective and active measures are taken for these. | The impacts of the Plan on cultural and natural heritage are largely expected to be associated with site level impacts (e.g. change in hydrologic regime, construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to cultural and natural heritage could be emphasised in the Plan. | The requirement to carry out environmental impact assessment, including cultural and natural heritage assessments prior to implementation of specific items in the POM is aimed at addressing the objectives of this Convention. |
| **Environment / Pollution Prevention** | The MARPOL Convention International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78). | Objectives include for the protection of the marine environment. | The purpose of the Plan is to achieve good water quality status in all water bodies, including coastal water bodies, or maintain high quality or good status in those bodies currently achieving these. As such the Plan will aim to prevent pollution of the marine environment. | The POM, which is an integral part of the Plan, includes specific measures aimed at addressing pollution of the marine environment. It should be noted however that these measures are restricted to the one-nautical mile radius boundary identified in the Plan. |

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan? |
|---|---|---|---|---|
| **Human Health/Air** | World Health Organisation (WHO) Air Quality Guidelines (1999) and Guidelines for Europe (1987) | Objectives seek the elimination or minimisation of certain airborne pollutants for the protection of human health. | The impact of the Plan on air emissions is largely expected to be associated with site level impacts (e.g. transport and disposal of wastewater sludge, construction of new infrastructure).<br>The measures included in the Plan should aim to prevent such pollution and promote a scenario which minimises the emission of the pollutants specified under the guidelines. The favouring of measures in the Plan that generate lower concentrations of air emissions could be emphasised. | The requirement to carry out environmental impact assessment, including air impact assessment at both the project and construction level, prior to implementation of specific projects related to the POM is aimed at addressing the objectives of these Guidelines. |
| **Landscape** | The European Landscape Convention<br>(Council of Europe ETS No. 176) | Objectives are the protection, management and planning of European landscapes. | The impact of the Plan on landscapes is largely expected to be associated with site level impacts (e.g. construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to landscape could be emphasised in the Plan. | The requirement to carry out environmental impact assessment, including landscape assessments prior to implementation of specific items in the POM is aimed at addressing the objectives of this Convention. |

**Table 2 Review of Legislations, Plans, Policies and Programmes – European Union**

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan? |
|---|---|---|---|---|
| Air | The Air Framework Directive Directive on Air Quality Assessment and Management (Framework Directive) (1996/62/EC) | Objectives include the prevention and/or reduction of airborne pollutants for the protection of human health and environment. | The impacts of the Plan on air emissions are largely expected to be associated with site level impacts (e.g. transport and disposal of wastewater sludge, construction of new infrastructure). The Plan should aim to prevent such pollution and promote a scenario that would minimise the emission of the pollutants regulated under the Directive. The favouring of measures in the Plan that carry a lower risk of air emissions could be emphasised in the Plan. | See WHO Guidelines. |
| | Directive on National Emission Ceilings for Certain Atmospheric Pollutants (2001/81/EC) | Objectives seek to limit the national emissions of certain airborne pollutants for the protection of human health and the environment. | The Plan should aim to prevent such pollution and promote a water management scenario that would minimise the emission of the pollutants regulated under the Directive so as to ensure compliance in both jurisdictions. | See WHO Guidelines. |
| Biodiversity | The EU Biodiversity Strategy Communication on a European Community Biodiversity Strategy | Objectives seek to prevent and eliminate the causes of biodiversity loss and maintain and enhance current levels of biodiversity. | Although the principal impacts of the EU nature conservation strategy and its founding legislation (see below) will primarily be at a site level, the favouring of water infrastructure and management measures that carry a lower risk of damage to biodiversity could be emphasised in the Plan. It should be noted that the impacts of the Plan on biodiversity are largely expected to be positive. | See UN Convention on Biodiversity.<br>In addition, the requirement to carry out environmental impact assessment, including ecological impact assessment, prior to implementation of specific projects related to the POM is aimed at addressing the objectives of this Strategy. |
| Climate | Second European Climate Change Programme (ECCP II) 2005. | Objectives seek to develop the necessary elements of a strategy to implement the Kyoto protocol. | See UN Kyoto Protocol. | See UN Kyoto Protocol. |
| | Adapting to climate change in Europe – options for EU action {SEC (2007) 849} | Objective is to kick-start a Europe-wide public debate and consultation on how to take forward possible avenues for action in adapting to climate change at EU level. | Impacts related to climate change should be considered during development of the Programme of Measures for the Plan. | See UN Kyoto Protocol. |

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan? |
|---|---|---|---|---|
| Human Health | The EU Environment and Health Strategy 2004-2010 (first period) | Objectives seek to prevent and reduce the impacts of pollution on human health. | Elements of the Plan that could create direct and indirect health impacts should be included in the assessment. It should be noted that the impacts of the Plan on biodiversity are largely expected to be positive due to improvements in water quality. | The items in the POM aimed at reducing pollution discharges to water, including dangerous substances are, in part, aimed at reducing impacts to water quality, human health and the general environment.<br>In addition, the requirement to carry out environmental impact assessment, including assessment of air emissions, prior to implementation of specific projects related to the POM is aimed at addressing the objectives of this Strategy. |
| | Laying down the Health Conditions for the production and placement on the market of live bi-valve molluscs (91/492/EEC) | Objectives seek to ensure a suitable environment for shellfish growth and protect consumers of shellfish. It classifies shellfish harvesting areas according to the quality of shellfish populations. The classification determines the conditions under which shellfish harvested from those waters can be offered for sale. | Under the WFD, waters containing economically significant aquatic species are to be designated as protected and be addressed as part of the Plan. | The measures included in the POM are primarily aimed at improving and/or preserving water quality. The shellfish areas identified within the Register of Protected Areas are identified in the Plan and are subject to specific measures to protect their water quality. |
| Sustainable Development | EU Common Agricultural Policy | Aims to provide farmers with a reasonable standard of living, consumers with quality food at fair prices and to preserve rural heritage. | Elements of the Plan that could create direct and indirect impacts on agricultural land uses should be included in the assessment. | The mitigation measures required to fulfil SEA Objective 10 are aimed at addressing the objectives of this policy. |
| | The Gothenburg Strategy (2001) Communication from the Commission on “a Sustainable Europe for a Better World” | Objectives seek to make the future development of the EU more sustainable. Informs the 6th EAP and the Irish sustainable development strategy. | Elements of the Plan that could create direct and indirect impacts on land use should be included in the assessment. | The mitigation measures required to achieve each of the SEA Objectives are aimed at addressing the environmental objectives of this Strategy.<br>In addition, economic sustainability has been explored through the economic assessment of the individual aspects of the POM. |
| | The Sixth Environmental Action Programme (EAP) of the European Community 2002-2012 | Objectives seek to make the future development of the EU more sustainable. | Elements of the Plan that could create direct and indirect impacts on land use should be included in the assessment. | See Above. |

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan? |
|---|---|---|---|---|
| **Waste** | The Landfill Directive (99/31/EC) | The Landfill Directive sets targets to reduce landfilling of biodegradable municipal waste. | The impacts of the Plan with regard to landfilling of waste are largely expected to be associated with specific measures implemented at site level (e.g. farm slurry). Measures that do not require additional landfilling of biodegradable waste could be favoured in the Plan. | The mitigation measures aimed at reducing waste sent to landfill are aimed at achieving the objectives of this Directive. |

**Table 3 Preliminary Review of Legislations, Plans, Policies and Programmes – Ireland**

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan |
|---|---|---|---|---|
| Air | Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002) | Objectives include the reduction of certain airborne pollutants for the protection of human health and the environment. | See Air Framework Directive | See Air Framework Directive |
| | Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004). | Objectives include the reduction of certain airborne pollutants for the protection of human health and the environment. | See Air Framework Directive | See Air Framework Directive |
| | The Environmental Protection Agency Act 1992 (Ambient Air Quality Assessment and Management) Regulations 1999 | Objectives include the reduction of certain airborne pollutants for the protection of human health and the environment. | See Air Framework Directive | See Air Framework Directive |
| Biodiversity | Flora Protection Order 1999 | Objectives are to protect listed flora and their habitats from alteration, damage or interference in any way. This protection applies wherever the plants are found and is not confined to sites designated for nature conservation. | The Plan should aim to minimise impacts on listed flora and their habitats. However, impacts of the Plan on protected flora would be primarily at a site level (i.e. the location of a particular piece of infrastructure, etc.). The favouring of water infrastructure and management measures that carry a lower risk of damage to protected flora (i.e. through the appropriate siting of facilities) could be emphasised in the Plan. | The requirement to carry out environmental impact assessment, including assessment of ecological impacts, prior to implementation of specific projects related to the POM is aimed at addressing the objectives of this Order. |
| Climate | National Climate Change Strategy (2000) and National Climate Change Strategy 2007-2012 | Objectives include the reduction of national GHG emissions (including those from the water sector). The Plan should give regard to these objectives and targets for reductions in $CO_2$ equivalents from the water sector. | GHG emissions have the potential to be generated by some of the alternatives being considered as part of the SEA. Impacts associated with these need to be assessed. | See Kyoto Protocol. |
| Cultural Heritage | National Heritage Plan (2002) | Core objective is to protect Ireland's heritage. Plan uses the "polluter pays principle" and the "precautionary principle." Sets out archaeological policies and principles that should be applied by all bodies when undertaking a development. | The impacts of the Plan on cultural heritage are largely expected to be associated with site level impacts (e.g. change in hydrologic regime, construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to cultural heritage could be emphasised in the Plan. | The requirement to carry out environmental impact assessment, including archaeological, architectural and cultural heritage assessments prior to implementation of specific items in the POM is aimed at addressing the objectives of this Plan. |

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan |
|---|---|---|---|---|
| | The National Monuments Acts (1930 to 2004) | Objectives seek to protect monuments of national importance by virtue of the historical, architectural, traditional, artistic or archaeological interest attaching to them and includes the site of the monument, the means of access to it and any land required to preserve the monument from injury or to preserve its amenities. | The impacts of the Plan on national monuments are largely expected to be associated with site level impacts (e.g. change in hydrologic regime, construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to national monuments could be emphasised in the Plan. | The requirement to carry out environmental impact assessment, including archaeological, architectural and cultural heritage assessments prior to implementation of specific items in the POM is aimed at addressing the objectives of this Act. |
| | The Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999 | Provides for the establishment of a National Inventory of Architectural Heritage (NIAH). The objective of the NIAH is to aid in the protection and conservation of the built heritage, especially by advising planning authorities on the inclusion of particular structures in the Record of Protected Structures (RPS). | The impacts of the Plan on structures listed on the NIAH are largely expected to be associated with site level impacts (e.g. change in hydrologic regime, construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to listed structures could be emphasised in the Plan. | The requirement to carry out environmental impact assessment, including archaeological, architectural and cultural heritage assessments prior to implementation of specific items in the POM is aimed at addressing the objectives of this Act. |
| | Framework and Principles for the Protection of the Archaeological Heritage (1999) | Objective is to set out for all concerned parties the basic principles and approaches for the protection of the archaeological heritage. | The impacts of the Plan on archaeological heritage are largely expected to be associated with site level impacts (e.g. change in hydrologic regime, construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to archaeological heritage could be emphasised in the Plan. | The requirement to carry out environmental impact assessment, including archaeological, architectural and cultural heritage assessments prior to implementation of specific items in the POM is aimed at addressing the objectives of this Framework. |
| | Policy and Guidelines on Archaeological Excavation (1999) | Objective is to set down policy on licensing of excavations, and guidelines for licensees on strategies and method statements, reports and publications. | The impacts of the Plan on archaeological heritage are largely expected to be associated with site level impacts (e.g. change in hydrologic regime, construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to archaeological heritage could be emphasised in the Plan. | The requirement to carry out environmental impact assessment, including archaeological, architectural and cultural heritage assessments prior to implementation of specific items in the POM is aimed at addressing the objectives of these Guidelines. |

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan |
|---|---|---|---|---|
| | Architectural Heritage Protection – Guidelines for Planning Authorities | Objective is to provide a practical guide for planning authorities and for all others who must comply with Part IV of the Planning and Development Act 2000 on the protection of the architectural heritage and support the effort of protecting Ireland's architectural heritage. | The impacts of the Plan on architectural heritage are largely expected to be associated with site level impacts (e.g. change in hydrologic regime, construction of new infrastructure). The favouring of sites and measures that carry a lower risk of impacts to architectural heritage could be emphasised in the Plan. | The requirement to carry out environmental impact assessment, including archaeological, architectural and cultural heritage assessments prior to implementation of specific items in the POM is aimed at addressing the objectives of these Guidelines. |
| **Energy** | White Paper on Sustainable Energy (2007) | Objectives include the increased utilisation and development of renewable energies to meet EU targets. | Increased energy usage has the potential to occur with some of the alternatives being considered as part of the SEA. Impacts associated with these need to be assessed. | The mitigation measures aimed at addressing SEA Objective 7 are aimed at either reducing the amount of energy consumed or encouraging use of renewable energy sources. This would fulfil the objectives of this White Paper. |
| **Sustainable Development** | Sustainable Development: A Strategy for Ireland (1997) (DoEHLG) | Objectives are to ensure that future development in Ireland occurs in a sustainable manner. | This is informed primarily by the EU Gothenburg strategy. | See EU Gothenburg Strategy. |
| | The Protection of the Environment Act 2003 | Objectives include for better protection of the environment and the control of pollution through improved licensing and monitoring. | See above. | See Above. |
| **Water** | Arterial Drainage Acts, 1945 and 1995 | Deals with the improvement of lands by drainage and the preventing or sustainably reducing the flooding of lands. Sets up the process of Arterial Drainage Schemes and provides for the maintenance of these works. Also implements a number of drainage and flood reduction related measures such as approval procedures for bridges and weirs, and iterates reporting requirements for Drainage Districts. | The Plan should not result in an increase in flood events or negatively impact upon existing drainage schemes. | The mitigation measures required to achieve SEA Objective 8 are aimed at achieving the objectives of these Acts. |

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan |
|---|---|---|---|---|
| Material Assets | The Fisheries Acts 1959 to 1997 | Amends and extends the laws relating to fisheries, to prohibit persons from engaging in aquaculture except with and in accordance with a licence, to establish a procedure for the granting, renewal, amendment and revocation of licences, to allow for appeals against decisions relating to licences and for connected purposes. | Under the WFD, waters containing economically significant aquatic species are to be designated as protected and be addressed as part of the Plan. | The measures included in the POM are primarily aimed at improving and/or preserving water quality. The aquaculture areas identified within the Register of Protected Areas are identified in the Plan and are subject to specific measures to protect their water quality. |
| | The Harbours Act 1946 | An Act to make further and better provision in relation to the membership of certain harbour authorities and to the management, control, operation and development of their harbours, to provide for the charging of rates by such harbour authorities, to make certain provisions in relation to pilotage authorities and to provide for other matters connected with the matters aforesaid. | Under the WFD, the economic value of waters, including for recreation, navigation and transport, is considered. | The Plan includes measures related to maintaining and improving the quality of coastal water bodies as well as those determined to be 'Heavily Modified' under the WFD criteria. |
| | The Foreshore Acts 1933 to 2005 | The Foreshore Acts require that a lease or licence must be obtained from the Minister for Agriculture, Fisheries and Food for undertaking any works or placing structures or material on, or for the occupation of or removal of material from, State-owned foreshore which represents the greater part of the foreshore. The foreshore is the seabed and shore below the line of high water of ordinary or medium tides and extends outwards to the limit of twelve nautical miles (approximately 22.24 kilometres). | The impacts of the erection of long-term structures (e.g. piers, marinas, bridges, roads, carparks) and granting of licences for other works (e.g. laying of submarine pipelines and cables) and purposes (e.g. aquaculture) will primarily be at a site level. However, these types of activities will need to take cognisance of the provisions of the Plan and its POM prior to implementation. | The requirement for certain developments on State-owned foreshore to be subject to EIA would ensure that the provisions of the Plan are considered. |

| Topic | Title | Summary of Objectives | Links to Plan | Where are these Objectives addressed in the Plan |
|---|---|---|---|---|
| Waste | The Waste Management Act 1996 and amendments | Objectives include (amongst others) the more effective and environmentally sensitive management of wastes in Ireland.j | The impacts of the Plan with regard to waste are largely expected to be associated with two issues: 1) the siting of new waste infrastructure and its impacts on water quality; and 2) the implementation of measures in the Plan that require alternate disposal methods for wastewater sludge or agricultural waste.<br>The siting of new waste infrastructure that carries a lower risk of damage to water resources could be emphasised in the Plan. Also, new sludge and agricultural waste management measures included in the Plan should take account of the requirements of the Waste Management Act. | Some of the projects required pursuant to implementation of the POM for the Plan may require EIA under the provisions of the EIA Directive. |
| | European Communities (Port Reception Facilities for Ship Generated Waste and Cargo Residues) Regulations 2003 (SI 117 of 2003) | Objective is to reduce the discharges of ship-generated waste and cargo residues into the sea, especially illegal discharges, from ships using ports in the Community, by improving the availability and use of port reception facilities for ship-generated waste and cargo residues, thereby enhancing the protection of the marine environment. | The purpose of the Plan is to achieve good water quality status in all water bodies, including coastal water bodies, or maintain high quality or good status in those bodies currently achieving these. As such the Plan will aim to prevent pollution of the marine environment. | See Marpol Convention. |
| | Dumping at Sea Act, 1996 | Make provision to control dumping at sea, to give effect to the convention for the protection of the marine environment of the north-east Atlantic done at Paris on the 22nd day of September, 1992. | See Ospar Convention. | See Ospar Convention. |

# APPENDIX to CHAPTER 8

# Additional Measures considered in the Northern Ireland and Ireland Plan Processes

**Table 1 Additional Measures for Point and Diffuse Sources: Wastewater (Ire) / Urban Development (NI) / Collection And Treatment of Sewage (NI)**

| SEA Number | Comparable measures under consideration in NI and Ire |
|---|---|
| WW10 | Install secondary treatment at plants where this is not required under the urban wastewater treatment directive. (Ire) |
| WW11, 12 and 13 | Apply a higher standard of treatment (stricter emission controls), upgrade the plant to remove specific substances known to impact on water quality status, or install ultra-violet or similar type treatment (Ire). |
| WW9 | Review the environmental investment required after 2015, prioritise environmental problems and develop indicative lists (NI) |
| UP10 | Identify areas where there are potential constraints on development and address these e.g. identify whether there is capacity in the water bodies in terms of further development and categorise them as red, amber or green (NI) |
| WW2 | Impose development controls where there is, or is likely to be in the future, insufficient capacity at treatment plants (Ire). |
| UB 1 | Development of the Draft Strategy 'Managing Stormwater' (NI) |
| WW1 | Introduce measures intended to reduce loading to the treatment plant (Ire). |
| UB6 | Urban asset management plans should include surveys, mapping, and research; codes of best practice or legislation (e.g. in relation to SuDS); groundwater quality monitoring; improved infrastructure; and planning. (Ire) |
| | **Measures under consideration in Northern Ireland** |
| UB2 | Manage misconnections through development of a strategy that considers and develops best practice throughout UK, public information awareness, identification of water quality problems caused by misconnections and develop working relationships to resolve the issue. |
| UB5 | Development of an extended regulatory tool kit |
| UB7 | Development of a 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. |
| UB8 | Promote and adopt good practice with respect to storage, use and disposal of hazardous chemicals. |
| WW8 | Review consent conditions to ensure adequate controls and emission limits are set to achieve new water quality standards in receiving waters. Further development of mathematical models to examine cumulative impacts of discharges at a catchment scale. Detailed analysis to support the review of the consents for sewer systems and to address the volume spilt from overflows in urban areas. |
| UP9 | Consideration of grants to improve private sewage discharges and support sustainable development. |
| UP4 | Change current policy and guidance to improve existing controls and modify development control and enforcement practices to reflect restrictions if required. |
| UP7 | Following mapping and assessment of the receiving water vulnerability to loading from existing on-site systems, alternate treatment options such as providing main sewers or tank maintenance programmes may be investigated in priority areas. |
| WW7 / UP5 | Support removal of phosphates from domestic detergents to reduce nutrient loading entering the water environment. |
| | **Measures under consideration in Ireland** |
| WW4 | Initiate research into treated wastewater characteristics to verify risk assessments and determine the impact of discharges. |
| WW5 | Use decision-making tools in point source discharge management. |
| WW14 | Relocate the point of discharge. |

**Table 2 Additional Measures for Point and Diffuse Sources: Wastewater from Unsewered Properties (Ire) / Collection And Treatment of Sewage (NI)**

| SEA number | Comparable measures under consideration in NI and Ire |
|---|---|
| UP2 | Assess applications for new unsewered systems by applying risk mapping/decision support systems and codes of practice (Ire). |
| UP9 | Enforce requirements for percolation and de-sludging (Ire). |
| UP4 | Change current policy and guidance to improve existing controls on septic tanks and modify development control and enforcement practices to reflect restrictions if required (NI). |
| UP6 | Carry out an inspection programme in prioritised locations for existing systems and record results in an action tracking system (Ire). |
| UP11 | Consider connection to municipal systems (Ire). |
| UP7 | Following mapping and assessment of the receiving water vulnerability to loading from existing on-site systems, alternate treatment options such as providing main sewers or tank maintenance programmes may be investigated in priority areas (NI). |
| | **Measures under consideration in Northern Ireland** |
| UP9 | Consideration of grants to improve private sewage discharges and support sustainable development. |
| UP10 | Identify areas where there are potential constraints on development and address these e.g. identify whether there is capacity in the water bodies in terms of further development and categorise them as red, amber or green |
| WW7 / UP5 | Support removal of phosphates from domestic detergents to reduce nutrient loading entering the water environment. |
| | **Measures under consideration in Ireland** |
| UP1 | Amend Building Regulations and codes of practice. |
| UP3 | Establish certified expert panels for site investigation and certification of installed systems. |

**Table 3 Additional Measures for Point and Diffuse Sources:: Industrial Discharges (ROI) / Industry and other businesses (NI)**

| SEA Number | Comparable measures under consideration in NI and ROI |
|---|---|
| IND1<br>IND6 | Introduce codes of practice for potentially polluting activities and consideration of a system of General Binding Rules (NI)<br>Introduce Best Available Techniques (BAT) for industrial discharges (Ire) |
| | **Measures under consideration in Northern Ireland** |
| IND1 | Implement management controls as they become available, e.g. new or improved guidance, new or revised legislation or regulations, codes of practice |
| IND2 | Develop oil storage regulations to reduce pollution impacts |
| IND3 | Achieve compliance with discharge consent / licence standards to reduce inputs at source |
| IND4 | Compile an inventory of management best practice and reduction in peat usage |
| IND5 | Further research into diffuse pollution modelling |
| IND7 | Improve point source discharge controls after examination of the cumulative impact of discharge consents at a catchment scale |
| | **Measures under consideration in Ireland** |
| IND8 | Relocate discharge point |

**Table 4 Additional Measures for Point and Diffuse Sources: Other Point Sources (landfills, quarries, mines & contaminated lands)* (ROI)**
*** For Northern Ireland these sectors are considered in the RBPs under 'Industry and Other Businesses' and 'Waste' key sectors.**

| SEA Number | Measures under consideration in Northern Ireland |
|---|---|
| OP1 | Implement management controls as they become available, e.g. new or improved guidance, new or revised legislation or regulations, codes of practice. |
| OP2 | Reduce pollution arising from waste management, e.g. use of Site Waste Management Plans, proper disposal of construction, demolition and electrical wastes, segregated collection |
| OP3 | Introduce a Quality Protocol for the production of aggregates from inert waste to prevent water pollution from contaminated material |
| OP4 | Reduce illegal disposal of waste |
| | **Measures under consideration in Ireland** |
| OP5 | Undertake remediation projects for prioritised landfills, quarries, mines and contaminated lands, e.g. pollution containment measures and monitoring requirements. |

**Table 5 Additional Measures for Point and Diffuse Sources: Dangerous Substances & Chemical Pollution (ROI)**

**For Northern Ireland this issue is considered within the other key sectors under pollution**

| SEA Number | Measures under consideration in Ireland |
|---|---|
| DS2 / DS3 | Review of wastewater and industrial licences to identify measures for control of point and diffuse sources through use of pollution reduction programmes. |
| DS4 | Reduce discharges, losses and emissions from diffuse sources |
| DS5 | Upgrade treatment to remove substances from effluent |
| DS6 | Relocate discharge point |

**Table 6 Additional Measures for Point and Diffuse Sources: Agriculture (Ire and NI)**

| SEA Number | Comparable measures under consideration in NI and Ire |
|---|---|
| AG13 | Treatment of nutrient surplus by digestors. (Ire) |
| AG10 | Examine commercial/technical proposals that have the potential to bring about a significant reduction in the phosphorus surplus, e.g incinerator/digestor (NI) |
| AG8 | Increase participation in rural environmental protection schemes / other agri-environment schemes particularly in priority catchments (Ire) and focus advice and regulatory action in areas where there is a lower uptake in agri-environment schemes (NI) |
| | **Measures under consideration in Northern Ireland** |
| AG2 | Adoption of best management practices including using feedstuffs designed to minimise phosphorus in excreta without compromising animal health |
| AG11 | Phosphorus balances on individual holdings to be introduced on a phased basis |
| AG7 | Identification of regions where particular types of diffuse pollution problems are most severe |
| | **Measures under consideration in Ireland** |
| AG1 / AG3 / AG4 / AG5/ AG6 | Reduce pressures by; creation of buffer strips around water bodies to prevent pollutant loss; installation of fencing to prevent livestock access to watercourses; reduction of agricultural intensity, e.g. lower stocking density on land; requiring nutrient management planning or set aside of agricultural lands. |
| AG9 | Upgrade farm management systems. |
| AG12 | Removal of nutrient surplus by tanker. |

**Table 7 Additional Measures for Point and Diffuse Sources: Forestry (Ire and NI)**

| SEA Number | Comparable measures under consideration in NI and Ire |
|---|---|
| F1 | Implement management controls e.g. new or improved guidance, legislation, regulations or codes of practice (Ire/NI) |
| F5 / F6 / F7 / F8 / F16 / F17 | To manage eutrophication and sedimentation pressures; avoid or limit forest cover on peat sites; change the tree species mix on replanting; limit felling coup size; establish new forest structures on older plantation sites (including riparian zones, drainage layouts, species mix, open areas). Establish riparian zone management prior to clearfelling. Enhance sediment control. (Ire)<br><br>Establish riparian buffer zones in advance of harvesting, managing the size of the coupe (crop) area to be felled to limit nutrient inout, managing drainage systems and establishing sediment control systems such as ponds or diffuse overland flow. (NI)<br><br>Introduce more stringent actions for the most sensitive areas, when scientific evaluation establishes a need e.g. reduce nutrient loading by the phased felling (NI) |
| | **Measures under consideration in Northern Ireland** |
| F1 | Development of maps indicating where forests should be developed taking account of sensitive and protected areas |
| F1 | Ensure future forest development has a minimal impact on water quality especially in environmentally sensitive areas, with a need to limit nutrient and sediment losses and acidification |
| F20 | Operations posing a significant threat to water quality assessed on a whole catchment basis |
| | **Measures under consideration in Ireland** |
| F2 / F3 / F4 / F13 / F14 / F15 | Avoid or limit afforestation on 1st and 2nd order stream catchments in acid sensitive catchments. Restructure existing forests to include open space and structural diversity through age classes and species mix. Revise the Acidification Protocol to ensure actual minimum alkalinities are detected and revise boundary conditions for afforestation in acid sensitive areas. Mitigate acid impacts symptomatically using basic material (e.g. limestone or sand liming). Manage catchment drainage to increase residence times and soil wetting, including no drainage installation in some areas. Implement measures to increase stream production – for example with native woodland in riparian zones. |
| F9 / F18 | Audit existing drainage networks and enhance drainage network management – minimise drainage in peat soils. |
| F10 / F11 / F12 / F19 | To manage pesticide use; maintain registers of pesticide use; reduce pesticide usage; pre-dip trees in nurseries prior to planting out and develop biological control methods. |

**Table 8 Additional Measures for Physical Modifications (Ire) / Freshwater / Marine Morphology (NI)**

| SEA Number | Comparable measures under consideration in NI and Ire |
|---|---|
| PM1 | Implement management controls as they become available e.g. new or improved guidance, legislation, regulations, codes of practice. (Ire/NI) |
| PM8 / PM9 | Investigate significant barriers to fish movement and introduce impassable barriers remediation schemes. (Ire/NI) |
| PM7 | Over-grazing remediation (Ire), such as stabilisation of river banks (NI) |
| PM5 / PM6 | Channelisation investigation (Ire) and impact remediation schemes (Ire/NI), such as re-meandering of straightened channels, reconstruction of pools, substrate enhancement, removal of hard bank reinforcement/revetment or replacement with soft engineering solutions |
| | **Measures under consideration in Northern Ireland** |
| PM3 | Complete further surveys on all water bodies following review of morphology classification results |
| PM4 | Carry out SEA of tidal energy reserves |
| | **Measures under consideration in Ireland** |
| PM2 | Support voluntary initiatives, such as wetlands and Integrated Coastal Zone Management schemes |

**Table 9 Additional Measures for Abstractions (Ire) / Abstraction and flow regulation (NI)**

| | **Measures under consideration in Northern Ireland** |
|---|---|
| AB5 | Assess compliance of monitored abstractions and compensation flows with licence conditions |
| AB3 | Address data limitations and additional monitoring needs, e.g. monitor abstraction and compensation flows, assess ecology impacts associated with hydrologic changes |
| AB1 | Assess water resource availability and target management priorities |
| PM9 | Develop tool for assessing the extent to which barriers impede migration of a wide range of species |
| | **Measures under consideration in Ireland** |
| AB1 / AB2 / AB7 / AB9 | Manage water demand through measures such as: implementing water conservation programmes, supporting voluntary initiatives such as water conservation and rainwater harvesting schemes, reducing leakage and unaccounted for water in distribution systems and establishing water metering and water charging programmes for residential users |
| AB14 | Direct development to areas where capacity exists and restrict development if abstraction already at capacity |
| AB10 | Reduce abstraction demand, e.g. reduce leakage and unaccounted water, modify plumbing codes to support conservation, daily metering of abstracted volumes, implement small schemes with smaller demand |
| AB8 | Increase the water available in the catchment through: promoting reduction and/or infiltration of runoff (for example sustainable drainage schemes—SuDS); reuse of grey water or treated wastewater effluent |
| AB4 | Examine compensation flow requirements on regulated rives and maintain minimum flow or flow variability, where applicable |
| AB6 | Develop water budgets |
| AB11 / AB12 / AB13 | Implement schemes in priority areas including considering reducing current abstractions by; altered abstraction timing, conjunctive use, additional storage |
| AB8 | Consider alternative sources |

# APPENDIX TO CHAPTER 9

# Assessment

It should be noted that in the following assessments the term Appropriate Assessment refers to the assessment process as specified in Article 6 of the Habitats Directive. This starts with screening to determine whether a likely significant impact from the plan/programme is expected to occur to a Natura 2000/Ramsar site as a result of activities in/adjacent to/in the catchment of a Natura 2000/Ramsar site. If, in accordance with AA guidance (guidance produced by the EU, DEHLG in Ireland, and NIEA in Northern Ireland), it can be shown that there is no potential for impact at the screening stage, no further assessment may be required. However when the plan/programme being screening lies within or adjacent to a Natura 2000/Ramsar site then such a determination must be made in consultation with NPWS/NIEA. If the plan/programme is within the catchment (surface and groundwater) of a Natura 2000/Ramsar site, such consultation with NPWS/NIEA is only necessary for those water dependent Natura 2000 sites which are listed in the WFD Register of Protected Areas.

**Assessment: Wastewater (NI: Collection and Treatment of Sewage / Urban Development)**

| | WW1 | WW2 | WW6 | WW7 | WW10 | WW11 | WW12 | WW13 | WW14 | WW16 | Cumulative Impact |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Objective 1 (BFF)** | +/- | + | + | +/- | +/- | +/- | +/- | +/- | +/- | +/- | +/- |
| **Objective 2 (P)** | + | + | + | + | + | + | + | + | + | + | + |
| **Objective 3 (HH)** | + | + | + | + | + | + | + | + | + | +/- | + |
| **Objective 4 (S)** | +/- | + | + | + | +/- | +/- | +/- | +/- | + | + | +/- |
| **Objective 5 (W)** | +/- | + | + | + | + | + | + | + | + | + | + |
| **Objective 6 (AQ)** | +/- | 0 | + | 0 | + | + | + | + | 0 | +/- | + |
| **Objective 7 (CC)** | +/- | 0 | + | 0 | - | - | - | - | 0 | +/- | - |
| **Objective 8 (MA1)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Objective 9 (MA2)** | + | + | + | + | + | + | + | + | + | + | + |
| **Objective10 (MA3)** | +/- | +/- | + | +/- | +/- | +/- | +/- | +/- | +/- | + | +/- |
| **Objective11 (MA4)** | + | + | + | + | + | + | + | + | + | + | + |
| **Objective 12 (CH)** | 0/- | - | 0 | 0 | 0/- | 0/- | 0/- | 0/- | 0/- | 0/- | 0/- |
| **Objective 13 (L)** | 0/- | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0/- | 0 |

***Key**: BFF – Biodiversity, Flora and Fauna; AQ – Air Quality; W – Water; C – Climate; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

*See **Table 8.3** for further details on the contents of these alternatives*

**Discussion of Assessment**

WW1 relates to reducing loading on WWTP / WWTW by concentrating on inputs. This will have direct positive impacts for wastewater treatment plants / works by improving capacity and efficiency in existing plants. This alternative will have consequent indirect positive impacts on water, biodiversity, soils and human health by reducing pressure on the current infrastructure. However, limiting disposal of liquid wastes, landfill leachate, sludges, etc. to WWTP / WWTW will require alternative disposal. This may include options such as incineration, which would have potential indirect negative impacts for water and biodiversity (cooling waters), air quality and climate (energy use) as well as biodiversity, soils, cultural heritage and landscape where new facilities are required. Direct negative impacts will be experienced by operators producing polluting matter as use of alternative disposal methods or a shift in the quantity or quality of the matter produced will require additional costs to implement. Other options include recycling of sludge to agriculture for use as fertiliser, but this may impact negatively on soil quality as a result of increased

levels of contaminants in the soils. This also has the potential to reduce the quantity of mineral fertiliser used (and therefore the energy required to produce and emissions generated to import it) which will have indirect positive impacts for air quality and climate. The use of under-sink disintegrators in Ireland and Northern Ireland is limited to date compared to other countries such as the United States. Ireland and Northern Ireland have tended to favour a more European model based on composting; however, as people become more aware of other options this is a pressure that may grow in the future. Discouraging the increase of organic wastes from this source will reduce the load entering these facilities, allowing more efficient use of the system and reducing the potential for odours. Fats, Oils and Greases (FOG) also have the potential to negatively impact on the operation of existing plants causing scum build-up and blockages, creating odour nuisance and increasing the Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) of wastewater. Reducing inputs of FOG will improve existing infrastructure efficiency, which will have direct positive impacts for existing WWTP / WWTW and indirect positive impacts generally for the environment. The Appropriate Assessment has concluded that reducing nutrient loads will improve water quality and reduce the impacts of eutrophication. Elevated levels of nutrients can give rise to unnatural levels of food supply for certain bird species; reduced nutrient loads may lead to a situation where the composition of the flora and fauna may return to a more natural and sustainable level. This alternative has the potential for medium to long-term impacts, as further investigations will be required to implement specific measures.

WW2 focuses on sustainable planning practices which ensure that adequate wastewater treatment is available before giving planning permission for future development. This alternative will have direct positive impacts for population by ensuring sustainable development. It will also have indirect positive impacts for water quality, biodiversity, soil and human health through reduced intensity of development in areas with insufficient capacity. Potential direct negative impacts are likely for economic resources attempting to locate or expand in areas with insufficient capacity. However, indirect positive benefits would also be expected for existing economic activities that may be currently impacted by poor water quality, e.g. tourism, and which will benefit from improved water quality. Limiting development in areas currently over capacity will have a positive impact on existing WWTP / WWTW by reducing the cumulative ongoing pressure. Potential indirect negative impacts are likely in relation to cultural heritage if traditional industries are curtailed due to insufficient capacity in particular areas. The Appropriate Assessment has concluded that WW2 will have an overall positive affect if whole catchment loadings are considered as part of the planning process. This alternative could have effect from the short-term onward if controls are imposed on planning applications from the date of plan adoption.

As with similar alternatives for other key pressures, education campaigns in WW6 will have an overall positive impact on the environment by raising awareness of the issues and providing opportunities for individuals and businesses to become part of the solution. Prevention of pollution or limiting the amount of pollutants entering wasterwater treatment facilities will have direct positive impacts for wastewater infrastructure and indirect positive impacts on the environment generally, and may reduce expenditure on pollution clean up and treatment. No negative impacts are anticipated. Impacts from this alternative can be effective in the short-term and beyond as education will be the building block for all the measures that follow.

WW7 will also have an overall positive impact on the environment by providing a simple and straightforward alternative in which individuals and businesses can take part. As with any change in product use there may be cost implications to individuals; however, this alternative would be expected to have a direct positive impact on wastewater treatment facilities by reducing phosphorous at source, thereby improving efficiency of treatment. This in turn will have indirect positive impacts for water and biodiversity by decreasing eutrophication, and returning surface and groundwaters to a more natural state. Reducing the levels of phosphorous entering waterbodies will reduce weed and aquatic plant growth, as well as reducing the risk of potential toxicity to fish and other aquatic life. It will increase dissolved oxygen in the waterbody to the positive benefit of the natural system. The Appropriate Assessment has concluded that this alternative will have positive impact in terms of EU protected habitats and

species and that where elevated levels of nutrients have resulted in un-naturally high levels of food for certain bird species, reduced nutrient loads may lead to a situation where the composition of the flora and fauna will return to a more natural and sustainable level.. Further indirect positive impacts are anticipated for soils and human health, as less phosphorus will be released to surface and groundwaters.

WW10, WW11, WW12 and WW13 all relate to secondary and tertiary treatment options. Increasing the level of treatment will have direct positive impacts on material assets by providing for upgrades to existing water management infrastructure. The alternative will have indirect positive impacts for water quality, biodiversity, soils and human health by improving the quality of the effluent leaving the facility. Reducing the nutrient load entering waterbodies will reduce weed and aquatic plant growth, as well as reducing the risk of potential toxicity to fish and other aquatic life. It will increase dissolved oxygen in the waterbody to the positive benefit of the natural system. The Appropriate Assessment has concluded that reduced nutrient loads may improve water quality and reduce the impacts of eutrophication, with a higher standard of treatment particularly important for protected areas with more stringent objectives, e.g. freshwater pearl mussels or hard water lakes. The removal of elevated levels of nutrients currently providing an unnatural level of food supply for certain bird species, may cause the composition of flora and fauna to return to a more natural and sustainable level. Altering nutrient load from treatment plants may therefore indirectly impact on biodiversity by altering the existing food web dynamics of the receiving environment. Upgrade of existing plants and provision of UV treatment will contribute to sustainable development by ensuring adequate water and wastewater infrastructure and will also have indirect positive impacts by protecting the economic water resource as well as those sectors dependent on it. In particular, this alternative will have indirect positive impacts for designated bathing and shellfish waters. Potential negative impacts are possible if additional landtake is required for existing plant upgrades or provision of new plants. This could result in indirect negative impacts on biodiversity, soils, and cultural heritage, if sited inappropriately. Additional costs are also likely to upgrade systems to secondary and tertiary treatment. In all cases additional energy may be required, with a potential negative impact on climate through emission of $CO_2$. Impacts from these alternatives are likely to be delivered in the medium to long-tern horizon, as planning permissions may be required.

Relocation of discharge points in alternative WW14 will have direct positive impacts on water quality and aquatic biodiversity by ensuring discharges are directed to waterbodies with sufficient carrying / dilution capacity to reduce negative impacts on the water environment. There will be an overall improvement to the quality of aquatic biodiversity, flora and fauna if relocated away from sensitive/protected habitats and species. Indirect negative impacts are possible if the point of discharge is relocated without consideration of terrestrial habitats and species or cultural heritage. The Appropriate Assessment has recommended that implementation of this alternative should be prioritised in catchments containing sensitive/protected areas. WW14 will also have potentially positive direct impacts on wastewater treatment infrastructure by improving its overall function and also indirect positive impacts on economic activities such as tourism and angling, which are dependant on good water quality.

The use of community digestors in alternative WW16 to dispose of sludges would result in a direct positive impact to soils and an indirect positive impact to water quality, aquatic biodiversity and human health, due to the reduction in need to dispose of sludges using alternate methods, e.g. landspreading. The use of digestors to treat sludges would produce methane ($CH_4$), a GHG, thereby resulting in negative impacts to climate. However, this could be offset by capturing methane for re-use as fuel as suggested in the proposed alternative. After treatment the remaining digestate will require disposal, with associated negative impacts to air quality resulting from transport. If additional landfill capacity is required to dispose of this waste, potential indirect negative impacts to biodiversity, cultural heritage and landscape could occur if the additional landfill facilities are sited inappropriately. Incineration is also possible and this would have indirect negative impacts on air quality and climate as well as potential human health issues. In addition, construction of the digestors could result in indirect impacts to biodiversity and cultural heritage, if they are sited in sensitive locations. An Appropriate Assessment would be required for any new infrastructure to determine if there would be potential impacts on

EU designated sites. WW16 will also have potentially positive direct impacts on wastewater treatment infrastructure by improving its overall function and also indirect positive impacts on economic activities such as tourism and angling, which are dependant on good water quality.

**Cumulative Impact**

Negative cumulative impact was registered for climate in relation to the wastewater alternatives. While additional levels of treatment will undoubtedly improve water quality and contribute significantly to sustainable development in the RBD, there will be increased energy costs associated with treating more wastewater to a higher standard. This energy will potentially give rise to GHG emissions, which will contribute to climate change. This cumulative impact could be mitigated by a commitment to source additional energy requirements from renewable sources. This will be dependent on availability of renewable energy sources. Cultural heritage has also been recorded as negative / neutral based on possible impacts associated with new or relocated infrastructure. Consideration of the wider environment prior to siting new infrastructure will greatly reduce this potential cumulative impact.

**Mitigation**

**WW1** should be accompanied by an education and awareness campaign for householders and commercial premises dealing with under-sink disintegration and FOG.

**WW1** will require project level Appropriate Assessment if alternative facilities for treatment of waste are constructed e.g. incinerator.

**WW2** will need to link to the development planning process, e.g. by including a requirement to address watewater capacity as part of the scope in any accompanying SEA for development plans.

**WW2** will need to consider whole catchment loading.

**WW10, WW11, WW12 and WW13:** Negative impacts on climate associated with GHG emissions related to additional energy requirements for WW10, WW11, WW12 and WW13 should be offset by use of renewable energy sources or similar.

**WW10 / WW11/ WW12**: If these alternatives involve the building of a new plant or an extension to an existing plant an Appropriate Assessment will be required. Prior to any proposals for a new plant, further investigation will be required to show that a new plant will have the desired improvements in water quality for which it is being built.

**WW10/ WW11/ WW12/ WW16:** If additional landtake is required for these alternatives, environmental studies will be undertaken to assess the impact on the environment.

**WW14:** An Appropriate Assessment will be required for WW14 to demonstrate that the relocation will not negatively impact on protected areas.

**WW16:** An Appropriate Assessment will be required for WW16 to demonstrate that any new infrastructure will not negatively impact on protected areas.

**Assessment: Industrial Discharges (NI: Industry and Other Businesses)**

| | IND2 | IND3 | IND4 | IND6 | IND7 | IND8 | Cumulative Impact |
|---|---|---|---|---|---|---|---|
| **Objective 1 (BFF)** | + | + | + | + | + | + / - | + |
| **Objective 2 (P)** | + | + | 0 | + | + | + | + |
| **Objective 3 (HH)** | + | + | + | + | + | + | + |
| **Objective 4 (S)** | + | + | + | + | + | + | + |
| **Objective 5 (W)** | + | + | + | + | + | + | + |
| **Objective 6 (AQ)** | 0 | 0 | +/- | + / - | 0 | 0 | - |
| **Objective 7 (C)** | 0 | 0 | +/- | + / - | 0 | 0 | - |
| **Objective 8 (MA1)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Objective 9 (MA2)** | 0 | 0 | 0 | + | + | + | + |
| **Objective10 (MA3)** | + / - | + / - | - | + / - | + / - | + / - | + / - |
| **Objective11 (MA4)** | + | + | + | + | + | + | + |
| **Objective 12 (CH)** | 0 | 0 | +/- | 0 | 0 | - | - |
| **Objective 13 (L)** | 0 | 0 | + | 0 | 0 | 0 | 0 |

***Key**: BFF – Biodiversity, Flora and Fauna; AQ – Air Quality; W – Water; C – Climate; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

*See **Table 8.4** for further details on the contents of these alternatives*

**Discussion of Assessment**

There will be overall positive impacts from developing oil storage regulations in IND2. Where regulations can reduce the risk of a pollution event, they will have a direct positive impact to groundwater and soils and indirectly to surface water, biodiversity and human health, which interact with these environmental elements. This alternative also has an indirect positive impact on material assets as it protects the water resource for the enjoyment of all. However, indirect negative impacts may arise for targeted actives, as regulations may require investment in improved storage or may limit storage options in high-risk areas. The positive effects of this alternative are anticipated be to realised in the medium to long term as regulations will have to be drafted and agreed at government level following stakeholder consultation.

IND3 requires the enforcement of existing discharge consent and license standards. Similar to IND2, this alternative is likely to result in overall positive impacts to water (direct), and also to biodiversity, soils, human health and the water resource (indirect). However, indirect negative impacts are anticipated in relation to some economic activities, which may be targeted by such enforcement. Additional costs may be incurred in order to upgrade / replace existing treatment systems or alter management practices to meet standards. However, it is noted that where these discharge consent / licence standards are not currently being achieved, the operator is in breach of licence conditions and would be required to rectify this situation regardless of the enforcement measures under the RBMP and POMs. As this alternative is based on enforcement of existing consent / licensing systems, this could result in relatively short-term improvements which, with adequate resourcing, will also have long-term effects.

While the first aspect of IND4 (compilation of an inventory of best management practices) is not expected to result in significant environmental impacts, the second (reduction in peat usage) could. A reduction in peat usage would be expected to result in overall direct positive impacts on water quality and soils as well as terrestrial biodiversity associated with this habitat. In addition, indirect positive impacts to aquatic biodiversity would be expected due to improved water quality. A reduction in peat usage would require replacement of peat being used for fuel with an alternate energy source; the impacts associated with this on air quality and climate would be related to whether this was replaced with renewable energy sources or other fossil fuels. The cost of changing from peat to an alternate fuel would be expected to result in indirect negative impacts to current users; the speed at which this

alternative is implemented would determine if these are short, medium or long term impacts. Peat is also used for a variety of other uses by both individuals and at a commercial scale, the degree of reduction will determine whether there are negative economic impacts to these users as well.

IND6 is likely to require upgrade of systems and changes in current management practices for industry. Introducing BAT will have a direct positive impact on material assets by way of upgrades and improvements to the industrial sector. BAT for industrial discharges will reduce the risk of pollution to water and aquatic biodiversity (including protected sites), thereby directly impacting positively on these environmental receptors. This alternative will also have indirect positive impacts for soils, human health and the water resource (MA4). However indirect negative impacts are anticipated to material assets (MA3) as a result of cost implications. It is not clear from the alternative what BAT will be considered; therefore, a potential indirect negative impact has been recorded for air quality and climate change, as introducing BAT may result in emissions to air. It is anticipated that impacts associated with this alternative will occur in the medium to long term, as it will require review and implementation phases.

IND7 tackles the issue of cumulative impacts from numerous point source discharges. By taking a catchment level approach rather than a localised approach, a more realistic existing impact scenario will be available, thus focussing improvements. This alternative will have overall positive impacts for environmental receptors, including water and aquatic biodiversity (direct) and in addition is likely to have direct and indirect positive impacts on material assets by providing upgraded water infrastructure (MA2) and protecting the water resource (MA4). The Appropriate Assessment has concluded that catchment nutrient budgets should be prepared and emission limits set accordingly to take account of the specific requirements/objectives of protected areas. This may have a positive result for EU protected sites, as this should produce a realistic assessment of a catchment and therefore help to avoid impacts. Human health and soils are all likely to experience indirect positive benefits from this alternative. However, additional costs may be incurred by some economic sectors as a result of necessary improvements or changes to existing practices resulting in some indirect negative impacts for material assets (MA3). It is anticipated that impacts associated with this alternative will occur in the medium to long term, as it will require review and implementation phases.

IND8 will require potential relocation of discharge points to reduce pressure on water bodies. Changing the location of a discharge may provide greater opportunity for immediate dilution, if greater water volume or faster flow is available, reducing the residence time in the water body. Relocating discharges to locations which are better suited to achieving compliance with existing standards / licence conditions is expected to reduce the effect of discharge on water quality leading to direct positive impacts for water and aquatic biodiversity, although the Appropriate Assessment indicates that this will only be the case if the relocation site is away from sensitive habitats / species. Positive impacts are also likely for soil, human health and other biodiversity dependent on aquatic species or habitats for survival as these receptors may all be indirectly affected by the discharge of regulated and unregulated compounds. Again the positive impacts to biodiversity will be dependent on the proximity of the relocation site to sensitive habitats / species. Relocation has the potential to also have direct negative impacts on cultural heritage if the relocation point is poorly sited, impacting on known / unknown archaeology. Short-term negative impacts are also likely on economic activity as a result of relocation costs.

**Cumulative Impact**

Overall the cumulative impact of implementing all of the proposed industrial alternatives will be positive. For MA3, impacts to economic activity register a positive / negative cumulative assessment. This relates to potential positive impacts for economic sectors reliant on good water quality (residential, service, tourism, angling, etc.), compared to the negative impacts experienced by industries required to improve discharges. This could require operational and process changes to achieve targets. Potential negative impacts have been recorded for air quality and climate change, as introducing BAT may result in emissions to air. Likewise, relocation of discharge points has the potential to have negative impacts on cultural heritage if the relocation point is poorly sited, impacting on known / unknown archaeology and architectural heritage.

**Mitigation**

**IND3.** It is important to ensure the environmental quality standards that are set for receiving waters are achieved. Particular attention should be placed on discharges to EU protected areas in case a licence requires more stringent standards.

**IND6.** Once clarified, BAT should be reviewed in the context of impacts to air quality and GHG emissions.

**IND7.** Catchment nutrient budgets should be prepared and limits set according.

**IND8.** A cultural heritage assessment will be required for all proposed relocation options.

**IND8:** Areas containing sensitive habitats and species should be avoided. An Appropriate Assessment will be required to determine impacts on protected areas from relocation.

**Assessment: Other Point Sources (landfills, quarries, mines and contaminated lands) (NI: Industry and Other Businesses / Waste)**

| | OP2 / OP4 | OP3 | OP5 | OP6 | Cumulative Impact |
|---|---|---|---|---|---|
| **Objective 1 (BFF)** | + | + | + | + | + |
| **Objective 2 (P)** | + | + | + | + | + |
| **Objective 3 (HH)** | + | + | + | + | + |
| **Objective 4 (S)** | + | + | + | + | + |
| **Objective 5 (W)** | + | + | + | + | + |
| **Objective 6 (AQ)** | + / - | + | +/- | - | +/- |
| **Objective 7 (C)** | + / - | + | +/- | - | +/- |
| **Objective 8 (MA1)** | 0 | 0 | 0 | 0 | 0 |
| **Objective 9 (MA2)** | 0 | 0 | 0 | 0 | 0 |
| **Objective10 (MA3)** | 0 | +/- | 0 | - | +/- |
| **Objective10 (MA4)** | + | + | + | + | + |
| **Objective 11 (CH)** | 0 | 0 | +/- | 0 | +/- |
| **Objective 11 (L)** | + | 0 | +/- | 0 | +/- |

***Key**: BFF – Biodiversity, Flora and Fauna; AQ – Air Quality; W – Water; C – Climate; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

*See **Table 8.5** for further details on the contents of these alternatives*

**Discussion of Assessment**

OP2 and OP4 both relate to prevention of improper disposal of wastes. These are broadly positive alternatives, which are in keeping with the objectives of the Waste Management Legislation in Ireland and Northern Ireland. In particular, the prevention of incorrect disposal of waste will be a positive measure for EU protected areas. Proper plans and disposal mechanisms should limit the incidence of disposal in remote areas and within EU protected areas. Positive impacts of note will be the direct impact on soil and groundwater quality, direct positive impacts on terrestrial biodiversity (particularly protected habitats and species), landscape and on surface water where runoff is causing pollution to surrounding water bodies. Indirect positive impacts from proper disposal of waste material will also be likely for human health, the wider catchment and aquatic biodiversity. A minor indirect negative impact is noted for air quality and climate from the possibility of increased waste collection and disposal, requiring more transport and more treatment although it is recognised that prevention of illegal disposal of waste will also reduce the potential for burning waste which currently contributes to air quality and climate impacts.

OP3 recognises the benefits of reuse of wastes. However, if unsuitable materials are used in the production process the impact on the receiving environment can be negative. This protocol encourages re-use but provides a quality approach which provides a uniform control process for producers and ensures the end user receives a quality managed product which conforms to agreed standards. This alternative will have overall positive impacts on the environment, although some changes in the types of materials used may be required and this could negatively impact on aggregate producers in the short to medium-term as new practices are implemented. However, by adapting to this type of protocol now, the long-term sustainability of the aggregate industry is likely to be protected.

The speed of implementation of remediation projects in OP5 will dictate whether impacts will occur in the short-medium or medium-long term. There will be direct and indirect positive impacts for biodiversity as remediation offers opportunities for habitat rehabilitation, restoration and creation. Local projects could work with other similar habitat types in an area to create ecological networks to the benefit of flora and fauna. The Appropriate Assessment has noted that this alternative should consider protected area requirements/ impact on protected areas as one of the criteria for prioritisation. There will be direct positive impacts on soils and groundwater. Any alternative that

targets soil pollution will gradually give rise to improved soil quality and function. The export of contaminated soils for treatment could negatively impact on air quality and climate as a result of transport related emissions; however, on-site remediation would reduce the need for this and is in keeping with the objectives of the National Hazardous Waste Management Plan (Ire). There will be indirect positive impacts on air quality and water, and as a consequence on human health, related to improved water quality and reduced exposure to airborne pollution associated with containment. Remediation has the potential to indirectly impact on cultural heritage and landscape. Positive impacts would be expected if remediation considers the whole landscape; however, negative impacts are possible if specific local measures do not account for the receiving environment.

OP6 would be expected to result in similar impacts as in OP5, with the proper disposal of dredged harbour material resulting in direct positive impacts to water and aquatic biodiversity. However, if the removal of dredged material requires transport to locations further in distance than in previous instances negative indirect impacts to air quality, climate and material assets (MA3) may occur. Proper disposal of dredged harbour material implies that the disposal sites will be appropriately located to avoid indirect negative impacts to biodiversity, population, cultural heritage, landscape and human health; therefore, no further negative impacts are expected to occur.

**Cumulative Impact**

The overall cumulative impact of applying all of the diffuse and point sources will be positive. The potential negative cumulative impact relating to air quality and climate would be the result of transport related emissions. The effects of remediation works on the wider environment, in particular material assets, landscape and cultural heritage could also have a cumulative effect. If a holistic approach is taken to remediation, such cumulative impacts will not be significant.

**Mitigation**

**OP2 and OP4:** A programme of education and awareness is needed to tackle improper and illegal disposal of waste to support these alternatives. The Appropriate Assessment has recommended a campaign to reduce the illegal disposal of waste, as this would have particular benefit for protected areas, which tend to be remote rural areas, e.g. bogs, used for illegal disposal of unwanted materials.

**OP5:** Remediation of site and containment options will need to be inclusive and linked to risk assessment to look at all pathways for contamination, not just water.

**OP5:** Remediation needs to look at the whole receiving environment, not just water. Remediation projects will need to work with Biodiversity Action Plans (national and local). Local projects could work with other similar habitat types in an area to create ecological networks to the benefit of flora and fauna.

**OP5:** Project level Appropriate Assessments will be required for activities under this alternative.

**OP5:** On-site treatment of contaminated soils should be considered to reduce negative impacts to air quality and climate from transport related emissions.

**OP6:** Appropriate Assessment will be required for activities under this alternative.

**Assessment: Agriculture**

| | AG1 / AG3 | AG2 | AG4 / AG6 | AG5 | AG8 | AG9 | AG11 | AG12 / AG13 | Cumulative Impacts |
|---|---|---|---|---|---|---|---|---|---|
| **Objective 1 (BFF)** | +/- | +/- | +/- | + | + | + | +/- | + | + |
| **Objective 2 (P)** | +/- | + | +/- | + | + | + | + | - | + |
| **Objective 3 (HH)** | + | + | + | + | + | + | + | +/- | + |
| **Objective 4 (S)** | + | + | + | + | + | + | + | +/- | + |
| **Objective 5 (W)** | + | + | + | + | + | + | + | + | + |
| **Objective 6 (AQ)** | +/- | - | +/- | +/- | 0 | +/- | +/- | - | - |
| **Objective 7 (C)** | +/- | - | +/- | +/- | 0 | +/- | +/- | +/- | - |
| **Objective 8 (MA1)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Objective 9 (MA2)** | 0 | 0 | 0 | 0 | 0 | 0 | + | - | 0 |
| **Objective10 (MA3)** | - | - | - | - | - | - | + / - | - | - |
| **Objective11 (MA4)** | + | + | + | + | + | + | + | + | + |
| **Objective 12 (CH)** | 0 | 0 | 0 | 0 | + | 0 | 0 | - | 0 |
| **Objective 13 (L)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 |

***Key**: BFF – Biodiversity, Flora and Fauna; AQ – Air Quality; W – Water; C – Climate; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage.*

*See **Table 8.7** for further details on the contents of these alternatives*

**Discussion of Assessment**

A large portion of the phosphorus reaching inland waterways and causing eutrophication can be traced to agricultural sources both organic (animal wastes) and anthropogenic (chemical fertilisers). In addition to farmyard sources and fertiliser use, pressures have been identified in relation to sedimentation and nutrient enrichment associated with direct access by farm animals to water bodies. AG1 and AG3 will restrict this access and will therefore have a permanent, direct positive impact on water quality, which could be realised in the short to medium term. Fencing will have direct positive impacts on riverbank vegetation and the soil environment by reducing animal traffic (erosion and / or compaction). In addition, fencing will reduce the direct addition of nutrients and / or pathogens to the water body by farm animals. This will be particularly important for protected species such as the Freshwater Pearl Mussel, which are sensitive to sedimentation and enrichment pressures. Buffer strips will also prevent soil erosion adjacent to rivers and will contribute to the interception of both pathogen and nutrient enrichments from farm sources in surface water runoff. As a result, both of these alternatives would result in indirect positive

impacts on aquatic flora and fauna due to improved water quality, though the direct impacts to riverside biodiversity will be dependent on the management of the buffer strips as bird species, such as corncrake and chough, require artificial management of lands to survive and could be negatively impacted if such management was to cease. The Appropriate Assessment has also identified the need for management of these areas to reduce the potential for invasion by alien species. The Appropriate Assessment has also noted that these alternatives measure should target nutrient hot spots i.e. standard buffer widths should not be used, and these should be designed to cover variable source areas.

Both of these alternatives would indirectly contribute to protecting the economic value of the water resource, due to improvements in water quality; however, AG1 and AG3 will result in some loss of productive land from agricultural units and/or reduction in access to water for livestock, which may lead to indirect negative economic impacts for the farming sector. Removal of land from agricultural production could also lead to reduced production capacity, potentially increasing the need to import food. This would indirectly impact on air quality and climate in the medium to long term through increased transport related emissions from food imports. Indirect, medium to long term negative impacts on population are also possible if increased imports are required to satisfy local demand for basic foodstuffs.

AG2 will involve changes in management practices for farmers. It is not clear if AG2 will be a voluntary alternative; however, it is recognised that the BMP options chosen would likely be site specific to reflect the cumulative effect of a type of farming (e.g. poultry) combined with other source factors such as available phosphorous inputs into the water body, slope of the land, etc. This alternative will have indirect positive impacts to water quality by reducing phosphorous enrichment in soils and thus the risk of eutrophication, as confirmed by the Appropriate Assessment; however, the time scale for these impacts to occur is uncertain. Immediately after implementation, a reduction in phosphorous use could reduce cumulative loads; however, achievement of phosphorous balance may only occur in the medium to long term. The positive indirect impact on water quality would lead to secondary positive impacts to aquatic biodiversity and human health. However, changing the availability of phosphorous may also result in indirect negative impacts on aquatic biodiversity currently present in these phosphorous rich systems. The resultant change in aquatic species composition could then have secondary effects throughout the food chain that has developed around these phosphorous rich waterbodies. The implementation of BMP may include changes to feedstuffs designed to minimise phosphorus in excreta or changes to how or when manure fertiliser is applied to the land, e.g. ploughed in immediately. In the medium term, this will have indirect negative impacts on individual farming operations, where such management changes have additional cost implications during change over; whether these impacts are temporary or permanent is dependent on the extent of the change required. Where BMP require removal of excess manures for disposal in localities without nutrient surpluses, this could give rise to indirect negative impacts to farm enterprises in terms of additional transport costs and the potential need for additional storage. Increases in transport would also result in indirect negative impacts on air quality (odour, transport related emissions) and climate (transport related emissions).

AG4 and AG6 will restrict / reduce agricultural intensity. Both alternatives will reduce the requirement for application of fertilisers and pesticides, reducing nutrient and chemical inputs to soils, and thus pollution of water bodies. A reduction in stocking density would also reduce nutrient inputs to soil, while a reduction in land reclamation would lead to reduced levels of drainage and silt run off where land is being reclaimed for agricultural activities. This is considered a permanent, direct positive impact to soils and an indirect, positive impact to water quality. This positive impact to soils could occur in the short term, depending on how quickly the programme is implemented. However, impacts to water quality would likely take longer to realise, as existing nutrient and pesticide soil reserves would need to cycle through the system. Positive impacts to water quality would then result in secondary impacts to aquatic biodiversity and human health. The requirement for lower fertiliser / pesticide use and reduced stocking density also have the potential to indirectly and positively impact climate change through reduced GHG emissions from the production and transport of fertiliser / pesticide and from livestock, e.g. methane.

The Appropriate Assessment has identified that these alternatives would be most effective where intensive activities are currently occurring in unsuitable catchments, e.g. where soils are inappropriate or where groundwaters are vulnerable. It has also identified that the spraying of set aside lands with pesticides could result in negative impacts to biodiversity, while leaving a proportion of farm land uncultivated or put to non-agricultural use for a period of time can lead to changes in habitat types and associated changes in biodiversity, flora and fauna, which could be both positive or negative depending on how the land is managed. Less intensive use of agricultural land, e.g. lower stocking density and land set aside, will require some reduction in productivity from agricultural units; this is considered a direct, negative impact of these alternatives. Also, lower output of "home-grown" products could potentially lead to increased import costs, indirectly impacting on air quality and climate (transport related emissions) and on the economy generally. Indirect negative impacts on population are also possible if increased imports are required to satisfy local demand for basic foodstuffs.

AG5 relates to nutrient management planning. Direct positive impacts to soils and indirect positive impacts to water quality from this alternative will also result in indirect positive impacts to aquatic biodiversity and human health. As nutrient management planning will result in more efficient use of slurries, this will reduce the need to import fertilisers, which would have indirect positive impacts in relation to air quality and climate (reduced transport). However, this may be offset by indirect negative impacts to air quality and climate associated with tankering nutrient surplus between farms. This alternative would likely result in costs to farmers, resulting in a direct negative impact. The Appropriate Assessment has identified the need for farm level nutrient management to be linked to whole catchment nutrient budgets, with consideration of both imports and exports from the farm, in order for this alternative to be effective.

AG8 offers probably the most fundamental approach to tackling agricultural pressures on water quality on a farm-by-farm basis. Increased participation in agri-environment (NI) / rural environmental protection schemes (Ire) should be linked to a well-rounded information and advice campaign which has prevention first, followed by correct treatment and disposal as core themes. Like AG4 and AG6, this alternative has the potential to directly impact on economic productivity of intensively managed farms if they need substantial changes in management practices. However, this alternative does have the potential to have a direct positive impact on soils and water quality and indirect positive impacts aquatic ecology and human health. This alternative also contributes to the sustainable use and protection of the economic water resource for all. Participation in these schemes also has the potential to directly impact on cultural heritage in a positive manner, as such schemes can foster the continuation of farming methods in areas where these activities are culturally connected to the land. The Appropriate Assessment has identified that by their voluntary nature it is difficult to achieve consistent and application of these schemes. It is recommended that guidance and advice related to participation in these schemes should be produced and disseminated in a consistent manner to address these limitations.

AG9 would require changes to current farm management practices and upgrade of management systems. The associated cost of these could have a direct negative impact on the economic viability of individual farm operations. As with the other alternatives, the direct positive impacts to soils will be experienced, as will indirect positive impacts to water quality, aquatic biodiversity and human health. If removal of farm wastes is required under AG9 indirect negative impacts to air quality and climate may occur due to increased transport emissions. The Appropriate Assessment has noted that if grants are made available, these must be linked to the availability of appropriate receptor sites and not represent an increased risk to water quality.

AG11 requires individual holdings to achieve a phosphorous balance. This will result in indirect positive impacts for water quality in the medium to long term as a result of reduced diffuse losses of phosphorous from soils. It will also have indirect positive impacts for biodiversity and human health. However, achieving phosphorous balance will require significant changes in some cases to existing farm operations. This is likely to result in direct negative impacts on the agricultural sector, in particular the pig and poultry sectors, which generate high levels of excess phosphorous as a result of animal excreta. Indirect

negative impacts to biodiversity are possible due to reductions in phosphorous entering surface waters. Changes to existing food web dynamics could have negative impacts not only on flora and fauna directly dependant on existing levels of phosphorous, but also on higher order herbivores / carnivores reliant on these flora and fauna. This would particularly be the case for birds. Indirect impacts may also occur in relation to air quality and climate as achieving phosphorous balance may only be feasible with reduced intensity, which would lower emissions from livestock (indirect positive impacts on climate) or require transport of manures for disposal elsewhere (indirect negative impacts on air quality and climate). In areas where phosphorous is not limiting and there is already excess built up in the soil, significant cost savings can be expected with reduced use of mineral phosphorous fertilisers. Reduction in the use of fertilisers will have indirect positive impacts on climate, due to reduced energy use for production and reduced GHG emissions associated with transport. AG2 will complement this alternative.

As with the other alternatives for agriculture, the direct positive impact to soils from AG12 / AG13 will also result in indirect positive impacts to water quality, aquatic biodiversity and human health. Movement of surplus nutrients between farms, and possibly administrative areas, may result in cross contamination and / or spread of disease, which may be difficult to track. This potential for spread of disease would have indirect negative impacts on human health and also direct impacts on the health of livestock on recipient farms. In addition, the movement of slurries could result in other impacts in the areas it is being moved to. Due to the potential negative impacts in other areas the Appropriate Assessment has identified that this alternative should be subject to assessment prior to implementation and considered as a short-term alternative only. The transport required to move the surplus nutrient would also result in transport related emissions, impacting indirectly on air quality and climate, particularly where source and destination sites are widely located. The use of digestors to treat nutrient surplus would produce methane ($CH_4$), a GHG, thereby resulting in negative impacts to climate. However, this could be offset by capturing methane for re-use as fuel. After treatment the remaining digestate will require disposal, with associated negative impacts to air quality resulting from further transport. If additional landfill capacity is required to dispose of this waste, potential indirect negative impacts to biodiversity, cultural heritage and landscape could occur if the additional landfill facilities are sited inappropriately. Incineration is also possible and this would have indirect negative impacts on air quality and climate as well as potential human health issues.

| **Cumulative Impact** |
| --- |
| Overall the cumulative impact of the alternatives proposed for agriculture will have neutral to positive impacts on the receiving environment. Cases where negative impacts have been identified are air quality (AQ), climate (C) and material assets (MA3). The potentially negative impacts to air quality and climate are principally related to transport of materials as a result of changes to nutrient planning. Co-ordination and cooperation between farms could offset some of this negative impact. Other negative impacts in this regard relate to possible final treatment and disposal options such as digestors and incineration. The negative effects on climate relate to the release of GHG and energy use. Some of this can be offset by use of renewable energy sources and capture of $CH_4$ for reuse as a fuel source. The other negative cumulative impact relates to increased operational costs associated with implementation of the proposed alternatives. In some cases compensation may be available (e.g. loss of land); however, it is recognised that in many cases the improvement will be borne by individual farm owners and mitigation for income loss will not be available. |
| **Mitigation** |
| **AG1 and AG3:** It is recommended that compensation be linked to annual upkeep of fences and management of buffers to ensure the ongoing benefit of these alternatives.<br><br>**AG1 and AG3:** Appropriate guidance is required for implementation of these alternatives to prevent indirect impacts to biodiversity.<br><br>**AG1 and AG3:** An Appropriate Assessment will be required.<br><br>**AG3:** A management plan for buffer strips and set aside will be required to ensure there are no detrimental impacts on locally important flora and fauna. These plans should be farm specific to take account of the locally sensitive biodiversity.<br><br>**AG4:** An Appropriate Assessment will be required if a land use change is proposed in a protected area.<br><br>**AG6:** Set aside of lands shall only be implemented in combination with appropriate guidance for agricultural lands within or adjacent to protected areas (spraying of pesticides is the key concern).<br><br>**AG6:** An Appropriate Assessment will be required.<br><br>**AG8:** It is recommended that an information and advice campaign targeted at farmers should be implemented on a national scale. This should focus on prevention first followed by BMP as core themes. It will be important that adequate consideration is given not just to water and biodiversity but also soils and cultural heritage, as a narrowly focussed approach may lead to indirect negative impacts on these areas. It is also recommended that information campaigns highlight best practice in the sector in order to demonstrate that an economically viable farming operation is possible within such schemes. Opportunities for agri-tourism should also be highlighted as a way to supplement farm income while protecting the environment. This guidance shall also include information relating to implementation in areas protected for biodiversity.<br><br>**AG9:** An Appropriate Assessment will be required. |

**AG12:** A system of cooperation between farms at the local level would mitigate some of the impacts associated with tankering**,** including the need to move material over a large area (mitigation of air quality and climate impacts) and provision of numerous small storage areas (mitigation of landloss).

**AG12:** This alternative should be qualified and should only be considered as a short-term alternative as this does not resolve the issue with the pressure. An Appropriate Assessment is also recommended for the relocation area.

**AG13:** Methane gas, resulting from use of digestors to treat nutrient surplus, should be captured and re-used as a fuel source to offset impacts to climate associated with generation of greenhouse gas. The resultant digestate should only be disposed of in licensed landfill facilities. Should new landfill facilities be required, the siting of these should be subject to Environmental Impact Assessment.

**AG13:** An Appropriate Assessment will be required for any new facility. This alternative should only be implemented in areas when the intensity of farming is currently high, and should not be used as a method to allow further intensification of farming in protected areas.

**Assessment: Wastewater from Unsewered Properties (NI: Collection and Treatment of Sewage)**

| | UP1 | UP2 | UP4 | UP5 | UP7 | UP8 | UP11 | Cumulative Impacts |
|---|---|---|---|---|---|---|---|---|
| **Objective 1 (BFF)** | + | + | + | + | + / - | + / - | + / - | + |
| **Objective 2 (P)** | + | + | + | + | + / - | + / - | + / - | + |
| **Objective 3 (HH)** | + | + | + | + | + / - | + / - | + / - | + |
| **Objective 4 (S)** | + | + | + | + | + | + | + | + |
| **Objective 5 (W)** | + | + | + | + | + | + | + | + |
| **Objective 6 (AQ)** | 0 | 0 | 0 | 0 | +/- | + / - | + | + / - |
| **Objective 7 (C)** | 0 | 0 | 0 | + | - | - | - | - |
| **Objective 8 (MA1)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Objective 9 (MA2)** | + | + | + | + | + | + | + | + |
| **Objective10 (MA3)** | - | 0 | - | 0 | + / - | + / - | + / - | - |
| **Objective 11 (MA4)** | + | + | + | + | + | + | + | + |
| **Objective 12 (CH)** | 0 / - | 0 / - | 0 / - | 0 | 0 / - | 0 / - | 0 / - | - |
| **Objective 13 (L)** | 0 | 0 | 0 | 0 | 0 / - | 0 / - | 0 / - | 0/- |

***Key**: BFF – Biodiversity, Flora and Fauna; W – Water; AQ – Air Quality; C – Climate; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

*See **Table 8.8** for further details on the contents of these alternatives*

**Discussion of Assessment Table**

UP1, UP2 and UP4 address the impacts from unsewered properties at the earliest pre-planning stage when significant reduction of risk can be achieved by ensuring that systems are correctly located and are designed to achieve the intended treatment levels. Amendment of building regulations to include codes of practice and requirements for certification of on-site systems will have direct positive impacts on the soil and water environments by reducing cumulative pressures from new unsuitable systems being commissioned once the regulations are passed, in the short to medium term. All three alternatives are heavily reliant on the planning consent system for success, and as with several of the "reduce" alternatives, the consistent implementation of these alternatives will be dependent on the awareness and understanding of the regulations by individuals and administrators / planners.

Reduced risk of pollution from poorly planned and / or designed systems will also have indirect positive impacts for biodiversity, human health and population through improved water quality. The installation of on-site systems in a consistent manner, and in line with a code of practice and an enforcement system will ensure that the intended level of treatment is achieved, contributing positively to sustainable development. The expected improvement in water quality resulting from these alternatives could have significant positive cross-sector impacts, for instance, in terms of water dependent sectors such as tourism, which depend on good water quality both for consumption and recreational uses (e.g. bathing water, fisheries).

However, there may also be indirect negative impacts from a social and / or economic development perspective if soilwater conditions cannot support new on-site treatment systems even with engineered solutions. This may also result in indirect negative impacts to cultural heritage, particularly in rural areas where generations of the same families may have lived and where further individual residential development may no longer be allowed due to existing environmental conditions. The impacts from these alternatives are expected to occur in the medium to long term due to the time it will take to amend current policy/regulations and implement the changes.

The increased use of phosphate-free detergents which would be expected to accompany implementation of alternative UP5 would result in a direct positive impact in terms of water quality and an indirect aquatic biodiversity impact through reduced eutrophication of water bodies. In

general, an indirect positive impact across most of the other environmental topics is also likely. In particular, an indirect positive impact to human health would be expected due to the reduction in potential for eutrophication, which could impact on availability of water supplies. Biodiversity may also be indirectly impacted as changes in nutrient composition of some waters could result in a change in species composition, and thus the food chain, where phosphorus is currently abundant. Whether this would be a negative or positive impact is dependent on the current species composition.

It should be noted that phosphate-free detergents are currently available for purchase from some retailers. The effectiveness of this alternative would be directly related to whether an awareness programme is instituted in parallel to educate the public on the benefits of using phosphate-free products. As with any change in product use there may be minor cost implications to individuals; however, these may be offset by the reduction in requirement for new infrastructure to deal with existing nutrient loads from unsewered properties. This alternative has the potential to result in positive impacts in a relatively short timeframe, if consumer behaviour can be altered through education.

UP7, UP8 and UP11 are broadly similar in that they are aimed at addressing pressures on water quality associated with unsewered properties during the post-planning phase, i.e. existing houses. These alternatives would result in immediate direct positive impacts on water and soil quality upon implementation and indirect impacts on aquatic biodiversity and human health. Whether these alternatives would result in short-term or medium-term impacts would depend on how quickly the schemes are rolled out, though long-term positive impacts would be expected as more areas are targeted and remedial actions carried out. These alternatives will be particularly important in relation to those waterbodies containing Freshwater Pearl Mussels. The significant impacts on water quality associated with on-site wastewater treatment systems in terms of nutrient enrichment and eutrophication give rise to problems for these and other aquatic species that require clean water for survival. It should be noted that indirect negative impacts on biodiversity are also possible as changes in nutrient composition of some waters could result in a change in species composition, though the Appropriate Assessment notes that the return of surface and groundwaters to a more natural state as existed pre phosphate products would be considered a positive impact.

These three alternatives would also have direct positive impacts on the provision of water management infrastructure; however, the application of UP11 could be limited as it may be difficult and/or costly to achieve connection to the municipal systems over large areas with scattered development. UP11 could be more applicable in areas on the fringes of urban areas, which have experienced recent residential growth without the matching investment in wastewater infrastructure. Alternately, projects under UP8, such as tank maintenance programmes, could be more appropriate in more rural areas with scattered development. These alternatives would also have an indirect positive impact in terms of water as an economic resource as they each protect water quality from degradation.

The provision of connection to the municipal system and/or the requirement to institute programmes, such as tank maintenance, are likely to have cost implications at the local authority and individual level, depending on how the schemes are rolled out. In addition, connection of additional houses to the municipal system could require upgrades to the wastewater treatment facilities in areas where these are already at capacity. This could have indirect impacts on air quality and climate due to the increased demand for treatment resulting from increased fuel usage as well as an increase in the amount of sludge requiring disposal. The amount and type of emissions would depend on the process used for sludge disposal, e.g. landfill, incinerators or digestors. Increases in sludge disposal resulting from tank maintenance could also result in increased emissions to air due to the need to transport sludges (e.g. $CO_2$ and $NO_x$), particularly if individual property owners do not coordinate collection, as well as from the disposal itself. However, indirect positive impacts to air quality would occur more locally in areas where nuisance odours are reduced following proper maintenance or removal of on-site systems. There is the potential for indirect negative impacts to human health to arise if increased land spreading of sludges occurs without the proper guidance. In addition, the need to construct new facilities to deal with increased demand on municipal wastewater treatment facilities could result in indirect negative impacts to biodiversity, landscape and cultural heritage if these are not sensitively sited.

In the context of encouraging sustainable development, the provision of municipal sewage connections may result in indirect negative impacts as it could encourage further development in rural areas that may not be served by other links, such as public transport; however, it could be considered beneficial in the context of economic activity (Objective MA3) as it may remove an existing barrier to development of housing in these rural areas.

A further element to any alternative requiring increased tank maintenance would be education of owners of on-site systems, as surveys suggest that many people are not aware of the ongoing maintenance required for on-site treatment systems.

**Cumulative Impacts**

Overall the cumulative impact of the alternatives proposed for unsewered properties will have a neutral to positive impact on the receiving environment. Cases where negative impacts have been identified are air quality (AQ), climate (C), material assets (MA3), landscape (L) and cultural heritage (CH).

The potentially negative impacts to air quality and climate are principally related to transport of material offsite and the energy requirement for treatment / disposal of material. Co-ordination and cooperation between properties could offset some of these negative impacts. The negative effects on climate relating to the direct release of GHG from energy use during treatment could be offset somewhat by use of renewable energy sources.

The negative cumulative impact for material assets (MA3) relates to increased costs associated with desludging. However, this cost is committed to at design stage of the system as ongoing management is assumed.

In terms of cumulative negative impacts to cultural heritage, these are primarily of two types. The first is the cumulative physical impact on cultural heritage features resulting from the development of wastewater treatment infrastructure; however, avoidance or provision of specific mitigation measures at the project level should reduce the significance of this cumulative impact. The second would be the cumulative impact resulting from potential changes in the composition of rural communities should new generations of families that have resided in areas historically, no longer be able to continue to build individual residences on the family holding. It is recognised that the mitigation for this cumulative impact in many cases would be connection to the municipal system, which may not be feasible in the more rural areas. Cumulative impacts to landscape from development of wastewater infrastructure could also occur.

**Mitigation**

**UP2:** The pre-planning process should assess whether an Appropriate Assessment would be required for new development within or adjacent to a protected area.

**UP7 and UP8:** An education programme should be carried out in tandem with new requirements for tank maintenance, including guidance on disposal of sludges.

**UP8:** Intelligent transport programmes should be put in place to minimise the amount of emissions associated with movement of sludges from on-site treatment systems.

**UP11:** Upgraded treatment works should be required to introduce BAT, including the use of renewable energy sources, in order to reduce GHG emissions and others resulting from increased demand for treatment.

**UP7, UP8 and UP11:** New wastewater treatment infrastructure, including sludge disposal infrastructure, will be subject to environmental assessment at the project level to reduce indirect impacts to biodiversity, landscape, cultural heritage, air quality and climate.

**UP7 and UP11:** An Appropriate Assessment will be required for new structures.

**Assessment: Forestry**

| | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F11 | F12 | F13 | F14 | F15 | F16 | F17 | F18 | F19 | Cumulative impact |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Objective 1 (BFF)** | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | - | + |
| **Objective 2 (P)** | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Objective 3 (HH)** | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Objective 4 (S)** | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Objective 5 (W)** | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Objective 6 (AQ)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | + | 0 | 0 | 0 | 0 | 0 | 0 | + | + |
| **Objective 7 (C)** | - | - | - | - | - | - | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - |
| **Objective 8 (MA1)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Objective 9 (MA2)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Objective10 (MA3)** | - | - | - | - | - | - | - | 0 /- | 0 / - | 0 / - | 0 / - | 0 / - | 0 / - | 0 / - | 0 / - | 0 / - | - |
| **Objective 11 (MA4)** | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Objective 12 (CH)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Objective 13 (L)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

***Key**: BFF – Biodiversity, Flora and Fauna; AQ – Air Quality; W – Water; C – Climate; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

*See **Table 8.9** for further details on the contents of these alternatives*

**Discussion of Assessment**

F2 to F12 While each of these alternatives outlines a specific action to address a specific impact, e.g. acidification, eutrophication and sedimentation and pesticides, they all involve some type of change in forestry practices.

It is likely to take some time to realise the direct positive benefits of these alternatives to water and soil quality (and indirectly human health and aquatic biodiversity). Reserves of pesticides and fertilisers, acidification of soils and nutrient enrichment are expected to continue to exert an influence on the aquatic and terrestrial environment following implementation of these alternatives; the positive impacts of each would be realised in the long term. In particular, the reduction of planting on peat sites under F5, would be expected to avoid or limit the key pressure (drainage) on these sensitive habitats. Alternative F2 will protect small streams in acid sensitive catchments. If these 1st and 2nd order stream catchments in acid sensitive areas coincide with Freshwater Pearl Mussel

catchments, the Appropriate Assessment has identified that afforestation should be avoided.

In addition, long term, indirect positive impacts on the economic value of the water itself, for example as a habitat for fish in the context of the recreation and tourism sectors, would be expected.

The movement away from monoculture plantations to forests with more structural and species diversity in F3, F6 and F8 could improve these forests as recreational resources. It is currently estimated that forests contribute an economic value of €500m in terms of recreation in Ireland.[1] Therefore, the maintenance and/or improvement of forests as a recreational resource would have a positive, indirect long-term impact on population and human health. These changes in forest structure and species mix would also result in long term, direct positive impacts to terrestrial biodiversity, through the reintroduction of native species, which is would be of benefit to protected areas. The reduction in acidification from alternatives F2 and F4 would be expected to reduce impacts in sensitive upland headwaters, some of which are important for salmon spawning and Freshwater Pearl Mussels.

F2, F3, F4, F5, F6 and F8 would require a change in the composition and/or extent of the forests themselves. In addition to the costs associated with implementing the required changes, these alternatives could result in direct, negative impacts to the viability of the forests as an economic resource, either through reducing the size or area of the plantation or the number of harvestable trees on the plantation. This reduction in the amount of timber produced could also impact on availability of Irish timber products for sale domestically or for export. Similarly, F7 would reduce the amount timber that could be harvested in a given period by reducing the coup size, which may also result in direct impacts in relation to material assets.

The potential for the reduction in forest size or change in composition could affect the carbon dioxide sequestering capacity of existing forest stocks. If the carbon dioxide sequestering capacity is reduced, this could result in indirect negative long-term impacts to climate.

The more holistic approach to forestry embodied in many of these alternatives will result in the greatest benefit to the environment generally and water quality in particular. However, positive impacts may not be felt even in the medium term as the implementation of some of these alternatives, e.g. changing the specific mix on replanting, will require existing crops to mature before this alternative can be implemented. Spatially, the success and impact of some of these alternatives will depend on the age of the forestry resource in a given catchment. In addition, the application of each of these alternatives will need to be considered in its site-specific context to ensure that no indirect impacts to other issue areas result.

F11 requires a reduction in the application of pesticides in the forests themselves. This could be achieved using F12 or F19, both of which would reduce impacts on sensitive aquatic species, such as the Freshwater Pearl Mussel. The practice of pre-dipping of trees prior to planting would be expected to result in short, medium and long-term positive impacts in relation to air quality (and indirectly to biodiversity and human health), as it would decrease the requirement for aerial spraying of pesticides.

F19 would also result in a reduction in chemical pesticide use and therefore would be expected to result in direct positive impacts to water quality and indirect positive impacts to human health and aquatic biodiversity. However, without the detail as to the type of biological control methods that would be used it is unclear as to what the direct impacts of these would be on terrestrial biodiversity. Should non-native species be used, there is the potential for these to compete with native species. Further study would be needed to establish the ramifications of using biological control methods on the existing food web and on native

[1] Economic Value of Trails and Forest Recreation in the Republic of Ireland. September 2005. Coillte and the Irish Sports Council

species.

Each of these alternatives would require a change in management practices from those already being carried out and as such would be expected to result in direct, short term impacts to the cost of forestry management. However, as these alternatives became common practice it would be expected that they would become part of the normal process of forestry management reducing long term cost implications.

F13, F14, F15, F16, F17 and F18 While each of these alternatives outlines a specific action to address a specific impact, e.g. acidification, eutrohophication and sedimentation, they all involve some type of change in forestry practices.

It is likely to take some time to realise the direct positive benefits of these alternatives to water quality and soils (and indirectly human health and aquatic biodiversity). Acidification of soils, nutrient enrichment and sedimentation will continue to exert an influence on the aquatic and terrestrial environment. However, these alternatives are each expected to result in positive impacts in these issue areas in the long term, in addition to long term indirect positive impacts on the economic value of the water itself. In particular, F14 has been identified by the Appropriate Assessment as particularly desirable where afforestation on peat has taken place. Increased residence times and no drainage in some areas would be desirable and should be investigated. The Appropriate Assessment has also identified F16 and F17 as critical alternatives to reduce the impacts of sedimentation, noting that particular attention should be paid to sensitive protected areas, e.g. Freshwater Pearl Mussel, and their watercourses. Alternately, the Appropriate Assessment has identified that the use of basic material under alternative F13 should be avoided in protected areas, particularly in Freshwater Pearl Mussel catchments.

Each of these alternatives would require a change in management practices from those already being carried out and as such would be expected to result in direct, short term impacts to the cost of forestry management. However, as these alternatives became common practice it would be expected that they would become part of the normal process of forestry management reducing long term cost implications.

**Cumulative Impacts**

Negative impacts have been identified for climate and material assets. Much of this relates to limitations on forestry in sensitive areas. Limiting forestry reduces the potential for carbon sequestration and this could have cumulative, long-term negative impacts on Ireland's and Northern Ireland's climate change commitments. It would also prevent reaching current forestry targets throughout Ireland and Northern Ireland. The economic value of forests is also impacted by restrictions and limitations. In highly sensitive areas, the land considered suitable for forest may be considerably reduced, thereby, reducing direct income from timber related products and secondary income from recreational activity. It will be necessary to review this impact once detailed measures are available.

**Mitigation**

**All:** Future guidelines for forestry should be developed through a steering group represented by bodies such as Coillte, the Forest Service (Northern Ireland), the Forest Service (Ireland), National Parks and Wildlife Service, the Central Fisheries Board (Ireland), the Fisheries Conservancy Board (Northern Ireland) the Northern Ireland Environment Agency, and representatives from the relevant planning authorities to ensure that the final guidelines take a holistic approach to the environment which includes biodiversity, landscape, climate and cultural heritage interests. Consideration should be given to identifying and implementing as a priority those alternatives that can be applied to forests only starting or midway through the growth cycle.

**F2-F8:** It is recommended that prior to any changes in forest size or species mix, a study is carried out to determine the change, if any, in the carbon dioxide sequestering capacity of the forest. Should sequestering capacity be reduced, compensation measures will be required to offset these.

**F2:** The following change to the language in the Draft POM is required: Avoid afforestation on 1st and 2nd order stream catchments in acid sensitive catchments and in protected areas.

**F3:** An Appropriate Assessment will be required.

**F5:** An Appropriate Assessment will be required if a new plantation is proposed to be developed on peat sites or erodible soils in areas or catchments protected for biodiversity (i.e. an SAC, SPA or Ramsar).

**F5:** Change to the Draft POMs recommended: Eutrophication and Sedimentation - Avoid or limit forest cover on peat sites and on errodable soils.

**F13:** The following change to the language in the Draft POM is required: Avoid the use of basic material in protected areas, particularly in sensitive freshwater pearl mussel catchments.

**F13 and F14:** An Appropriate Assessment will be required.

**F19:** Detailed studies should be carried out prior to the introduction of any non-native species to be used as a biological control method.

**F19:** An Appropriate Assessment will be required.

**Assessment: Usage and Discharge of Dangerous Substances (NI: Included in key sectors under Pollution)**

| | DS3 | DS4 | DS5 | DS6 | Cumulative Impact |
|---|---|---|---|---|---|
| **Objective 1 (BFF)** | + | + | + | + / - | + |
| **Objective 2 (P)** | + | + | + | + | + |
| **Objective 3 (HH)** | + | + | + | + / - | + |
| **Objective 4 (S)** | + | + | + | + | + |
| **Objective 5 (W)** | + | + | + | + | + |
| **Objective 6 (AQ)** | +/- | +/- | + / - | 0 | +/- |
| **Objective 7 (CC)** | +/- | +/- | + / - | 0 | +/- |
| **Objective 8 (MA1)** | 0 | 0 | 0 | 0 | 0 |
| **Objective 9 (MA2)** | 0 | 0 | + | + | + |
| **Objective10 (MA3)** | - | - | - | - | - |
| **Objective 11 (MA4)** | + | + | + | + | + |
| **Objective 12 (CH)** | 0 | 0 | 0 | 0/- | 0/- |
| **Objective 13 (L)** | 0 | 0 | 0 | 0 | 0 |

***Key**: BFF – Biodiversity, Flora and Fauna; W – Water; AQ – Air Quality; C – Climate; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

*See **Table 8.6** for further details on the contents of these alternatives*

**Discussion of Assessment**

Dangerous substances can have toxic effects for flora, fauna and human beings that come in contact through media such as water and soil. In some circumstances these substances may bio-accumulate causing cumulative impacts through the food chain. In addition they are often persistent in the environment causing long-term negative impacts.

DS3 targets reduction of pollution at source. Licence reviews to address point discharges may require changes to management practices, entailing additional costs and negatively impacting on economic activity for certain sectors. Licence reviews may require changes in operation of industries to reduce the quantity of water used in processing (inputs) or to reduce the amount needing treatment (output), which would have indirect positive impacts on climate as a result of reduced energy costs associated with treatment. Stricter controls on diffuse discharge may also require alternative disposal options to be implemented with indirect negative impacts on air quality and climate if additional transport is required or alternative methods of disposal result in air emissions. Pollution reduction programmes are likely to lead to improvements in water quality and aquatic biodiversity by reducing chemical pollution to water bodies. This is particularly important in sensitive habitats such as those for the Freshwater Pearl Mussel. The Appropriate Assessment has noted that this alternative must consider protected areas objectives and requirements and prioritise review according to their needs. Indirect positive impacts as a result of reduced pollution are anticipated for terrestrial biodiversity, soil and human health. As these pollutants may remain in the environment for years, existing pollution may cause problems beyond the medium term assessment period (2015); however, reducing the input will have some immediate benefits for these environmental receptors.

DS4 will lead to improvements in water quality and benefits for biodiversity due to reduced

nutrient losses, and reduced diffuse emissions of dangerous substances, such as pesticides and herbicides. This will give rise to an overall positive affect on water quality, biodiversity and soils. Stricter controls on diffuse discharge in DS4 may also require alternative disposal options to be implemented with indirect negative impacts on air quality and climate if additional transport is required or alternative methods of disposal result in air emissions. Currently many diffuse discharges are unregulated and these stricter controls may be difficult to enforce if cause and effect cannot be established.

DS5 will have similar impacts to those already discussed above. It will lead to improvements in water quality and soils with benefits for biodiversity due to reduced dangerous substances concentrations in effluents. In addition, upgrades to treatment facilities may have additional costs to achieve adequate protection; however, this will directly contribute to provision of new and upgraded wastewater infrastructure (MA2).

DS6 will require potential relocation of discharge points to reduce pressure on water bodies. Changing the location of discharge may provide greater opportunity for immediate dilution, if greater water volume or faster flow is available, thereby reducing the residence time in the water body. Relocating discharge points to locations which are better suited to achieving compliance with existing standards / license conditions is expected to reduce the effect of discharge on water quality leading to direct positive impacts for water and aquatic biodiversity; these could be effected in the short-term at specific locations. Indirect positive impacts are also likely for human health and other biodiversity, which may be secondarily affected by the discharge of dangerous substances. Relocation has the potential to have direct negative impacts to biodiversity, cultural heritage if the relocation point is poorly sited, either by impacting on known / unknown archaeology, architectural heritage or sensitive flora and fauna. Indirect negative impacts are also possible for human health if the relocation does not take into account existing populations. Short-term negative impacts are likely on economic activity as a result of relocation costs.

**Cumulative Impacts**

Cumulative negative impacts are recorded for air quality, climate, material assets and cultural heritage. The changes that may be required to put DS3, DS4, DS5 and DS6 into effect may give rise to additional transport requirements which will contribute to air quality emissions and to transport related GHG emissions. Much of this will depend on the specific methods by which reduction is achieved. Relocation has the potential to have negative impacts on cultural heritage or biodiversity if the relocation point is poorly sited.

**Mitigation**

**DS3 and DS4:** Sector specific targeted pollution reduction programmes will need to be developed in the early stages to ensure maximum medium to long-term gains can be achieved.

**DS5:** An Appropriate Assessment will be required if this alternative would involve the building of a new plant or an extension to an existing plant.

**DS6:** An Ecological Impact Assessment, Human Health Impact Assessment and a Cultural Heritage Assessment will be required for all proposed relocation options. Sensitive areas should be avoided.

**DS6:** An Appropriate Assessment will be required.

**Assessment: Physical Modifications (NI: Freshwater Morphology/ Marine Morphology)**

| | PM2 | PM6 | PM7 | PM9 | Cumulative Impact |
|---|---|---|---|---|---|
| **Objective 1 (BFF)** | **+ / -** | **+ / -** | **+ / -** | **+ / -** | **+ / -** |
| **Objective 2 (P)** | **+** | **0/-** | **0** | **+ / -** | **+ / -** |
| **Objective 3 (HH)** | **+** | **0/-** | **0** | **+ / -** | **+ / -** |
| **Objective 4 (S)** | **0** | **+ / -** | **+** | **+ / -** | **+ / -** |
| **Objective 5 (W)** | **+** | **+** | **+** | **+** | **+** |
| **Objective 6 (AQ)** | **0** | **0** | **0** | **0** | **0** |
| **Objective 7 (C)** | **+** | **-** | **0** | **-** | **+/-** |
| **Objective 8 (MA1)** | **+/-** | **-** | **0** | **-** | **+/-** |
| **Objective 9 (MA2)** | **0** | **0** | **0** | **0** | **0** |
| **Objective10 (MA3)** | **0** | **+ / -** | **+ / -** | **+ / -** | **+ / -** |
| **Objective 11 (MA4)** | **+** | **+/-** | **+** | **+/-** | **+** |
| **Objective 12 (CH)** | **0 / -** | **0 / -** | **0/-** | **0 / -** | **0/-** |
| **Objective 13 (L)** | **0 / -** | **0 / -** | **0/-** | **0 / -** | **0/-** |

***Key**: BFF – Biodiversity, Flora and Fauna; AQ – Air Quality; W – Water; C – Climate; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

*See **Table 8.10** for further details on the contents of these alternatives*

**Discussion of Assessment**

Physical modifications include dams and reservoirs, weirs, river crossings and embankments, marine ports and coastal defences. They represent a key water pressure that has implications for many other SEA issues, particularly material assets. Impacts associated with physical modifications relate to reduction of natural habitat (e.g. through dredging for port development) and alteration of natural habitat (e.g. installation of sea and flood defences and weirs). These modifications can remove the natural pools and shallows needed by fish, reduce suitable habitat and cause changes to natural erosion and sedimentation processes, with some preventing sediments from ultimately reaching estuaries and the shoreline.

PM6 and PM9 offer reduction and rehabilitation approaches to assist in improving water quality impacted by physical modification. For these alternatives, direct positive impacts to water quality and aquatic biodiversity are likely. PM6 will improve rivers previously impacted from these types of works, and this in particular will benefit rivers which were previously straightened, or where habitats for fish spawning were destroyed. This will allow naturalisation of the river channel and re-colonisation of previously unsuitable areas by flora and fauna. PM9 is overall of positive benefit for fish movement in particular, and for the wider biodiversity of surface waters.

For both PM6 and PM9 the potential for negative impacts is dependant on the methodology in which they are implemented. There is a need for a holistic approach to be applied in each of these cases so that implementation does not result in indirect negative impacts in other issue areas. For instance, the removal of barriers may give rise to negative impacts to architecture, archaeology and cultural heritage. Industrial archaeology and cultural heritage features in particular can include old bridges, walls of dams, etc. These features may also form important parts of the landscape and their removal could give rise to further indirect negative impacts on landscape.

In addition, though remediation of channelisation or barriers could be seen to have direct positive impacts to biodiversity, these could in fact result in negative impacts to existing habitats, which

developed as a result of these physical modifications. For example, removal of weirs could lower the water level and affect flow rates, thereby changing the hydrologic regime, which is one of the principal factors influencing the ecology of aquatic ecosystems.

Physical modifications are usually in place to meet a specific need, be it reduction of flood risk, improvement of navigation or provision of renewable energy. The impacts of removing and/or altering these features will need to be considered against the gains in water quality that will be achieved. For instance, the use of renewable energy is a key component in meeting the targets of the Kyoto Protocol, and hydroelectric power stations currently provide some of this resource. The removal of these would have indirect, negative impacts on climate in the absence of provision of energy by replacement renewable energy sources and also on water as an economic resource (MA4). Also, removal of flood defences could result in indirect impacts on human health, population and material assets should flood risks increase. Further, the removal of flood defences may enlarge the floodplain, potentially restricting future development potential. From a recreational perspective the improvement of fishery resources through the removal of impassable barriers represents an economic benefit to this sector.

Impacts are likely to be in the medium to long-term for these alternatives, as further assessment will be required to identify where enhancement schemes are likely to provide the greatest benefit.

PM 2 Similar to the alternatives above, the support of voluntary schemes, such as wetlands and Inter Coastal Zone Management Schemes, is likely to result in direct positive impacts to water and biodiversity and indirect positive impacts to population, climate and human health as wetlands and the coastal zone will be managed more appropriately. However, there is the potential for negative impacts to occur to biodiversity and other resources, such as cultural heritage, if these voluntary schemes are not rolled out in tandem with an educational programme and guidelines for their implementation. As a voluntary alternative with no defined programme or action, it is likely that this alternative will not have the necessary focus and positive impacts associated with it may be confined to the longer-term. The Appropriate Assessment has noted that these types of schemes need to be properly planned and take account of all protected area requirements.

PM 7 will reduce impacts on water and associated flora and fauna from soil erosion caused by over grazing. Though the remediation of overgrazing would be expected to result in fewer negative impacts than the other alternatives discussed above, until more detail is known as to what these remediation schemes would involve it is difficult to determine the types of impacts associated with these schemes. Therefore, it is again recommended that these schemes be carried out using a holistic approach, with consideration of other impacts aside from those associated with water quality. This alternative could give rise to impacts over the shorter-term if implemented quickly.

**Cumulative Impact**

The proposed alternatives for physical modifications have considerable potential to improve the environment individually or cumulatively if implemented correctly; however, based on the current level of detail available, it is not possible to clearly define the cumulative impact in many cases, The potential for negative impacts from these alternatives is dependant on the methodology in which they are implemented. Possibly the most sensitive environmental receptors to physical modifications will be cultural heritage (many existing cultural heritage features may have archaeological or architectural heritage value), which in turn through their removal may negatively impacts on the landscape. Removing or altering structures may impact habitats and species, which have flourished in areas derived from a physical modification and hence negatively impact on biodiversity. The impacts of removing and/or altering these physical modifications will need to be considered against the gains in water quality that will be achieved. The removal of hydroelectric power stations would have cumulative negative impacts on climate in the absence of provision of energy by replacement renewable energy sources.

**Mitigation**

**PM2:** An Appropriate Assessment will be required.

**PM6 and PM7:** An Appropriate Assessment will be required for remediation schemes.

**PM6 and PM9:** An archaeology, architecture and cultural heritage assessment will be required before removal of any physical modifications with potential for cultural heritage value. Mitigation measures will be in agreement with the relevant authority. This assessment should include reference to cultural heritage in the context of the existing landscape.

**PM6:** A flood impact assessment should be carried out for all channelisation and barrier remediation schemes to determine whether an increased risk of flooding would occur as a result.

**PM7:** Any voluntary schemes and/or overgrazing remediation schemes should be rolled out in tandem with an education and guidance programme to ensure that the schemes are carried out in a holistic manner.

**PM9:** An Appropriate Assessment will be required for impassable barrier remediation schemes.

**Assessment: Abstractions (NI: Abstraction and Flow Regulation)**

| | AB4 / AB5 | AB6 / AB7 / AB8 | AB9 | AB10 / AB11 / AB12 / AB13 | AB14 | Cumulative Impact |
|---|---|---|---|---|---|---|
| **Objective 1 (BFF)** | + | +/- | + | +/- | +/- | + |
| **Objective 2 (P)** | + | + | + | + | +/- | + |
| **Objective 3 (HH)** | + | + | + | + | +/- | + |
| **Objective 4 (S)** | + | + | + | +/- | + | + |
| **Objective 5 (W)** | + | + | + | + | + | + |
| **Objective 6 (AQ)** | 0 | 0 | 0 | - | 0/- | - |
| **Objective 7 (C)** | + | + | + | - | 0/- | +/- |
| **Objective 8 (MA1)** | 0 | 0 | 0 | 0 | 0 | 0 |
| **Objective 9 (MA2)** | 0 | + | + | + | + | + |
| **Objective10 (MA3)** | + | + | - | +/- | +/- | +/- |
| **Objective11 (MA4)** | + | + | + | + | + | + |
| **Objective 12 (CH)** | +/- | 0/- | 0 | +/- | +/- | +/- |
| **Objective 13 (L)** | 0 | 0/- | 0 | +/- | 0 | +/- |

***Key**: BFF – Biodiversity, Flora and Fauna; AQ – Air Quality; W – Water; C – Climate; MA – Material Assets; L – Landscape; P – Population; HH – Human Health; S – Soils; CH – Cultural Heritage*

*See **Table 8.11** for further details on the contents of these alternatives*

**Discussion of Assessment**

AB4 and AB5 deal with compensation flows, which can be a useful tool to maintain the health of a river and to safeguard downstream users. The appropriate assessment has identified this as a desirable alternative, with overall benefits for protected areas. Ensuring minimum flow and flow variability as required, will have a direct positive impact on water and on aquatic biodiversity. Indirect positive impacts are likely for human health and soils. Indirect positive impacts are also expected for population and for material assets including angling and tourism, which depend on flows for fish migration, navigation, water supply, etc. In addition, material assets may also benefit as review of compensation flows can offer opportunities for some protection from the effects of climate change into the future. There is some potential for impacts on cultural heritage if flows are regulated. This impact may be positive where minimum flows keep submerged archaeology from exposure or it could be negative where compensation flows cause damage to riverine or bank side archaeology. The impacts for AB4 and AB5 are likely to be felt in the medium to long term.

AB6, AB7 and AB8 focus on ways to reduce demand while also using currently undervalued resources such as grey water through a reduce, reuse, recycle approach. Lower overall requirement for water from abstraction has many positive knock-on effects for the environment. Less abstraction from domestic and industrial settings will lead to reduced demand for supplies and therefore incidences of over abstraction. This will have direct positive impacts for surface and groundwater and also aquatic biodiversity, which may be under stress from increased low flow periods and changes to the hydrological regime. Water availability is a key driver of development and economic growth; therefore, strategies to reduce consumption would result in less drinking water requiring treatment and consequently less wastewater requiring treatment. This would have indirect positive impacts on climate change as less energy will be required and consequently lower $CO_2$ outputs would be expected. Also, with lower consumption there will be reduced need to improve and provide more water management infrastructure allowing funds to be redirected to other areas. This would have

indirect positive impacts for population and the economy generally. In the longer term, reduced consumption will improve capacity overall and facilitate continued growth and development in line with government policies, i.e. development strategies. The success of such alternatives will be closely related to education and awareness. Building infrastructure for alternate sources would have the potential to impact negatively on biodiversity as well as landscape and cultural heritage. Elements of AB7 and AB8 could be put in place in the short-term, especially if supported by education and awareness.

AB9 is likely to be the most controversial of the alternatives proposed for abstraction. It has the potential to significantly reduce the volumes of water used and wastewater produced and will have similar positive impacts to AB7 / AB8. The main direct negative impact relates to economic activity, i.e. domestic users. The acceptance of this alternative will be dependent on proper education and awareness to demonstrate how water can be conserved in the home and also on the manner in which metering is developed. It is anticipated that this alternative will require political debate before any concrete actions are taken. Rolling out of metering would also then involve considerable resource input; therefore, it is likely that impacts would not be felt until well into the medium term horizon (i.e. beyond 2015).

Reducing the volume of abstraction (AB10) is anticipated to have direct positive impacts on water quality and aquatic biodiversity by endeavouring to make adequate water available to provide dilution capacity for external inputs to the system; however, improvements will be dependant on local conditions. The appropriate assessment has recognised that this alternative would have a particularly positive effect on biodiversity in over abstracted catchments, and should be implemented where over abstraction has been identified. Reduced volumes will have direct positive impacts for biodiversity by reducing the risk to flora and fauna from eutrophication or high levels of dangerous substances in a waterbody. This will also have indirect positive impacts for human health and economic activities reliant on good water quality e.g. tourism, water supply, etc. Reducing volumes may restrict or limit development and this would result in an indirect negative impact to economic development in an area unless additional sources could be identified. AB12 will have similar impacts to AB10 as it reduces the volumes required from a single source. AB11 will also have similar impacts to AB10. It focuses abstraction to periods when the system has adequate carrying capacity. It is likely that this alternative would be used in combination with storage AB13. Positive impacts are anticipated for biodiversity, especially in systems currently experiencing eutrophication. However, provision of storage may potentially indirectly impact positively or negatively on biodiversity and soil depending on the location of storage and the type of storage used, e.g. water towers, degraded wetland areas. Storage also provides opportunities for spread of alien species, e.g. zebra mussel, as water is moved from one location to another. Additional water management infrastructure, e.g. pumping station, piping, etc. would be required with a storage option and this has associated energy costs for additional construction and for the operation, indirectly impacting on climate change. A similar impact would be expected with AB12 conjunctive use. AB12 and AB11 / AB13 offers many benefits in terms of economic activity as they facilitate continued development while working with environmental conditions to reduce impacts. In addition, storage facilities have the potential to have indirect permanent positive impacts on tourism, angling and biodiversity (incorporating landscape and cultural interests if relevant) if the storage can be designed to provide a multi-purpose sustainable resource. Construction impacts associated with the provision of additional infrastructure for storage / conjunctive use will be temporary. In all cases there is potential to indirectly negatively impact on cultural heritage and landscape as a result of siting of infrastructure. Impacts from these alternatives are unlikely before the medium-term horizon and it is likely to take longer to research and implement the changes required.

AB14 has implications for planning and land use. Directing development to areas with adequate capacity and limiting development in areas which have reached capacity will result in positive impacts for water quality by ensuring that the volume of water required to support development is maintained within sustainable limits. This alternative would ensure this factor is taken into account in strategic planning. The drinking water resource should be a critical factor in the location of development; however, it should not contribute to overdevelopment of areas where this resource is plentiful. This will have indirect positive impacts on biodiversity, in particular habitats such as wetlands, which are in

danger of reduced flow or drying out. It will also have indirect positive impacts on the groundwater resource by ensuring that abstractions of this resource do not exceed the recharge potential of an aquifer and possibly lead to lowering the groundwater table or causing salt water intrusion in coastal areas. Directing development to existing urban areas will allow opportunities to rehabilitate brownfield sites with indirect positive impacts on soil as well. Focussing infrastructure will allow for improved services and a more efficient and sustainable water supply if a holistic approach is taken to planning generally. However, directing development may have negative impacts if other associated services, such as public transport and waste, do not also exist. This could have negative impacts on population, human health, biodiversity, economy, air quality and climate. There will be potential negative impacts on economic activities in a given area or region, particularly agriculture, forestry, energy, and drinking water provision, if development is redirected and or restricted. However, by ensuring that the water resource is not compromised by over-abstraction due to development pressure, water dependent economic activities, e.g. tourism and angling, will experience an indirect positive impact. While archaeology and cultural heritage will benefit from indirect positive benefits from reduced pressure associated with over abstraction, e.g. potential exposure of crannogs, as a result of lowering water levels, potential indirect negative impacts may occur where traditional industry or development is restricted or not permitted. This alternative could have relatively short-tem impacts by reducing the cumulative effect from future planning applications.

**Cumulative Impact**

The implementation of the majority of the abstraction alternatives will result in a positive cumulative impact on the receiving environment; however, some small potential exists for negative cumulative impacts on air quality and climate if all the alternatives were implemented together. This relates to impacts associated with the increased infrastructure required with any option requiring storage or conjunctive use. These impacts would be from the transport and production of materials for infrastructure and also the additional energy costs associated with operation of pumping stations, etc. The GHG emissions associated with construction and operation can be mitigated by a focussed awareness campaign on water use to reduce the volumes used / wasted, followed by leakage improvement and only then looking at new infrastructure. Any new infrastructure, e.g. storage, should source its fuel from renewable sources. The site locations of new infrastructure could potentially impact negatively on cultural heritage and landscape if the sites are chosen poorly. Also, there are potential negative impacts relating to material assets (MA3) and economic activity through water metering and charging programmes, and reducing volumes may restrict or limit development.

**Mitigation**

**AB4:** The assessment shall determine whether compensation flow is sufficient to meet the needs of in stream flora and fauna.

**AB5:** This alternative should take account of the results from AB4.

**AB6-8**: Although water conservation awareness campaigns have been implemented the message has not hit home for many people. It is therefore recommended that a working group be established to develop tools to promote water awareness and these tools are included in future water awareness campaigns.

**AB8:** An Appropriate Assessment should be undertaken for any new infrastructure.

**AB9:** Suitable education and awareness campaigns are recommended to provide residential users with the tools / knowledge to reduce water consumption. It is also strongly recommended that water metering schemes promote conservation.

**AB10:** An Appropriate Assessment should be carried out.

**AB12:** An Appropriate Assessment should be carried out.

**AB13:** Possible storage sites should not impact negatively on sensitive habitats and species. Good quality agricultural land should also be avoided where alternatives exist. Storage options will include proposals for biodiversity enhancement and opportunities for economic benefit e.g. tourism, angling without compromising environmental sustainability. Energy required for pumping stations should be sourced from renewable sources.

**AB13:** A protocol for prevention of the spread of any alien species shall be developed and agreed with the relevant authority and the relevant fisheries board in advance of any inter-catchment transfers.

**AB13:** An Appropriate Assessment should be undertaken for any proposed storage facility.

**AB14:** It is recommended that the Planning Authority, in directing or restricting development take account not only of the water capacity of an area but its wider capacity in terms of cultural heritage, biodiversity and landscape, etc.

**AB14:** An Appropriate Assessment should be considered for new abstractions in line with the requirements of the Habitats Directive.

**All:** A focussed awareness campaign on water use will be implemented to reduce the volumes of water used / wasted, followed by leakage improvement and only then new infrastructure. Any new infrastructure e.g. storage should source its fuel from renewable sources.

**Assessment: Freshwater Pearl Mussel**

| | FPM1 | FPM3 | FPM4 | FPM6/ FPM7 | FPM9 | FPM10 / FPM11 / FPM12 | FPM13 / FPM15 / FPM16 | FPM17 / FPM18 | FPM19 | FPM21 / FPM22 | FPM23 | FPM 26/ FPM 27 | Cumulative impact |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Objective 1 (BFF)** | +/- | + | + | + | +/- | + | + | +/- | +/- | + | + | +/- | + |
| **Objective 2 (Pop)** | + | +/- | + | + | +/- | + | + | + | + | + | + | +/- | + |
| **Objective 3 (HH)** | + | + | + | + | +/- | + | + | + | + | + | + | +/- | + |
| **Objective 4 (S)** | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Objective 5 (W)** | + | + | + | + | + | + | + | + | + | + | + | + | + |
| **Objective 6 (AQ)** | 0 | - | 0 | - | 0 | 0 | + | 0 | 0 | + | 0 | 0 | +/- |
| **Objective 7 (CC)** | 0 | - | 0 | - | 0 | - | + | 0 | 0 | + | 0 | 0 | +/- |
| **Objective 8 (MA1)** | 0 | 0 | 0 | 0 | 0/- | 0 | 0 | 0 | 0 | 0 | 0 | - | - |
| **Objective 9 (MA2)** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + | + | + | 0 | 0 | + |
| **Objective10 (MA3)** | + | - | - | - | 0/- | - | - | - | - | + | 0 | - | - |
| **Objective 11 (MA4)** | + | + | + | + | +/- | + | + | + | + | + | + | 0 | + |
| **Objective 12 (CH)** | +/- | 0 | 0 | 0 | 0/- | 0 | 0 | 0 | 0 | 0 | 0 | 0/- | 0/- |
| **Objective 13 (L)** | 0 | 0 | 0 | 0 | 0/- | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0/- |

**Discussion of Assessment**

The freshwater pearl mussel *Margaritifera margaritifera* is protected under several tiers of national and international legislation and red data listings. Currently Ireland has stretches of 36 rivers within 26 sub-basins designated as SACs for the freshwater pearl mussel *Margaritifera margaritifera* and one river stretch in one sub-basin designated for *M. durrovensis*. The Freshwater Pearl Mussel (FPM) requires very high quality rivers with clean riverbeds and waters with very low levels of nutrients.

Within the draft Plan, waters have been classified as moderate status where they contain the FPM populations for which a Natura 2000 site was designated and where these populations are not at favourable conservation status. Some of these waters would otherwise have been classified as good or high status if the more stringent objectives for the freshwater pearl mussel did not apply.

Consultation during the SEA process has highlighted concerns that this approach may lead to an overall perception of bad water quality for the rivers associated with FPM catchments and that this may result in negative impacts on water dependent sectors due to the perception that these catchments are of poor water quality due to their classification as moderate, regardless of underlying status. Concerns were raised that if a similar approach is not taken in other European countries this could leave Ireland at a competitive disadvantage in the tourism sector. However, improvements in water quality required for FPM catchments will, in the long term raise the status of these catchments to High and this could have indirect positive impacts on the tourism sector if this aspect

of the “green environment” is marketed in Ireland and abroad.

Measures will have indirect negative short to medium term impacts on other sectors also particularly farming and forestry as proposed measures will require some significant management changes. Two particular key drivers for FPM in Ireland are sedimentation / siltation and nutrient enrichment. Forest harvesting and bank side grazing by farm animals would be areas, which would require more detailed measures. Nutrient release from farmyards, slurry runoff and water access by cattle all add to nutrient enrichment of waters, which cause algal blooms and can indirectly impact on survival of the FPM. Phosphorus is of particular concern for FPM and stricter thresholds of achievement may be required.

FPM1 will have overall positive benefits for protected areas. Ensuring that control of flows is done in a more natural manner will have a direct positive impact on water and on aquatic biodiversity with indirect positive impacts for human health and soils. Indirect positive impacts are also expected for population and for material assets including angling and tourism, which depend on flows for fish migration, navigation, water supply, etc. In addition, material assets may also benefit as natural flows can offer opportunities for some protection from the effects of climate change into the future. There is some potential for impacts on cultural heritage if flows have to be altered significantly. This impact may be positive where flows keep submerged archaeology from exposure or it could be negative where natural flows cause damage to riverine or bank side archaeology. The impacts of FPM1 are likely to be felt in the medium to long term.

As mentioned above, two of the key drivers for FPM are siltation and nutrient enrichment. By providing effective buffer strips in FPM3, these pressures can be effectively controlled. Fencing will prevent access by livestock to the rivers edge, which will control erosion of the riverbank. In addition, the buffer zone will act as a filter for nutrients before they reach the water body. This alternative will therefore have an indirect positive impact on water and aquatic biodiversity and human health and a direct positive impact on soils and also on terrestrial biodiversity along the rivers edge. It would indirectly contribute to protecting the economic value of the water resource, due to improvements in water quality; however, it will result in some loss of productive land from agricultural units and/or reduction in access to water for livestock, which may lead to indirect negative economic impacts for the farming sector. Removal of land from agricultural production could also lead to reduced production capacity, potentially increasing the need to import food. This would indirectly impact on air quality and climate in the medium to long term through increased transport related emissions from food imports. Indirect, medium to long term negative impacts on population are also possible if increased imports are required to satisfy local demand for basic foodstuffs.

The FPM plans have identified FPM4 as a critical alternative to reduce the impacts of sedimentation, noting that particular attention should be paid to sensitive protected areas. This measure is expected to result in positive impacts on aquatic biodiversity and water quality, leading to indirect positive impacts on population and human health, and on the economic value of the water itself. This alternative would require a change in management practices for peatlands from those already being carried out and as such would be expected to result in direct, short to medium term negative impacts for material assets due to the costs associated with silt trapping and establishment of buffer zones. The buffer zones may result in some loss of productive land. The positive impacts are likely to be realised on a medium to long-term basis.

FPM6 and FPM7 outline a specific action to address a common impact of temporary or permanent pollution from road construction and operation. It is likely to take some time to realise the positive benefits of these measures to water quality and soils human health and aquatic biodiversity. Sedimentation and alkalinity problems (pH) will continue to exert an influence on aquatic and terrestrial environment. However, these measures are expected to result in positive impacts in these issue areas in the long term, in addition to long term indirect positive impacts on the economic value of the water itself. Indirect impacts on air quality and climate in the short to medium term through increased retrofitting construction related emissions (manufacture and import of new materials, export and disposal of old materials), together with direct impacts in the short-term to the cost of road construction and operation are also expected. However, as these measures became common practice it would be expected that they would become part of the normal process of road construction and operation

reducing long term cost implications.

FPM9 will offer a reduction and rehabilitation approach to assist in improving water quality impacted by physical modification. This alternative would result in direct positive impacts to water quality and aquatic biodiversity. FPM9 will improve rivers previously impacted, and this in particular will benefit rivers which were previously straightened, or where habitats for fish spawning were destroyed. This will allow naturalisation of the river channel and re-colonisation of previously unsuitable areas by flora and fauna. Indirect positive impacts to human health and population are expected as a result of improvements to water quality. The potential for negative impacts from this alternative is dependant on the methodology in which it is implemented. There is a need for a holistic approach to be applied so that implementation does not result in indirect negative impacts in other issue areas. For instance, altering the morphology of a river channel may give rise to direct and indirect negative impacts to architecture, archaeology and cultural heritage. Further altering morphology may have indirect negative impacts on landscape as features may form important parts of the landscape and morphological alterations may result in their loss.

In addition, though remediation of channelisation, could be seen to have direct positive impacts to biodiversity, these could in fact result in negative impacts to existing habitats, which developed as a result of these physical modifications. For example, remediation could lower the water level and affect flow rates, thereby changing the hydrologic regime, which is one of the principal factors influencing the ecology of aquatic ecosystems. Physical modifications are usually in place to meet a specific need, be it reduction of flood risk, improvement of navigation or provision of renewable energy. The impacts of removing and/or altering these features will need to be considered against the gains in water quality that will be achieved. Also, removal of flood defences could result in indirect impacts on human health, population and material assets should flood risks increase. Further, the removal of flood defences may enlarge the floodplain, potentially restricting future development potential. Impacts are likely to be in the medium to long-term for this alternative, as further assessment will be required to identify where remediation schemes are likely to provide the greatest benefit.

FPM10, FPM11 and FPM12 include many of the alternatives already assessed under forestry and the reader is directed to that table for additional commentary. These alternatives will have direct impacts on terrestrial biodiversity, soils and material assets and indirect impacts on water quality, aquatic biodiversity, human health and the water resource. These alternatives would require a significant change in the composition and/or extent of the coniferous plantations themselves. The costs associated with implementing these changes, and limitation in available area for planting these measures could result in direct, negative impacts on this economic resource. Reductions in the amount of timber produced could also impact on availability of Irish timber products for sale domestically or for export. Similarly, these alternatives would reduce the amount timber that could be harvested in a given period by reducing the coup size, which may also result in direct impacts in relation to material assets. The potential for the reduction in forest size or change in composition could affect the carbon dioxide sequestering capacity of existing forest stocks. If the carbon dioxide sequestering capacity is reduced, this could result in indirect negative long-term impacts to climate.

The more holistic approach to forest/woodland management within designated catchments will result in the greatest benefit to the environment generally and water quality in particular. Changes to species diversity and structural diversity will have direct positive impacts to forest biodiversity, especially where monocultures of plantation forest have been planted. It is likely to take some time to realise the direct positive benefits of these measures to water and soil quality (and indirectly human health and aquatic biodiversity). These changes in forest structure and species mix would also result in long term, direct positive impacts to terrestrial biodiversity, through the reintroduction of native species, which is would be of benefit to protected areas.

FPM13, FPM15 and FPM16 would each indirectly contribute to protecting the economic value of the water resource, due to improvements in water quality; however, FPM15 will result in some reduction in access to water for livestock, which may lead to indirect negative economic impacts for the farming sector. FPM13 relates to nutrient management planning. Direct positive impacts to soils and indirect positive impacts to water quality from this alternative will also

result in indirect positive impacts to aquatic biodiversity and human health. As nutrient management planning will result in more efficient use of slurries, this will reduce the need to import fertilisers, which would have indirect positive impacts in relation to air quality and climate (reduced transport). These alternatives would likely result in some additional costs to farmers however reduced need for artificial fertilizer application would also save on costs. FPM13 and FPM15 would require changes to current farm management practices and upgrade of management systems. The associated cost of these could have a direct negative impact on the economic viability of individual farm operations. As with the other alternatives, the direct positive impacts to soils will be experienced, as will indirect positive impacts to water quality, aquatic biodiversity and human health. Impacts are likely to be medium to long term for these alternatives as management plans will be required, however, short terms impacts may be possible if measures are implemented quickly.

FPM 17 and FPM 18 relate to treatment options. Upgrading existing septic tanks and small effluent systems that are not effectively capturing pollutants will have direct positive impacts on water quality and indirect positive impacts population and human health. Reducing nutrient inputs to the aquatic system will have a positive impact on FPM, however other flora and fauna dependant on the elevated levels of nutrients may be lost as a result. The upgrading of defective or insufficient systems will provide even further benefit for water quality, aquatic biodiversity and indirect positive impacts to human health, together with increasing the economic value of the water. Likewise, ensuring that household pumping of potential nutrient sources to waste water systems will only add further to water quality. However, alterations and upgrades to existing systems will result in increased initial expenditure but will be off set by the positive impact over the longer term. The impacts are likely to be medium to long term as surveying and upgrading of all existing septic tanks, small effluent systems and household plumbing will be rather time consuming.

Increasing the level of treatment as a result of FPM19 will have direct positive impacts on material assets by providing for upgrades to existing water management infrastructure. The alternative will have indirect positive impacts for water quality, biodiversity, soils and human health by improving the quality of waste water. Reducing the nutrient load entering water bodies will reduce weed and aquatic plant growth, as well as reducing the risk of potential toxicity to fish and other aquatic life. It will increase dissolved oxygen in the water body to the positive benefit of the natural system. Reduced nutrient loads will improve water quality and reduce the impacts of eutrophication. The removal of elevated levels of nutrients currently providing an unnatural level of food supply for certain species, will cause the composition of flora and fauna to return to a more natural and sustainable level. Altering nutrient load from municipal and industrial discharge may therefore indirectly impact on biodiversity by altering the existing food web dynamics of the receiving environment. There will be negative impacts associated with alterations to road management plans as a result of amendments to salt management. Impacts are likely to be medium to long term for these alternatives as surveying of existing municipal and industrial outfall discharges will be rather time consuming.

FPM21 and FPM22 both relate to an education and awareness campaign. Such campaigns will have an overall positive impact on the environment by raising awareness of the issues and providing opportunities for concerned individuals and stakeholders to become part of the solution. Prevention of pollution or limiting the amount of pollutants entering the surface and groundwater networks will have a positive affect on the environment, and will reduce expenditure on pollution clean up and treatment. No negative impacts are anticipated. Impacts from this alternative can be effective in the short-term and beyond as education will be the building block for all the measures that follow.

Providing managed walkways and controlling access to unstable riverbanks in FPM23 will have direct positive impacts on population and human health by and also the tourism sector by providing access to recreational walks. This alternative will have indirect positive impacts on water quality, aquatic biodiversity, soils and material assets by limiting walks to specific areas, protecting venerable, unstable river banks and promoting awareness of the ecology and biodiversity within these catchments.

FPM26 requires removal (as necessary) of weirs, croys and stone banks in FPM catchments and will overall be of positive benefit for fish movement in

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| particular, and for the wider biodiversity of surface waters. FPM27 will improve rivers previously impacted from sand, gravel and stone extraction, and this in particular will benefit rivers where habitats for fish spawning were destroyed. Indirect positive impacts to human health and population are expected from these alternatives as a result of improvements to water quality. The potential for negative impacts from these alternatives is dependant on the methodology in which they are implemented. There is a need for a holistic approach to be applied in each of these cases so that implementation does not result in indirect negative impacts in other issue areas. For instance, the removal of weirs may give rise to negative impacts to architecture, archaeology and cultural heritage. Industrial archaeology and cultural heritage features in particular can include old bridges, walls of dams, etc. These features may also form important parts of the landscape and their removal could give rise to further indirect negative impacts on landscape. In addition, though remediation could be seen to have direct positive impacts to biodiversity, these could in fact result in negative impacts to existing habitats, which developed as a result of these physical modifications. For example, removal of weirs could lower the water level and affect flow rates, thereby changing the hydrologic regime, which is one of the principal factors influencing the ecology of aquatic ecosystems.<br><br>Physical modifications are usually in place to meet a specific need, be it reduction of flood risk, improvement of navigation or provision of renewable energy. The impacts of removing and/or altering these features will need to be considered against the gains in water quality that will be achieved. Also, removal of flood defences could result in indirect impacts on human health, population and material assets should flood risks increase. Further, the removal of flood defences may enlarge the floodplain, potentially restricting future development potential. Impacts are likely to be in the medium to long-term for these alternatives, as further assessment will be required to identify where enhancement schemes are likely to provide the greatest benefit. |
| **Cumulative impact** |
| Overall the cumulative impact of the alternatives proposed for FPM will have neutral to positive impacts on the receiving environment. Cases where negative impacts have been identified are climate (C) and material assets (MA1 and MA3). The potentially negative impacts to climate are principally related to transport emissions and potentially reduced carbon dioxide sequestering capacity as a result of forestry alternatives. However, these are short to medium term impacts and could potentially be offset. The other negative cumulative impact relates to increased operational costs associated with implementation of the proposed alternatives. In some cases compensation may be available (e.g. loss of land); however, it is recognised that in many cases the improvement will be borne by individual landowners and mitigation for income loss will not be available. |
| **Mitigation** |

**FPM1** will require monitoring of the success of changes implemented to ascertain if modification to a natural flow benefits FPM.

**FPM3:** It is recommended that compensation be linked to annual upkeep of fences and management of buffers to ensure the ongoing benefit of this alternative.

**FPM6, FPM7:** An impact assessment will be required for future roads and brides of any size to ascertain the potential of damage to the mussel population alone or in conjunction with other effects.

**FPM9:** Flood and ecological impact assessments will be required prior to any remediation works. There is a need for a holistic approach to be applied so that implementation does not result in indirect negative impacts in other issue areas.

**FPM10, FPM11 and FPM12:** It is recommended that prior to any changes in forest size or species mix a study is carried out to determine the change in the carbon dioxide sequestering capacity of the forest. Should sequestering capacity be reduced, compensation measures will be required to offset these.

**FPM17, FPM18 and FPM19:** In-stream data loggers for turbidity and regular water sampling will be required as part of these alternatives.

**FPM26 and FPM27:** There is a need for a holistic approach to be applied so that implementation does not result in indirect negative impacts in other issue areas. Flood and aquatic impact assessments will be required prior to any river bed or bank works.