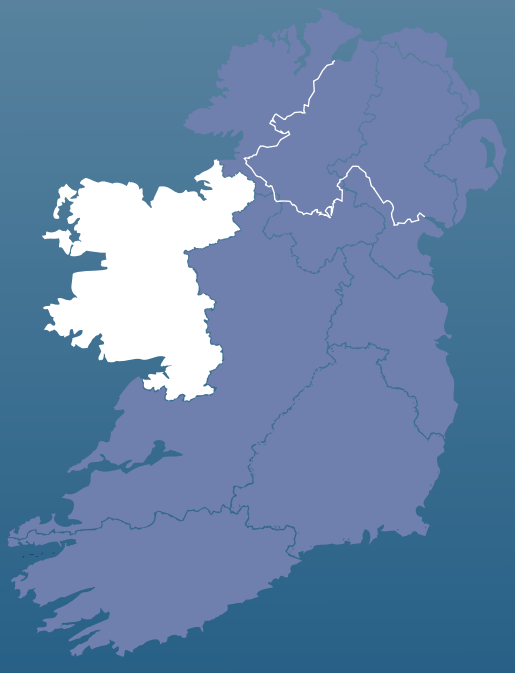
Strategic Environmental Assessment for the Water Framework Directive River Basin Management Plans and Programmes of Measures - Western RBD

Updated Environmental Report and Appendices



North Western | Neagh Bann | North Eastern | Western | Eastern | Shannon | South Eastern | South Western

NON-TECHNICAL SUMMARY

INTRODUCTION

This Environmental Report has been prepared as part of the Strategic Environmental Assessment (SEA) of the River Basin Management Plan and Programme of Measures (hereafter referred to as the Plan and POM) for the Western River Basin District (RBD) in accordance with national and EU legislation. SEA is a systematic method of considering the likely significant environmental effects of a Plan or Programme by integrating environmental factors into the development of the Plan and related decision-making.

The purpose of this Environmental Report is to: a) inform the development of the Plan; b) identify describe and evaluate the likely significant effects of the Plan and its reasonable alternatives; and c) provide an early opportunity for the statutory authorities and the public to offer views through consultation.

METHODOLOGY INCLUDING CONSULTATION (Chapter 2 and 4)

This Environmental Report contains the findings of the assessment of the likely significant effects on the environment, of implementing the proposed draft Plan and POM. It reflects the requirements of the SEA Directive (2001/42/EC) on the assessment of the effects of certain plans and programmes on the environment and also the transposed regulations in Ireland (S.I. 435/2004). The stages followed in the SEA are summarised in **Figure 1** below.

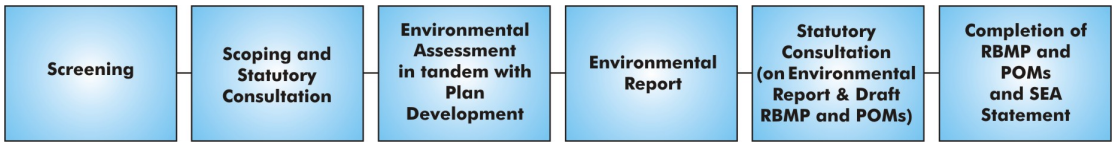


Figure 1 Summary of SEA stages

Integration of the SEA and draft Plan and POM was achieved through close involvement of relevant team members in all stages of the project, including SEA scoping; review of the existing situation; and public consultation. The SEA and Plan Teams also participated in a number of workshops in relation to developing the: SEA assessment methodology; alternatives to be considered in the SEA; SEA objectives, targets and indicators; and mitigation measures and monitoring strategies. The development of the River Basin Management Plan, including the Programme of Measures, was progressed in consultation with the *River Basin Management Plan and Programme of Measures Strategic Environmental Assessment Steering Group (see Chapter 4)*.

SCOPING THE RELEVANT ENVIRONMENTAL ASPECTS

The objective of scoping is to identify key issues of concern that should be addressed in the environmental assessment of the Plan and POM so that they can be considered in appropriate detail. Scoping also helps determine the boundaries of the assessment in terms of geographical extent and the time horizon for the assessment. **Figure 2** outlines the various elements that contribute to the scope of the SEA.

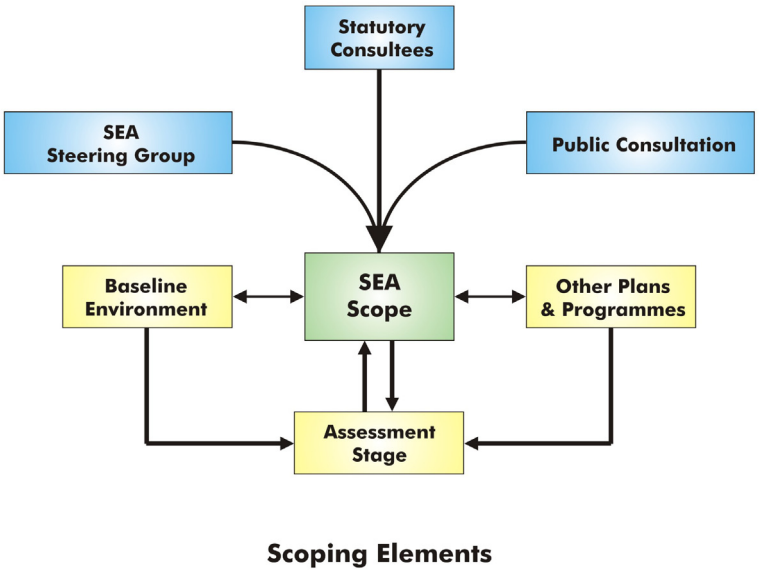


Figure 2 Overview of the Scoping Process

Consultation was carried out with the statutory consultees (Department of Communications, Energy and Natural Resources, Department of the Environment, Heritage and Local Government and Environmental Protection Agency) and with the public and other stakeholders. Taking into consideration feedback from consultees, a broad assessment of the potential for the Plan to influence the environment was carried out. All of the environmental topics listed in the SEA Directive have been scoped in for the assessment of the Plan. These are:

- Biodiversity, Flora and Fauna;
- Population;
- Human Health;
- Soil;
- Water;
- Landscape;

- Air;
- Climatic Factors;
- Material Assets; and
- Cultural, Architectural and Archaeological Heritage.

The draft Western River Basin Management Plan and POM is a regional plan for the Western RBD and as such the assessment has been limited geographically to activities occurring within the functional area of the Plan. The first Plan and POM will cover the period from 2009 up to 2015, with an interim review after three years. In certain circumstances the draft Plan considers the timeline horizons of 2021 and 2027, being the end of the second and third 6-year Plan cycles, respectively. These longer-term horizons are necessary where good status or good potential or indeed LSO (less stringent objectives) cannot be achieved by 2015 or where measures to achieve these are deemed technically infeasible or disproportionate in cost. In line with the SEA Directive, short, medium and long-term impacts have been considered during the assessment. As the Plan is on a regional scale, the majority of the data relates to overall national and regional performance.

Based on the requirements of the legislation and guidance, the following information is provided in the Environmental Report.

Table 1 Contents of the Environmental Report

Requirement of SEA Directive (Article 5(1), Annex 1)	Section of Environmental Report
An outline of the contents and main objectives of the plan or programme, or modification to a plan or programme, and relationship with other relevant plans or programmes;	Chapter 3: Description of the Plan Chapter 4: Consultation
The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme, or modification to a plan or programme,	Chapter 5: Baseline Environment
The environmental characteristics of areas likely to be significantly affected	Chapter 5: Baseline Environment
Any existing environmental problems which are relevant to the plan or programme, or modification to a plan or programme, including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to the Birds Directive or the Habitats Directive	Chapter 5: Baseline Environment
The environmental protection objectives, established at international, European Union or national level, which are relevant to the plan or programme, or modification to a plan or programme, and the way those objectives and any environmental considerations have been taken into account during its preparation	Chapter 6: Review of Relevant Plans, Programmes and Policies

Requirement of SEA Directive (Article 5(1), Annex 1)	Section of Environmental Report
The likely significant 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	Chapter 9: Assessment
The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme, or modification to a plan or programme	Chapter 10: Mitigation and Monitoring
An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information	Chapter 2: Methodology Chapter 7: Strategic Environmental Objectives, Targets and Indicators Chapter 8: Alternatives
A description of the measures envisaged concerning monitoring of the significant environmental effects of implementation of the plan or programme, or modification to a plan or programme	Chapter 10: Mitigation and Monitoring
A non-technical summary of the information provided under the above headings	Non-Technical Summary

Habitats Directive Assessment Consultation (Chapter 4)

In addition to this SEA, there is a requirement under the EU Habitats Directive assess whether the Plan has the potential to impact negatively on a Natura 2000 site. These sites include areas designated for the protection and conservation of habitats and of wild flora and fauna and include Special Protection Areas and Special Areas of Conservation. The Habitats Directive Assessment (also known as Appropriate Assessment) has been carried out in conjunction with both the SEA and the Plan making processes. Consultation on methodology of approach has taken place with both the National Parks and Wildlife Service (NPWS) as the competent authority in Ireland.

DESCRIPTION OF THE PLAN (Chapter 3)

The Water Framework Directive (WFD) (2000/60/EC) came into force in December 2000 and establishes a framework for community action in the field of water policy and for the protection of inland surface waters, transitional waters, coastal waters and groundwater.

The main objectives of the WFD are to maintain the "high and good status" of waters where it exists, prevent deterioration in existing status of waters and to achieve or restore at least *"*good status*"* in relation to all waters by 2015. The mechanism to achieve this under the WFD is through the adoption and implementation of River Basin Management Plans (RBMPs) and Programmes of Measures (POMs) for each of the eight identified RBDs (see **Figure 3**).

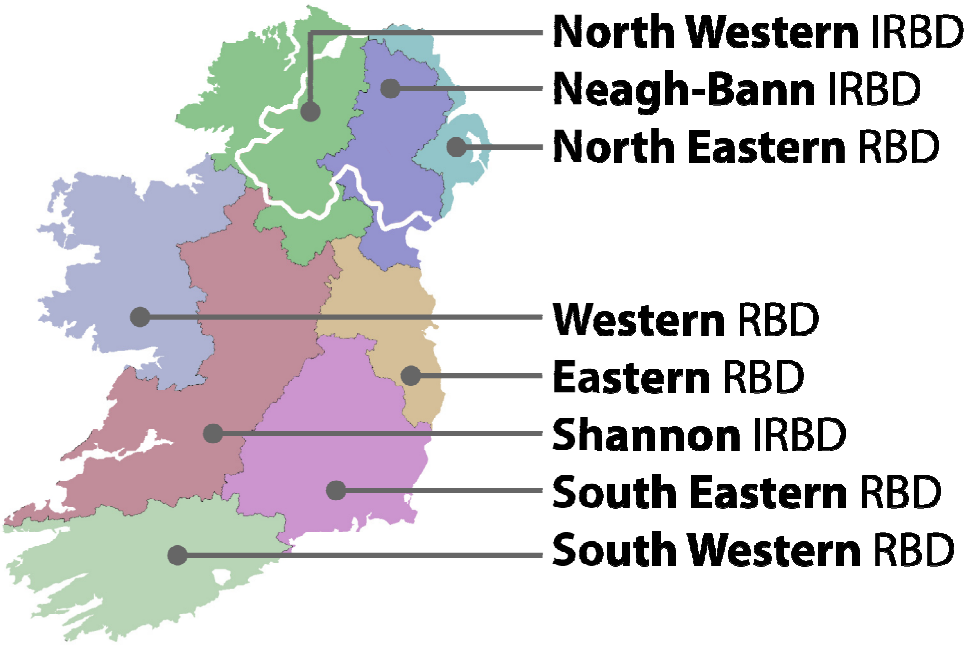


Figure 3 River Basin Management areas of Ireland

The Western River Basin District stretches from County Clare in the south to County Leitrim in the north, containing parts of Counties Galway, Galway City, Mayo, Roscommon, and Sligo. The Western RBD incorporates all or part of seven local authority areas. The Western RBD includes all of Galway City Council, parts of Clare County, Galway County, Leitrim County, Mayo County, Roscommon County and Sligo County Councils. Each of the local authorities for these areas is a competent authority for the Western RBD, with Galway County Council the co-ordinating authority for the Western RBD.

The Atlantic Ocean is responsible for the rugged coastline with its many islands, inlets and headlands.

The Plan outlines measures to tackle key water pressures in the District. Some issues of concern in the WRBD for which measures are proposed in the draft Plan include: spread of invasive alien species; pressure on fisheries; presence of heavily modified and artificial water bodies; point and diffuse pollution from wastewater treatment plants, licensed discharges, mines, landfills, quarries and contaminated lands; agriculture; unsewered properties; forestry; physical modifications; and abstraction. The overall objectives of the Plan are based on the objectives of the WFD and can be summarised as follows:

- Enable waters supporting protected areas to achieve their stricter status standards;
- Prevent deterioration, and in particular maintain high or good status (surface water);
- Improve waters where appropriate to achieve at least good standards (surface water);

- Progressively reduce chemical pollution (surface water);
- Limit Pollution Inputs and prevent deterioration (groundwater);
- Improve chemical quality and improve quantity where appropriate to achieve good status (groundwater); and
- Reverse increasing pollution trends (groundwater).

REVIEW OF RELEVANT PLANS, POLICIES AND PROGRAMMES (Chapter 6)

A review of the plans, policies and programmes relevant to the Plan was carried out. The review focussed primarily on National, European and International plans and programmes. In reviewing other plans, the following questions were asked:

- Does the Plan contribute to the fulfilment of objectives and goals set in other Plans?
- To what degree are the goals and objectives set in other plans and programmes impacted by the Plan?

The findings of the review helped define the objectives for the SEA and informed the assessment of alternative options. Some of the key Plans, Programmes and Policies include;

- The Kyoto Protocol;
- The EIA Directive;
- The EU Habitats and Birds Directives;
- The Groundwater Directive (2006/118/EC); and
- The EU Floods Directive (2007/60/EC).

THE BASELINE ENVIRONMENT (Chapter 5)

As this strategic environmental assessment deals with a plan for the Western RBD, the baseline data is focused at the RBD level.

According to recent EPA publications (EPA, 2008), Ireland's natural environment, although under increasing pressure, generally remains of good quality and represents one of the country's most essential national assets. The fourth EPA *State of the Environment Report* (2008) identified four priority challenges for the environment, which comprise: limiting and adapting to climate change; reversing environmental degradation; mainstreaming environmental considerations; and complying

with environmental legislation and agreements. **Table 2** sets out existing environmental pressures in the WRBD.

Table 2 Baseline Environment and Existing Environmental Pressures

Aspect	Existing Environmental Pressures
Biodiversity, Flora and Fauna	Throughout the island of Ireland there has been a decline in many of the native species through habitat loss, competition, development and agriculture. Wastewater discharges, runoff from agriculture, leachate from landfills and contaminated sites and nutrient input from forestry can all have detrimental effects on water quality resulting in subsequent impacts to biodiversity. Annex II species such as freshwater pearl mussel and salmon are particularly sensitive to pollution. Widespread development on shorelines and floodplains and the associated infilling of wetlands, is a potential environmental problem within this District. Invasive non-native plant and animal species are one of the greatest threats to biodiversity in Ireland.
Population and Human Health	Ireland's economy has experienced unprecedented economic growth since the early 1990's. New individual houses and housing clusters, reliant on septic tanks, threaten water quality. Additional homes mean the spread of urban areas and an increase in rural housing, with the associated threat of more water pollution. Pressure from abstractions can reduce flow in springs and lower water levels in lakes, wetlands and wells. Although water supplies in terms of quantity are not at present seen as a major issue in the Western River Basin District, the development of some regional water supply schemes may have a future impact.
Water	The main pressures on surface and groundwater quality within the RBD are point and diffuse, physical modifications, climate change and other local issues. Point and diffuse sources include; wastewater and industrial discharges, landfills, quarries, mines and contaminated sites, agriculture, wastewater from unsewered properties, forestry; and discharge of dangerous substances.
Air and Climate	Currently there are no significant concerns with regard to air quality at the River Basin District level. With regard to climate, inputs of greenhouses gasses from water management activities in the River Basin District, which require the use of fossil fuels, add to the carbon dioxide emissions produced on the island.
Cultural Heritage	Development of water-related infrastructure, in addition to development resulting from economic growth and increasing population, is placing pressure on sites or features of architectural, archaeological or cultural heritage interest.
Landscape and Visual	Existing pressures on landscape and visual resources as a result of water management activities are limited and are primarily related to impacts to sensitive views and landscapes resulting from the siting of development, including water related infrastructure, without sensitivity to these resources.
Material Assets	Increased development including residential and industrial expansion continues to put pressure on existing water sources with regards to quantity as well as on the treatment facilities used to treat both raw water for drinking and other purposes and wastewater. In addition, existing water quality issues are resulting in pressures on economic shellfish and aquaculture activities along with fisheries used for recreational purposes. Some of the physical modifications identified as material assets, such as dams and weirs, may also be resulting in pressures on fisheries used for recreational and commercial purposes.
Soils and Land Use	Precipitation changes, predicted as one of the global warming impacts on Ireland, could have serious implications for slope stability and landslides and their resultant impacts on water management activities.

Aspect	Existing Environmental Pressures
	Eroded soil washed into rivers during heavy rainfall contains an increased nutrient content, which can damage the balance of nutrient poor, aquatic ecosystems by shifting their species composition, supporting more nutrient-loving species. This can lead to the eutrophication of rivers and lakes. As discussed previously, extraction activities, when mismanaged, are resulting in pressures on water quality. In particular, peat cutting can be damaging to vegetation, hydrology and landscape. Alternately, the extractability of mineral, sand and gravel resources is also being curtailed and/or reduced by the encroachment of residential development into rural areas and the conflicts between people and the impacts associated with these activities, e.g. noise, traffic.

In accordance with the SEA Directive, the inter-relationship between the SEA environmental topics must be taken into account. **Table 3** highlights the key inter-relationships identified in this SEA. Of particular note is the primary interrelationship between water (quality and quantity) and biodiversity, flora and fauna, soils, human health and population. Flora and fauna rely directly on the aquatic environment as a habitat but the terrestrial environment can also be strongly impacted by the aquatic environment. Water quality is also of particular importance with regard to human health as it provides a source of drinking water and it yields foodstuffs (e.g. fish and shellfish). Water is also used for leisure and recreational purposes, providing a material asset both for local populations and as part of the tourism economy.

Table 3 Potential Inter-Relationships Between SEA Topics

	Biodiversity Flora, Fauna	Population / Human Health	Soil	Water	Air	Climatic Factors	Material Assets	Cultural Heritage
Population / Human Health	√							
Soil	√	√						
Water	√	√	√					
Air	√	√	√	√				
Climatic Factors	√	√	√	√	√			
Material Assets	√	√	√	√	X	√		
Cultural Heritage	X	√	√	√	√	√	√	
Landscape	X	√	√	√	X	√	√	√

In the absence of the Plan, water resources in the District would continue to be managed in an uncoordinated manner, thus the cumulative and synergistic impacts on water of increasing population figures across the District would continue. According to a recent EPA report (2008) trends in water

quality in Ireland show an overall improvement; however, the rate of this improvement in surface waters is not sufficient to meet the requirement of having good status in all waters by 2015 as required by the Water Framework Directive. The pressures identified in the *Water Matters – Have Your Say Report* also known as the Significant Water Management Issues or SWMI report would continue to impact on water quality and quantity, perpetuating the indirect impacts associated with these on biodiversity, flora and fauna, population and human health. Development may continue to take place in a dispersed manner, though some control would be provided by existing controls in plans such as the National Spatial Strategy and the National Development Plan. This growth would place further pressure on water and wastewater services in those areas, leading to adverse impacts on human health and population from poor water quality, in the form of possible cryptosporidium outbreaks, *e-coli* contamination and deterioration of bathing water quality. As a result of manmade greenhouse gas emissions, climate change is predicted to occur in the future regardless of action. The potential impacts from sea level increases, increased flooding, summer droughts, etc., will impact on water management. Some cultural heritage features would continue to be at risk from water pollution. However, planned changes to the morphology of certain water bodies as part of the Plan would not occur, potentially avoiding interference with water dependent features, such as mills and weirs.

ENVIRONMENTAL OBJECTIVES, TARGETS AND INDICATORS (Chapter 7)

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** are separate to the Plan objectives and provide a statement of what is intended from an environmental perspective, giving a desired direction of change. The **Strategic Environmental** Objectives reflect the existing environmental concerns in Ireland relevant to water management and take account of the scoping and consultation feedback. The selected objectives for this SEA are listed below in **Box 1**.

Box 1: Strategic Objectives Selected

Objective 1: Prevent damage to terrestrial, aquatic and soil biodiversity, particularly EU designated sites and protected species. (Biodiversity, Flora and Fauna)

Objective 2: Contribute to sustainable development. (Population)

Objective 3: Protect and reduce risk to human health in undertaking water management activities. (Human Health)

Objective 4: Avoid damage to the function and quality of the soil resource in the River Basin District. (Soil)

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 groundwater's to at least good status, as appropriate to the WFD. (Water)

Objective 6: Minimise emissions to air as a result of Plan activities. (Air Quality)

Objective 7: Minimise contribution to climate change by emission of greenhouse gasses associated with Plan implementation. (Climatic Factors)

Objective 8: Maintain level of protection provided by existing morphological infrastructure, e.g. flood defences, coastal barriers, groynes, etc. (Material Assets 1)

Objective 9: Provide new and upgrade existing water management infrastructure to protect human health and ecological status of water bodies. (Material Assets 2)

Objective 10: Support economic activities within the District without conflicting with the objectives of the WFD. (Material Assets 3)

Objective 11: Protect water as an economic resource. (Material Assets 4)

Objective 12: Avoid damage to cultural heritage resources in the River Basin District. (Cultural Heritage)

Objective 13: Avoid damage to designated landscapes in the River Basin District. (Landscape)

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 for this SEA 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 **Chapter 7** of the report.

ALTERNATIVES (Chapter 8)

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. The types of measures considered is 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.

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 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 in the 2007 Water Matters – Have Your Say document prepared for the RBD and listed in **Chapter 5**. The additional measures have been grouped by pressure 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.

ASSESSMENT (Chapter 9)

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 WFD reinforces the requirement to implement the provisions of existing environmental and water protection directives. The implementation of the 11 Existing Directives as specified in the WFD is considered the **Business as Usual** scenario. While many of the measures required under these 11

existing directives are expected to result in improved water quality, some of the actions arising from their implementation do not lend themselves to formal environmental assessment. The types of measures required have been grouped into themes (e.g. education and awareness, monitoring and identification) and an explanation provided as to whether or not assessment of these in the context of the Strategic Environmental Objectives is practicable at this time. For those that could be assessed, the assessment has been qualitative.

A second scenario is also assessed which includes implementation of the 11 Existing Directives plus implementation of further water protection measures listed under Article 11(3) of the WFD. This is termed the **Business as Usual plus Other Required Measures** 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.

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. Each Additional Measure has been assessed against each of the Strategic Environmental Objectives in terms of how it contributes to achieving the objective with an assessment rating assigned for the purpose 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 Additional Measures meet the Strategic Environmental Objectives and which, if any, contradict these.

A *Do Nothing* scenario i.e. no change in current practices, has not been assessed as part of the SEA. It is considered that the 11 Existing Directives will have to be implemented regardless of the Plan and POM; therefore, a do nothing scenario is not realistic.

The approach used for assessing the draft Plan Options was an objective led assessment. For the purposes of this 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.

At the broad level, implementation of the Plan is expected to bring environmental improvements, since it tackles specific pressures on water quality. However, there are some cases where negative impacts may arise in the wider environment. The SEA has identified such areas and where mitigation of impacts can be achieved including ensuring that monitoring and regulation is adequate, and encouraging an integrated approach to water management both within the WRBD and throughout the

island of Ireland. In addition, the Habitats Directive Assessment results have been integrated into the SEA and where mitigation has been proposed under the Habitats Directive Assessment this has also been brought forward into the SEA. The assessment of Additional Measures is summarised in **Table 3**.

Table 3 Summary Assessment Table

	Overall Impact	Mitigation Measures Recommended
Existing 11 Directives and Other Article 11(3) Measures	+/-	√
Industrial sources	+	√
Dangerous Substances	+	√
Physical Modifications	+/-	√
Other Sources	+	√
Abstractions	+	√
Agriculture	+	√
Unsewered Properties	+ / -	√
Wastewater	+	√
Forestry	+	√
Freshwater Pearl Mussel	+ / -	√

MITIGATION AND MONITORING (Chapter 10)

Article 10 of the SEA Directive requires that monitoring be carried out to identify at an early stage any unforeseen adverse effects due to implementation of the Plan, in order to take remedial action where adverse effects are identified through 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.

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.

A total of 84 mitigation measures have been recommended, including a number of measures identified during the assessment carried out under Article 6 of the Habitats Directive (92/43/EEC). See **Chapter 10** for a list of the recommended mitigation measures.

NEXT STEPS (Chapter 11)

There is still some important work to complete before this 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 SEA. The next step in the SEA and Plan/ 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.

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1 INTRODUCTION

This Environmental Report has been prepared as part of the Strategic Environmental Assessment of the River Basin Management Plan, and the associated Programme of Measures (POM), for the Western River Basin District in accordance with national and EU legislation. The purpose of this Environmental Report is to: a) inform the development of the Plan and POM; b) identify describe and evaluate the likely significant effects of the Plan and POM and its reasonable alternatives; and c) provide an early opportunity for the statutory authorities and the public to offer views on any aspect of this Environmental Report, through consultation.

1.1 BACKGROUND

The Water Framework Directive (WFD) (2000/60/EC) came into force in December 2000 and establishes a framework for community action in the field of water policy and for the protection of inland surface waters, transitional waters, coastal waters and groundwater. The WFD is a wide-ranging and ambitious piece of European environmental legislation, which provides for a new, strengthened system for the protection and improvement of water quality and dependent ecosystems. The WFD rationalises and updates existing legislation and provides for water management on the basis of River Basin Districts (RBDs). RBDs are essentially administrative areas, with statutorily designated co-ordinating local authorities, for coordinated water management and are comprised of multiple river basins (or catchments). Cross-border basins (i.e. those covering the territory of more than one Member State) are assigned to an international RBD (IRBD). All of the river basins on the island of Ireland have been distributed within eight RBDs. Four of the eight RBDs are wholly contained within Ireland, one is wholly within Northern Ireland and the remaining three are international RBDs, i.e. occur within Ireland and Northern Ireland.

The WFD was transposed into law in Ireland by the European Communities (Water Policy) Regulations 2003 (S.I. 722 of 2003) (as amended by S.I. 413 of 2005 and S.I. 219 of 2006). The main objectives of the WFD are to maintain the "good and high status" of waters where it exists, prevent any deterioration in the existing status of waters and to restore at least *"*good status*"* in relation to all waters by 2015. The mechanism by which this is to be achieved under the WFD is through the adoption and implementation of River Basin Management Plans (RBMPs) and Programmes of Measures (POMs) for each of the identified RBDs.

The overall purpose of the Directive is to bring about the effective co-ordination of water environment policy and regulation across Europe in order to achieve the following, as laid out in Article 1:

- Prevent further deterioration and protect and enhance the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands directly depending on the aquatic ecosystems;
- Promote sustainable water use based on a long-term protection of available water resources;
- Enhance protection and improve the aquatic environment, *inter alia*, through specific measures for the progressive reduction of discharges, emissions and losses of priority substances and the cessation or phasing-out of discharges, emission and losses of the priority hazardous substances;
- Ensure the progressive reduction of pollution of groundwater and prevent its further pollution; and
- Contribute to mitigating the effects of floods and droughts.

1.2 WESTERN RIVER BASIN DISTRICT

The Western RBD is one of Ireland's largest river basin districts, covering about one fifth of the country with a land area of nearly 12,000km^2, a coastline of some 2,700km and further 4,630km^2 of marine waters. Over 400,000 people live in the District and this population is growing every year.

The Western RBD incorporates all or part of seven local authority areas. The Western RBD includes all of Galway City Council, parts of Clare County, Galway County, Leitrim County, Mayo County, Roscommon County and Sligo County Councils. Each of the local authorities for these areas is a competent authority for the Western RBD, with Galway County Council the co-ordinating authority for the Western RBD. Offshore islands, such as the Aran Islands, Inishboffin, Clare Island and Achill Island are also included in the basin.

1.3 STRATEGIC ENVIRONMENTAL ASSESSMENT

Strategic Environmental Assessment (SEA) is a process for evaluating, at the earliest appropriate stage, the environmental effects of plans or programmes before they are adopted. It also gives the public and other interested parties an opportunity to comment and to be kept informed of decisions and how they were made. An early consideration of environmental concerns in the planning process creates an opportunity for environmental factors to be considered explicitly alongside other factors such as social, technical or economic aspects.

The European Directive (2001/42/EC) on the Assessment of the Effects of Certain Plans and Programmes on the Environment (the SEA Directive), was transposed into national legislation in Ireland by the European Communities (Environmental Assessment of Certain Plans and Programmes)

Regulations 2004 (S.I. 435/2004) and the Planning and Development (Strategic Environmental Assessment) Regulations 2004 (S.I. 436/2004). In Ireland, River Basin Management Plans fall under the remit of S.I. No. 435 of 2004. **Figure 1.1** shows an overview of the SEA Process.

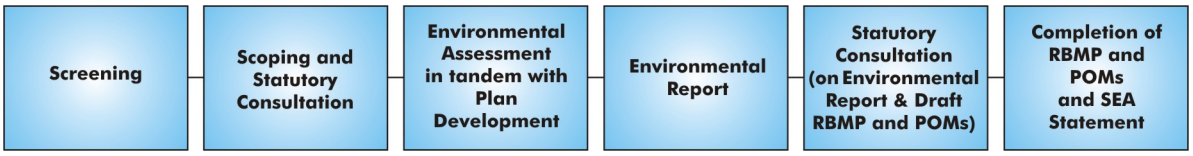

Figure 1.1 Overview of SEA Process

1.4 RESPONSIBLE AUTHORITIES FOR THE WESTERN RBD

This SEA is being carried out on behalf of the 7 competent authorities for the Western RBD, which includes the county councils of Clare, Galway, Leitrim, Mayo, Roscommon and Sligo as well as Galway City Council. Galway County Council is the coordinating authority for the Western RBD.

1.5 STUDY TEAM

The study team for the Western RBD comprises RPS, an environmental and engineering consultancy, working with an SEA Steering Group comprised of representatives from the following organisations:

- Northern Ireland Environment Agency;
- Department of the Environment, Heritage and Local Government;
- Environmental Protection Agency;
- Department of Agriculture, Fisheries and Food;
- North South Share Project; and
- Coordinators from each of the River Basin Districts.

These representatives are in turn participants in a number of other RBD related Steering / Working Groups and Advisory Councils within the eight river basin districts, providing an important link between the SEA Team and the River Basin Management Plan Teams. **Figure 1.2** outlines the main organisational structure for the RBDs and places the SEA project team in context.

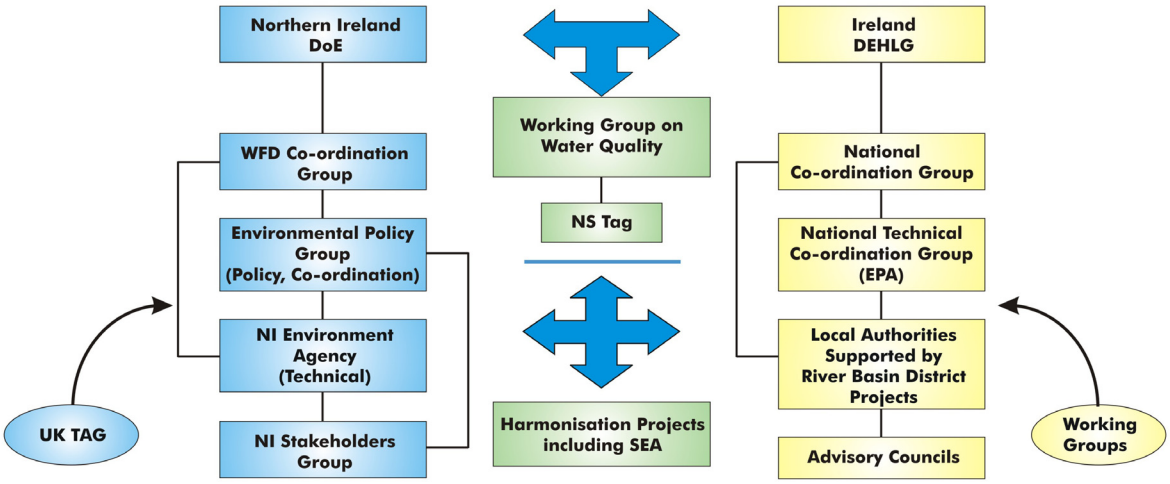

Figure 1.2 Organisational Structure for the River Basin Districts

2 METHODOLOGY

2.1 INTRODUCTION

The SEA Directive requires that certain Plans and Programmes, which are likely to have a significant impact on the environment, be subject to the SEA process. The SEA process is broadly comprised of the following steps:

SEA Step / Stage	Purpose	Status
Screening	Decision on whether or not an SEA of a Plan/Programme is required.	Completed, 2007. The Screening Document entitled *The Water Framework Directive, Assessment, Participation and Protected Areas: What are the Relationships?* is available to download from the EPA website.
Scoping	Consultation with the defined statutory bodies on the scope and level of detail to be considered in the assessment.	Completed, late 2007 to mid 2008. The Final Scoping Document is available on the public download section of the WRBD website.
Environmental Assessment	Assessment of the likely significant impacts on the environment as a result of the Plan or Programme culminating in the production of an Environmental Report.	Completed, December 2008.
Consultation	Consultation on the draft Plan/Programme and associated Environmental Report.	This will take place January 2009 to June 2009.
SEA Statement	Identification of how environmental considerations and consultation have been integrated into the Final Plan/Programme culminating in the production of an SEA Statement.	To be published with Final Plan in late 2009.

2.2 GUIDANCE

The Environmental Report contains the findings of the assessment of the likely significant effects on the environment resulting from implementation of the proposed RBMP and POM. It reflects the requirements of the SEA Directive (2001/42/EC) on the assessment of the effects of certain plans and programmes on the environment and also the transposed regulations in Ireland (S.I. 435/2004). The following sources of guidance have been used during the overall SEA process and preparation of the Environmental Report.

2.2.1 Ireland

Strategic Environmental Assessment (SEA) Checklist - Consultation Draft. January 2008. Environmental Protection Agency.

Implementation of SEA Directive (2001/42/EC). Assessment of Certain Plans and Programmes on the Environment. Guidelines for Regional Planning Authorities. November 2004. Department of Environment, Heritage and Local Government.

Development of Strategic Environmental Assessment (SEA) Methodologies for Plans and Programmes in Ireland. Synthesis Report. 2003. Environmental Protection Agency.

Guidelines on SEA. Department of Communications, Energy and Natural Resources. Available at: http://www.dcmnr.gov.ie/Marine/Environmental+Assessment/Environmental+Assessment.htm

2.2.2 Other

Strategic Environmental Assessment DRAFT Practical Guidance for Practitioners on How to Take Account of Air. June 2008. Scotland & Northern Ireland Forum for Environmental Research.

Strategic Environmental Assessment DRAFT Practical Guidance for Practitioners on How to Take Account of Soil. June 2008. Scotland & Northern Ireland Forum for Environmental Research.

Strategic Environmental Assessment DRAFT Practical Guidance for Practitioners on How to Take Account of Water. June 2008. Scotland & Northern Ireland Forum for Environmental Research.

Strategic Environmental Assessment Toolkit (Version 1). September 2006. Scottish Executive.

A Practical Guide to the Strategic Environmental Assessment Directive. September 2005. Office of the Deputy Prime Minister.

Strategic Environmental Assessment and Biodiversity: Guidance for Practitioners. June 2004. Countryside Council for Wales, English Nature, the Environment Agency and the RSPB.

Strategic Environmental Assessment. Services and Standards for Responsible Authorities. Environment and Heritage Service.

2.3 KEY STEPS IN STRATEGIC ENVIRONMENTAL ASSESSMENT

2.3.1 SCOPING

The objective of scoping is to identify key issues of concern that should be addressed in the environmental assessment of the Plan and POM so that they can be considered in appropriate detail. Scoping also helps determine the boundaries of the assessment in terms of geographical extent and the time horizon for the assessment. **Figure 2.1** outlines the various elements that contribute to the scope of the SEA.

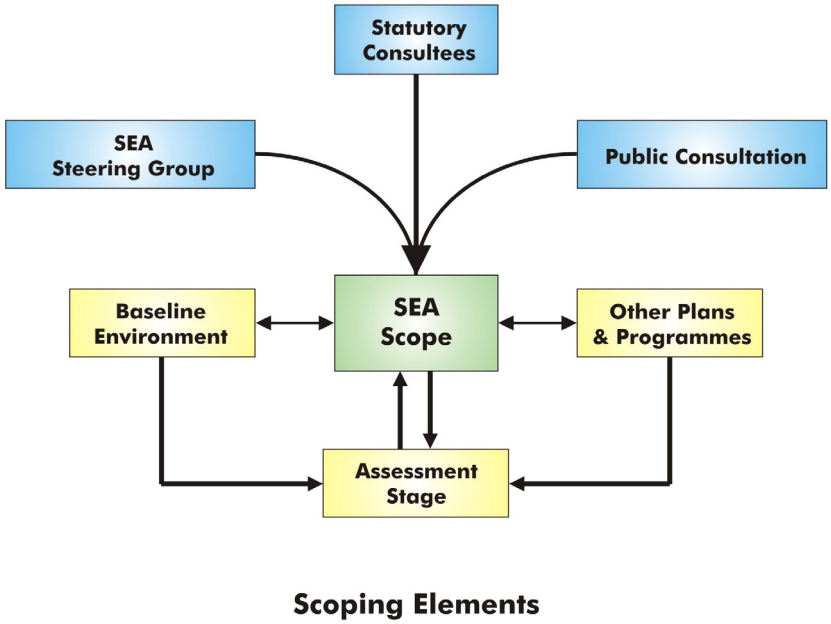

Figure 2.1 Overview of the Scoping Process.

Scoping for each of the SEAs was carried out in a coordinated manner for all eight RBMPs and their associated POMs between September 2007 and July 2008. In line with the SEA Directive, specific "environmental authorities" (statutory consultees) were consulted on the scope and level of detail of the information to be included in the Environmental Report. For the Western RBMP and POM, the relevant statutory consultees are:

- Department of Communications, Energy and Natural Resources (DCENR);
- Department of Environment, Heritage and Local Government (DEHLG); and
- Environmental Protection Agency (EPA).

Scoping for the SEA was carried out through a series of consultations with these statutory environmental authorities based on initial draft Scoping Report. A further draft was placed on public display in February 2008 and following amendments a final version was placed on the RBD website in September 2008 (www.westernrbd.ie).

Further details on consultation (dates, comments received, etc) can be found in **Chapter 4**.

2.3.1.1 DEFINING THE SCOPE

The following table provides a summary of the scope of the SEA.

Table 2.1 Scope of the SEA

Geographic Scope	The Western RBMP and POM is a regional plan for the Western RBD (see **Figure 3.2**) and as such the assessment has been limited geographically to activities occurring within the functional area of the Plan. While recognition will be given within the Plan to the issue of water management in the adjacent RBDs, no separate assessment has been undertaken of these areas in this SEA. A separate SEA will be carried out for each of the seven remaining (I)RBDs.
Temporal Scope	The RBMP and POM will cover the period from 2009 up to 2015, with an interim review after three years. However, the Plan also considers the horizons of 2021 and 2027, which are the end of the second and third 6-year plan cycles, respectively. 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.
Level of Detail of the Plan	The level of detail of the Environmental Report is determined by the content and level of detail of the Plan and POM. As the Plan is on a regional scale, the majority of the data relates to overall national and regional performance. The Plan delivers over-arching policy recommendations - including the general type of infrastructure required for water management - that to a large extent are implemented on a practical basis by bodies such as government agencies and local authorities.
Level of Detail of Assessment	This exercise is based on a broader judgement as to whether effects would be better assessed under lower level plans and/or programmes. This SEA, for example, does not examine site-specific impacts due to development of water infrastructure, since that is outside the scope of this regional level plan. As portions of the Plan and POM will be implemented within other regional or local plans, or through infrastructure projects, the local environmental concerns related to these may be examined through subsequent SEAs on these plans or Environmental Impact Assessment (EIA) at the project level.
Assessment Parameters	Cumulative / synergistic and secondary, permanent and temporary effects have been assessed. Medium and long-term impacts were also assessed.

Scoping of SEA Environmental Topics	All of the environmental topics listed in the SEA Directive have been scoped in for the assessment of the RBMP and the associated POM. These are:	
	Biodiversity, Flora and Fauna	Air
	Population	Climatic Factors
	Human Health	Material Assets
	Soil	Cultural, Architectural and Archaeological Heritage
	Water	Landscape

2.3.1.2 Climate Change

Although not expressly referenced in the WFD, the evolution of the RBMPs and POMs has considered the implications of climate in terms of characterisation of baseline conditions, identification of pressures on water bodies and in the development of the POMs for achievement of water quality objectives under the WFD.

In Ireland, consideration has been given to "climate checking" measures in the document, *Adapting the Plan to Climate Change*, prepared by the Western River Basin District (2008). The purpose of the climate check exercise was to ensure the resilience of the proposed water management measures in the longer term.

Current predictions for Ireland indicate that climate issues may be relatively significant for measures related to:

- Protected areas;
- Abstractions; and
- Physical modifications to river and marine morphology.

The study identified the need for the Programme of Measure to be flexible and adaptable to potential future climate change, in terms of temperature, storm surge, floods and droughts.

The SEA Directive does reference climate as an environmental issue to be addressed in the assessment of the Plan. The SEA has considered climatic factors by considering first if climate change can impact on the identified pressure (e.g. abstractions) and if so whether the measure proposed in the RBMP and POMs could be compromised in the future as a result of climate change. In addition, the SEA has also considered how the measures proposed could contribute to climate change through generation and emission of greenhouse gases.

2.3.1.3 Flooding

The broad purpose of the WFD is to protect ecosystems, prevent pollution and promote sustainable water use with a strong focus on water quality and the health of aquatic ecosystems. The WFD represents one arm of water management; however, there are other elements which the EU is tackling in parallel, with one such element being flooding. The frequency and intensity of flood events in Ireland and Europe generally has increased in the recent past and it is predicted that this situation will continue into the future. In response to this the EU has developed a directive on the assessment and management of flood risk ("Floods Directive"). The purpose of the Floods Directive is "*to establish a framework for the assessment and management of flood risks, aiming at the reduction of the adverse consequences for human health, the environment, cultural heritage and economic activity associated with floods in the Community*".

The Directive came into force in November 2007 and is required to be transposed into Irish law before 26 November 2009. The Directive requires Member States to first carry out a preliminary assessment by 2011 to identify the river basins and associated coastal areas at risk of flooding. For such zones they would then need to draw up flood risk maps by 2013 and establish flood risk management plans focused on prevention, protection and preparedness by 2015. The Directive applies to inland waters as well as all coastal waters across the whole territory of the EU.

There is obviously considerable potential for overlap between these two Directives and it is intended that the Floods Directive will be closely linked with the WFD in terms of implementation and administration, e.g. EU Commission has indicated that the Floods Directive will be focussed at the RBD level to ensure compatibility between these two pieces of legislation. In addition, the WFD is already linked with the Floods Directive through one of its key objectives *to mitigate the effects of floods and drought.*

In response to the key objectives of the WFD and the link to the Floods Directive, the RBMP and POM will address flooding through measures to reduce the risk of flood related impacts on water quality and ecosystem health, such as from accidental pollution incidents as a result of floods. However, it will not address specific measures to combat or reduce flooding from a socio-economic perspective. This will be addressed under Flood Management Plans as part of the implementation of the Floods Directive.

It is likely that during the second round of RBMP drafting, when the Floods Directive is in force in Member States, the coherence of the two Directives and their resultant Plans and measures can be tested and adjustment made, where necessary.

2.3.2 ENVIRONMENTAL ASSESSMENT AND ENVIRONMENTAL REPORT

2.3.2.1 Contents of the Environmental Report

Based on the legislation and guidance, the Environmental Report must include the information outlined in **Table 2.2**.

Table 2.2 Key Elements of the Environmental Report

Requirement of SEA Directive (Article 5(1), Annex 1)	Section of Environmental Report
An outline of the contents and main objectives of the plan or programme, or modification to a plan or programme, and relationship with other relevant plans or programmes;	Chapter 3: Description of the Plan Chapter 4: Consultation
The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme, or modification to a plan or programme,	Chapter 5: Baseline Environment
The environmental characteristics of areas likely to be significantly affected	Chapter 5: Baseline Environment
Any existing environmental problems which are relevant to the plan or programme, or modification to a plan or programme, including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to the Birds Directive or the Habitats Directive	Chapter 5: Baseline Environment
The environmental protection objectives, established at international, European Union or national level, which are relevant to the plan or programme, or modification to a plan or programme, and the way those objectives and any environmental considerations have been taken into account during its preparation	Chapter 6: Review of Relevant Plans, Programmes and Policies
The likely significant 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	Chapter 9: Assessment
The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme, or modification to a plan or programme	Chapter 10: Mitigation and Monitoring
An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information	Chapter 2: Methodology Chapter 7: Strategic Environmental Objectives, Targets and Indicators Chapter 8: Alternatives
A description of the measures envisaged concerning monitoring of the significant environmental effects of implementation of the plan or programme, or modification to a plan or programme	Chapter 10: Mitigation and Monitoring
A non-technical summary of the information provided under the above headings	Non-Technical Summary

2.3.2.2 Environmental Assessment

The environmental assessment includes a combination of qualitative assessment and expert judgement. Quantitative assessment was not possible at the level of detail currently presented in the draft Plan / POMs; however, it is recognised that additional detail may be developed in the future as

part of the RBMP / POM planning process. **Table 2.3** outlines the type of assessment has been carried out.

Table 2.3 SEA Environmental Assessment

Environmental Receptors	Is it Quantifiable?
Biodiversity, Flora and Fauna	Quantitative assessment may be possible, e.g. % loss of habitat, number of EU designated sites impacted, if sufficient detail is available from the draft Plan / POMs.
Human Health / Population	Health impacts would primarily be secondary via emissions to air, water, soil, etc. There is no quantitative baseline data that could be usefully examined vis-à-vis Plan policies. However reference to emissions under the heading *Air Quality* may be useful.
Soil / Geology	Quantitative assessment may be possible, e.g. area of contaminated land to be addressed, if sufficient detail is available from the draft Plan / POMs.
Water	Quantitative assessment may be possible, e.g. volumes extracted, if sufficient detail available from the draft Plan / POMs.
Air / Climate	Relevant issues relate to odour from WWTP / WWTW, emissions from digesters / incinerators and transport related emissions. Quantitative assessment may be possible, e.g. changes in energy use in the context of increased / improved water and wastewater treatment, if sufficient detail is available from the draft Plan / POMs.
Material Assets	Quantitative assessment may be possible, e.g. number of bridges, dams affected, if sufficient detail is available from the draft Plan / POMs.
Cultural, Architectural and Archaeological Heritage	Quantitative assessment may be possible, e.g. number of monuments and listed buildings near or in water bodies, if sufficient detail available from the draft Plan / POMs.
Landscape	By its nature assessment of landscape and visual impacts is subjective. In addition, without specific information on the location and character of potential infrastructural projects, there is no obvious way of examining alternatives quantitatively.

2.3.3 SEA STATEMENT

The main purpose of the SEA Statement is to provide information on the decision-making process and to document how environmental considerations, i.e. the views of consultees and the recommendations of the Environmental Report, have been taken into account in the adopted Western River Basin Management Plan and Programme of Measures. The SEA Statement illustrates how decisions were taken, making the process more transparent.

The SEA Statement for the Western River Basin Management Plan and Programme of Measures will be compiled after the statutory consultation on the draft RBMP and associated POMs and Environmental Report has been completed.

2.4 HABITATS DIRECTIVE ARTICLE 6 ASSESSMENT

The Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) obliges member states to designate Special Areas of Conservation (SACs) to protect and conserve habitats and species of importance in a European Union context. Article 6 is one of the most important articles of the Habitats Directive in determining the relationship between conservation and site use. Article 6(3) requires that "Any plan or project not directly connected with or necessary to the conservation of a site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives."

It is important to note that the phrase 'Appropriate Assessment' is sometimes used more loosely to refer to the whole process set out under Articles 6(3) and 6(4) of the Habitats Directive. Therefore, it is important to note that in this case the term Habitats Directive Assessment will be used, not *'Appropriate Assessment'* (which refers to Stage 2 in the sequence under Habitats Directive Assessment). A Habitats Directive Assessment of the RBMP and POM was carried out in parallel with the SEA and Plan processes, with the findings of the Habitats Directive Assessment used to guide the development of the alternatives to be considered as part of the SEA.

2.5 DIFFICULTIES AND DATA GAPS

The following difficulties and data gaps were encountered:

- Poor boundaries / administrative overlap for some data sets;
- Lack of quantitative data to same degree of detail for topic areas other than those which are water-related;
- Some information not compiled by the relevant agencies (e.g. biodiversity, cultural heritage);
- Lack of digitised data in some topic areas (e.g. landscape);
- Quantitative assessment made very difficult due to the very strategic level of the measures proposed for incorporation in the Programme of Measures; and
- Not all of the proposed monitoring measures are currently being gathered and reported on at a national level.

3 DESCRIPTION OF THE PLAN

3.1 RIVER BASIN PLANNING AND THE WESTERN RBD

As stated in **Section 1, Introduction,** the purpose of the WFD is to maintain the "high and good status" of waters where it exists, prevent deterioration in existing status of waters and to achieve or restore at least *"*good status*"* in relation to all waters by 2015. The mechanism by which this is to be achieved under the WFD is through the adoption and implementation of River Basin Management Plans (RBMPs) and Programmes of Measures (POMs) for each of the eight identified RBDs (see **Figure 3.1**)

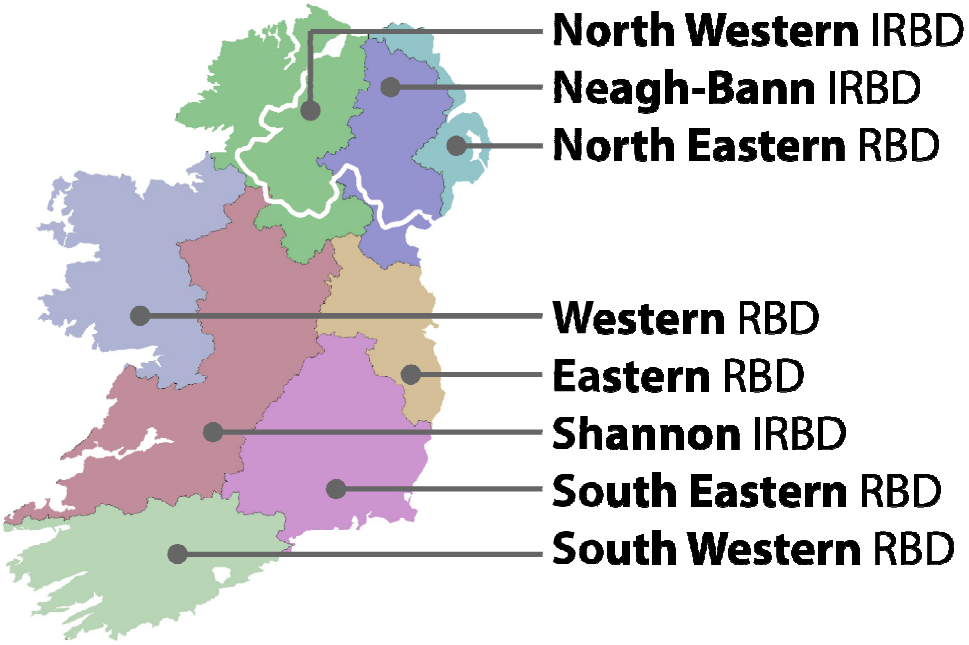

Figure 3.1 River Basin Management areas of Ireland

As mentioned, the Western RBD is one of Ireland's largest river basin districts, covering about one fifth of the country with a land area of nearly 12,000km^2, a coastline of some 2,700km and further 4,630km^2 of marine waters. The geographic scope of the Western RBD is shown in **Figure 3.2**.

The Western RBD encompasses parts of counties Galway, Mayo, Sligo and Leitrim, small parts of counties Clare and Roscommon and also includes Galway City. Offshore islands, such as the Aran Islands, Inishboffin, Clare Island and Achill Island are also included in the basin. The Western RBD boasts scenic landscapes with more than 5,600 lakes and a coastline that incorporates the entire coastline of counties Galway and Mayo as well as almost all of the Sligo and Clare coastlines.

Over 400,000 people live in the District and this population is growing every year. The region has seen the population grow by 16% in the last ten years with much of this in rural areas and with the largest urban centre, Galway City, experiencing a growth rate of over 25%. The growing population is placing an increased demand on water resources and wastewater treatment needs, with development pressure continuing to increase in the basin. The proliferation of rural and coastal housing units using either individual treatment systems or in cluster groups is giving rise to water protection issues.

Figure 3.2 Western RBD

Agriculture predominates in the eastern part of the basin and is mainly pasture and some tillage, with industry concentrated in major cities and towns. The extensive mountain and peat land areas to the

west provide natural habitats and large areas are designated as protected areas. Forestry in the areas is an important contributor to the timber sector in Ireland. The extensive coastline and sea area provide for significant sea fishery and aquaculture activity, such as oyster production and farmed salmon and trout. In addition, areas such as Kilkierin Bay, Killary Harbour and Clew Bay are designated sensitive shellfish growing areas. The great natural beauty of the basin is a haven for a thriving tourist industry with many popular holiday resorts. In particular, the Moy River is renowned internationally as a salmon fishery. The Corrib, Mask and Conn lake systems also provide major boating and fishing interests. Connemara National Park, in Co. Galway, and Ballycroy National Park, in Co. Mayo, are both located in the Western RBD.

In addition, some areas of the RBD contain rare and vulnerable habitats and wildlife. These areas include parts of the Corrib, Carra and Mask lakes and the Moy River as well as coastal areas such as Black Head, parts of Galway Bay, Kilkieran Bay, Clew Bay, Blacksod Bay, Broadhaven Bay, part of Killala Bay and Ballysadare Bay. Large areas of Connemara have also been identified for nature protection, as have the turloughs of Rahasane and Coole.

3.2 CURRENT WATER MANAGEMENT SITUATION IN THE WRBD

In Ireland, municipal drinking water supplies are provided by local authorities, which obtain approval to abstract water from surface water sources under the Water Supplies Act 1942 and must establish and maintain registers of abstractions under the Water Pollution Acts 1977 to 1990 as amended. Local authorities also provide wastewater treatment for urban areas in Ireland, and are obligated to undertake monitoring at treatment plants, adhere to water quality objectives, designate bodies of water that are sensitive to eutrophication and make provision for pre-treatment of industrial wastewater entering the collection system (under Section 16 of the Water Pollution Act 1997). The Department of Environment Heritage and Local Government (DEHLG) plan and supervise provision of water supply and wastewater treatment under the Water Services Investment Programme (WSIP) and supervise and monitor the performance of water services authorities in accordance with the Water Services Act, Strategic Plans and EPA licensing regulations.

Local authorities also provide licences or consents for small-scale commercial and industrial discharges to sewer systems and/ or waters. The Environmental Protection Agency (EPA) administers the Integrated Pollution Prevention Control (IPPC) licensing system, which covers all operations, including discharges, carried out in connection with licensed large-scale industrial and agricultural activities. The EPA is also responsible for processing licences in the waste management sector.

The Office of Public Works (OPW) is the lead authority for river and coastal flooding and erosion management. In terms of flood controls, the OPW are responsible for controlling river flooding in

agricultural and urban areas, while the ESB are responsible for managing level control in catchments modified by hydroelectric power schemes. In lakes used for abstraction local authorities are responsible for maintaining certain levels in the lakes itself and in maintaining a compensation flow to the down stream catchment. The OPW are responsible for constructing and maintaining drainage works, emergency works to watercourses and sea defences. The local authorities and OPW are responsible for permitting of culverting and canalisation of watercourses.

Fishing and aquaculture activities are licensed by local authorities, regional fisheries boards and the Department of Agriculture, Fisheries and Food. Works on the foreshore are authorised or licensed by the Department of Agriculture, Fisheries and Food. Permits for disposal of dredged material at sea are required from the Minister for Agriculture, Fisheries and Food.

The DEHLG, under the Nitrates Directive, are required to develop a National Action Programme in consultation with all interested parties and to ensure implementation of the National Action Programme. The Department of Agriculture, Fisheries and Food (DAFF) are responsible for monitoring and evaluating programmes in relation to farm practices to determine the effectiveness of measures and maintaining a register of all farm holdings to be made available to the EPA and local authorities. The EPA are responsible for issuing reports to the DEHLG on implementation every four years, carrying out monitoring for the purposes of the Regulations and providing recommendations and direction to Local Authorities regarding monitoring, inspections and measures to be taken. The local authorities are responsible for carrying out monitoring to establish the extent of pollution in surface and groundwater's attributable to agriculture and determine trends in the occurrence and extent of such pollution, carrying out farm inspections, maintaining a register of farm inspections.

3.3 STEPS TO RIVER BASIN MANAGEMENT PLANNING

A sequential approach was taken to developing the River Basin Management Plans and their associated Programmes of Measures, for the Western RBD. This involved asking a number of questions as to determine the needs of each River Basin Management Plan, as laid out in **Table 3.1**.

Table 3.1 Steps to RBMP and POM Development

Questions	Details	Where has this been answered
What Causes Our Water Problems?	Which issues are causing problems? What waters should be the focus and what actions should we take to solve them.	Article 5 Characterisation - Technical Summary Report Water Matters – Have Your Say Booklet POMS study output reports Draft River Basin Management Plan

Questions	Details	Where has this been answered
How Healthy Are Our Waters?	What is the condition of the waters?	WFD Monitoring Programme National Report WFD Status Background Document Draft River Basin Management Plan
What Do We Plan To Achieve?	Once we know the condition of our waters and the causes of their problems we have to set sustainable goals, or objectives; this means deciding what standards we need our waters to achieve, in balance with what uses and special interests we need them to support.	WFD Objectives & Exemptions Background Document Draft River Basin Management Plan
What Actions Must We Take?	The Water Framework Directive stipulates some required measures we have to take to manage our waters. We have identified actions under these required measures, setting out existing and new plans and programmes to ensure full and effective implementation.	Programme of Measures Background Document POMS study output reports Draft River Basin Management Plan
What Will Required Measures Achieve?	We need to identify how far the required measures will take us towards achieving our objectives. We have assessed how effective these measures will be and identified cases where extra effort may be needed to improve or protect our waters.	WFD Objectives & Exemptions Background Document Draft River Basin Management Plan
What Further Actions Can We Take?	We need to identify additional actions that can go further than the required measures to deal with any remaining problems in targeted waters. Alternative actions have to be tested to select ones that are practical, feasible and of significant benefit.	Programme of Measures Background Document POMS study output reports Economic Baseline and Guidance Background Documents Draft River Basin Management Plan
What Will Additional Measures Achieve?	Again we need to review how far the required plus the additional measures will take us towards achieving our objectives. In some cases, even after considering every possible action, we may not be able to restore waters and objectives must be refined.	WFD Objectives & Exemptions Background Document Artificial and Heavily Modified Water Bodies Background Documents Draft River Basin Management Plan
Our Objectives in the Western District	We have set out the particular waters in the Western District where we have proposed alternative objectives. The timescales for achieving improvements in our waters are also demonstrated.	Draft River Basin Management Plan Water Maps (electronic tool)
Our Plan For The Western District	The outcome of this planning process is an action programme for the Western District to achieve these improvements. We have proposed a detailed action plan setting out what, where and when actions are needed and who will do them.	Draft River Basin Management Plan Water Maps (electronic tool)

Further information on the supporting documents and Water Maps is available on www.wfdireland.ie/ and www.wrbd.ie/

3.4 RISK ASSESSMENT OF WATER BODIES IN THE WESTERN RBD

3.4.1 Introduction

As part of the 2005 Characterisation Study for the WRBD an assessment of the risks to water bodies within the RBD was carried out. This was risk-based analysis, which projected the likelihood of a water body meeting its WFD status objectives. The assessment examined water status issues both from the top down (looking at drivers which cause **pressures** on waters) and from the bottom up (looking at known **impacts** on water status). The overall risk assessment process was a precautionary one, in that a single pressure can cause a water body to be classified at risk. Where a water body was identified as having more than one pressure, the worst case was used to classify the overall risk assessment results for the water body. Four categories have been used to describe the analysis results as described in **Table 3.2.**

Table 3.2 Water body Risk Categories

	Category	Description
(1a)	**Water bodies at significant risk – "At Risk"**	Water bodies for which consideration of appropriate measures to improve status can start as soon as practical
(1b)	**Water bodies probably at significant risk** – "**Probably at Risk"**	Focus for more detailed risk assessments (including, where necessary, further characterisation) aimed at determining whether or not the water bodies in this category are at significant risk in time for the publication of the interim overview of significant water management issues in 2007
(2a)	**Water bodies probably not at significant risk** – "**Probably not at Risk"**	Focus for more detailed risk assessments aimed at improving the quality of information and determining whether or not the water bodies in this category are not at significant risk in time for the publication of the draft River Basin Management Plan due to be completed in 2008
(2b)	**Water bodies not at significant risk – "Not at Risk"**	Consideration of appropriate measures to ensure no deterioration in status can start as soon as practical

It should be noted that the 2005 risk assessments have now been superseded by current water body classifications. Further information can be found in Section 5.3.3 and in the draft Plan.

3.4.2 Surface Water Bodies Risk Assessment Summary

Tables 3.3 to 3.6 provide a summary of the 2005 risk assessment for each of the water body types considered, e.g. river, lakes, coastal and transitional. Within the WRBD 50% of the river water bodies (65% by area) were classified as either At Risk or Probably at Risk, while 24.8% of the lake water bodies in the WRBD (84.3% by area) were classified as either At Risk or Probably at Risk. An estimated 26.5% of the transitional water bodies in the District were classified as either At Risk or

Probably at Risk, representing almost 85% of transitional water bodies by area. Of the 30 coastal water bodies in the WRBD, 13.4% were classified as either At Risk or Probably at Risk; however, this accounts for only 4.4% of the coastal water body area.

Table 3.3 River Water Bodies Risk Assessment Summary

Reporting Category	Number of Water bodies	% of Number	% Area of RBD
1a – At Risk	126	13.25	36.62
1b – Probably At Risk	350	36.80	28.37
2a – Probably Not At Risk	223	23.45	20.72
2b – Not At Risk	252	26.50	14.29
Total At Risk (1a + 1b)	**476**	**50.05**	**64.99**

Source: Table 3.16, W*estern River Basin District Management System Article 5 Characterisation: Summary Report*

Table 3.4 Lake Water Bodies Risk Assessment Summary

Reporting Category	Number of Water bodies	% of Number	% Area of RBD
1a – At Risk	47	14.6	78.6
1b – Probably At Risk	33	10.2	5.7
2a – Probably Not At Risk	50	15.5	8.7
2b – Not At Risk	192	59.6	7
Total At Risk (1a + 1b)	**80**	**24.8**	**84.3**

Source: Table 3.23, W*estern River Basin District Management System Article 5 Characterisation: Summary Report*

Table 3.5 Transitional Water Bodies Risk Assessment Summary

Reporting Category	Number of Water bodies	% of Number	% Area of RBD
1a – At Risk	8	11.8	19.8
1b – Probably At Risk	10	14.7	61.5
2a – Probably Not At Risk	6	8.8	16.0
2b – Not At Risk	44	64.7	2.7
Total At Risk (1a + 1b)	**18**	**26.5**	**81.3**

Source: Table 3.29, W*estern River Basin District Management System Article 5 Characterisation: Summary Report*

Table 3.6 Coastal Water Bodies Risk Assessment Summary

Reporting Category	Number of Water bodies	% of Number	% Area of RBD

1a – At Risk	2	6.7	0.4
1b – Probably At Risk	2	6.7	4.0
2a – Probably Not At Risk	19	63.3	95.3
2b – Not At Risk	7	23.3	0.3
Total At Risk (1a + 1b)	**4**	**13.4**	**4.4**

Source: Table 3.30, W*estern River Basin District Management System Article 5 Characterisation: Summary Report*

3.4.2.1 Groundwater Risk Assessment Summary

The WFD sets objectives of good quantitative and chemical status for groundwater's. As shown in **Table 3.7**, of the 95 groundwater bodies included in the WRBD, 38 were classified as either At Risk or Probably at Risk, representing 40% of the groundwater body area.

Table 3.7 Groundwater Bodies Risk Assessment Summary

Reporting Category	Number of Water bodies	% of Number	% Area of RBD
1a – At Risk	0	0	0
1b – Probably At Risk	38	40	27.9
2a – Probably Not At Risk	43	45	67.4
2b – Not At Risk	14	15	4.7
Total At Risk (1a + 1b)	**38**	**40**	**27.9**

Source: Table 3.10, W*estern River Basin District Management System Article 5 Characterisation: Summary Report*

3.4.2.2 Other Issues of Concern

Alien Species. Alien species are non-indigenous invasive flora and fauna, which threaten the native ecology of the WRBD by competing for habitats and / or food. Three species of concern have been identified in waters in the Western District. Japanese Weed is found in coastal waters of the Western District. Zebra Mussels are located in Lough Gill and have been identified at a very early stage in Lough Conn and more recently in Ross Lake. Curly Leaf Pondweed has been identified in the upper Lough Corrib basin.

Fisheries. Fishery activities have started to be addressed. Amongst the freshwater fish species, salmon (and trout) are subjected to the greatest fishing /angling pressures in Ireland. Aquaculture is intensive along the Western RBD coastline; however not all areas have been designated under the Irish Shellfish Regulations (S.I. 200 / 1994). Of the fourteen areas designated as economically significant shellfish growing waters five are located in the Western RBD area. These are Aughinish Bay, Inner Galway Bay South, Kilkieran Bay, Killary Harbour and Newport Bay.

Bathing Water Standards. Bathing Waters are areas protected for use as recreational bathing and must meet standards for microbiological quality in order to protect human health. There are a total of 32 protected areas for bathing waters listed within the Western RBD; one in County Clare, 12 in County Galway, two in Galway City (Salthill and Silverstrand), 15 in Mayo and two in Sligo. One inland bathing area is listed in the Western RBD (Loughrea Lake bathing place, County Galway).

Risk categories were assigned to recognised bathing waters according to results of monitoring carried out in these waters. Where a bathing water failed to meet the requirements of the EU and national bathing water standards as 'at risk' designation was assigned. At the time the Article 5 Characterisation was carried out one water body was classed as either at risk or potentially at risk due to failure of the bathing water quality.

Heavily Modified and Artificial Water bodies. Surface water bodies that are unlikely to achieve good status because of physical alterations to facilitate human activities including navigation, water abstraction and regulation, flood protection and land drainage have been identified for special consideration under the WFD. The Directive recognises that there are cases where the benefits of such uses need to be retained and permits identification and designation of Artificial Water bodies (AWB) and Heavily Modified Water bodies (HMWB). There are no HMWB designations in the Western RBD. There are 2 water bodies designated as AWB in the Western RBD, these are Cong Canal and Eglington Canal.

3.4.2.3 Economics Baseline

While the SEA is not primarily concerned with the economic impact of the Plan, these types of impacts are considered indirectly in the assessment of impacts under SEA topic headings such as Material Assets and Population. A separate economic analysis was carried out in Ireland on the measures included in the Plan as part of the work performed under the WFD.

In Ireland, an initial economic characterisation was carried out for each of its RBDs, the results of which are published in the report, *Economic Analysis of Water Use in Ireland*.

The economics baseline included consideration of water demand sources (e.g. households, industry), the monetary value of water-using activities to the economy, the recreational benefits of water and the cost of provision of water services.

4 CONSULTATION

4.1 CONSULTATION DURING SCOPING STAGE

To begin the process of scoping the SEA for the Western RBMP and POMs an initial consultation was held with the Statutory Authorities, as designated by the relevant SEA legislation and listed in **Table 4.1**. Following the statutory consultation, it was considered best practice to include a number of relevant non-statutory consultees in the scoping process; these are also listed in **Table 4.1.** In addition, the Draft Scoping Report was published on the Western RBD website to encourage further participation by stakeholders and the public in the consultation process.

Table 4.1 Consultees in the SEA Scoping Process

Consultee	Statutory / Non-Statutory	Tier
Environmental Protection Agency	Statutory	First
Minister for Environment, Heritage and Local Government	Statutory	First
Minister for Communications, Energy and Natural Resources	Statutory	First
Ireland River Basin District Project Coordinators	Non-Statutory	Second
Ireland River Basin Advisory Councils	Non-Statutory	Second
Ireland River Basin Management Groups	Non-Statutory	Second
Ireland River Basin Steering Groups	Non-Statutory	Second

Prior to the publication of the Draft Scoping Report comments were received from the:

- Department of Communications, Energy and Natural Resources (23/11/07 and 10/01/08);
- Department of the Environment, Heritage and Local Government (28/11/07 and 15/01/08);
- Environmental Protection Agency (23/11/07 and 18/01/08);
- DoE (NI) Environment and Heritage Service (23/11/07, 15/01/08, 25/01/08); and
- Royal Society for the Protection of Birds (NI) (13/11/07).

In addition comments were received from the following stakeholders/bodies upon publication of the Draft Scoping Report:

- Health and Safety Executive, Ireland;
- Northern Ireland Freshwater Task Force;
- Office of Public Works, Ireland;

- Harbour Master Shannon Estuary;
- Coillte;
- Friends of Irish Environment;
- National Parks and Wildlife Service; and
- Department of the Environment, Heritage and Local Government.

It should be noted that the list above includes the names of all bodies/organisations from which comments were received, regardless of which (I)RBD comments were sent to, as comments received on one RBD were considered, where applicable, for the remaining seven RBDs.

The comments received in relation to the Draft Scoping Reports generally consisted of:

- Information on potential sources of baseline information;
- Comments on the assessment methodology;
- Additional SEA Objectives to be considered;
- Additional pressures to be considered; and
- Additional types of impacts to be considered.

All of the comments received are included with the Final Scoping Report for the SEA of the Western RBD River Basin Management Plan and Programme of Measures, which is available at www.wrbd.ie. Any comments received after publication of the Final Scoping Document have been considered in the development of this Environmental Report.

4.2 CONSULTATION DURING ENVIRONMENTAL ASSESSMENT STAGE

To ensure that timely consultation with the statutory consultees and non-statutory consultees continued throughout the evolution of the RBMP / POM and the SEA process, it was decided to circulate a paper discussing the preliminary alternatives being considered as well as the proposed assessment methodology. The purpose of this discussion paper was to inform key stakeholders about the proposed alternatives to be considered as part of the SEA and to elicit comment on these.

A number of SEA Integration Workshops and Information Awareness Sessions were held to elicit comments from the Plan makers in order to refine the assessment included in the SEA. Key issues raised during some of these workshops / meetings are included in **Table 4.2**.

Table 4.2 Key Issues Raised at SEA and Plan Integration Workshops

Alternatives Workshop (Ire)	SEA Awareness Day (NI)	Objectives, Targets and Indicators Workshop (Ire and NI)
Climate Change Language and Terminology Level of Detail Proposed Alternatives Assessment Approach Additional Plans to be produced, e.g. Pearl Mussel	Assessment of 'Business as Usual Scenario' Appropriate Assessment in the SEA and Plan making process Potential conflicts between the WFD and the Habitats Directive Language for measures Format of Ireland and Northern Ireland Plans	Proposed Objectives, Targets and Indicators Tone of Language and Terminology Level of Detail for Targets Water as an Economic Resource Consultation

4.3 INTEGRATION OF RIVER BASIN MANAGEMENT PLANNING AND STRATEGIC ENVIRONMENTAL ASSESSMENT

This Environmental Report was developed in parallel with the development of the Western River Basin Management Plan and Programme of Measures. The SEA process commenced in September 2007, and while the initial stages of the planning process began in 2004 with the start of the characterisation of the RBD, consultation on the issues to be addressed in the Plan began in June 2006 with the publication of a timetable and work programme for production of the Plan. This was followed by consultation on the *Water Matters – Have Your Say* report for the District published in 2007. The elements of the River Basin Management Plan and SEA are presented schematically below (**Figure 4.1**).

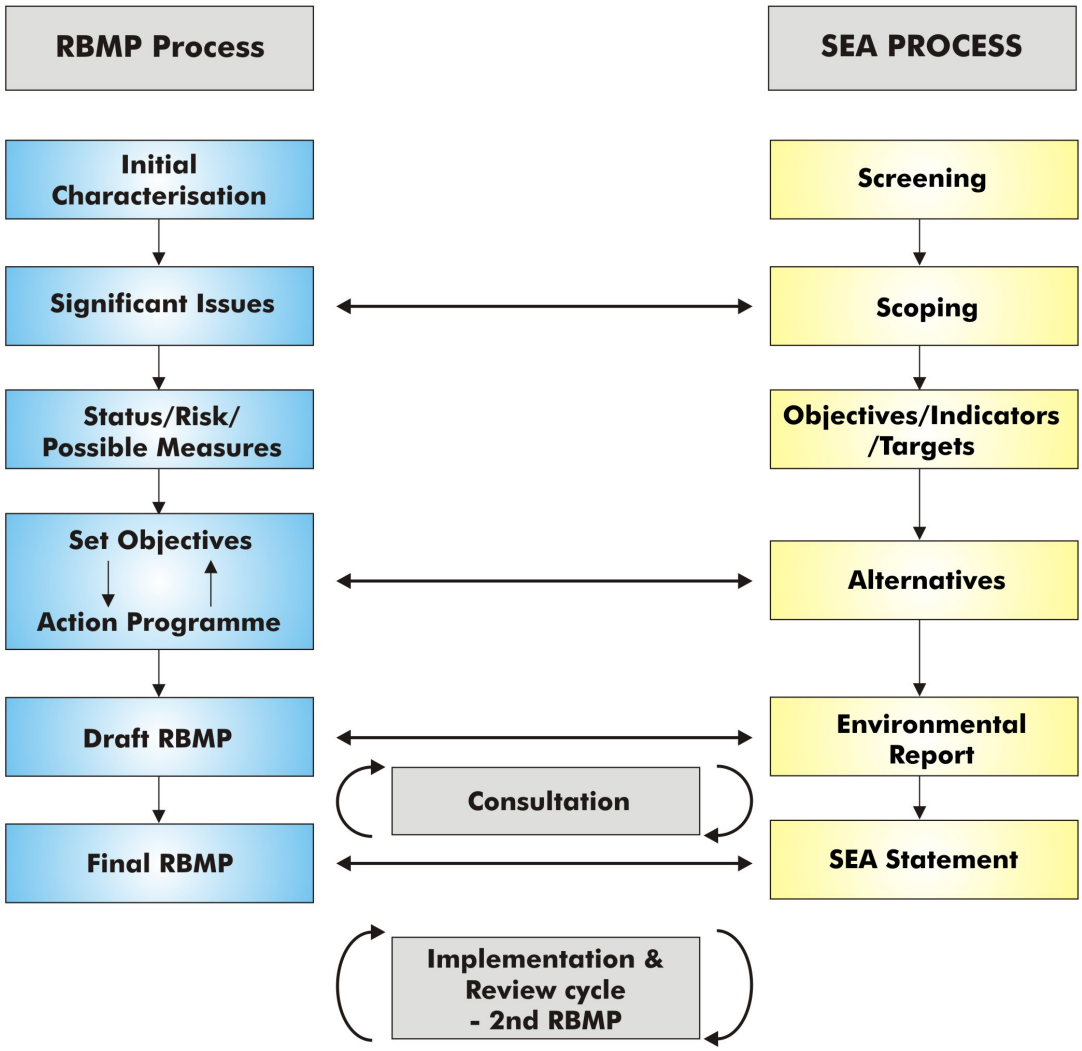

Figure 4.1 Building Blocks of the River Basin Management Plan and POM

Integration of the SEA and the RBMP/POM was achieved through close involvement of relevant team members in all stages of the project including: SEA scoping; review of the existing situation; and public consultation. The SEA and RBMP Teams also participated in a number of workshops in relation to developing the: SEA assessment methodology; alternatives to be considered in the SEA; SEA objectives, targets and indicators; and mitigation measures and monitoring strategies. The development of the River Basin Management Plan, including the Programme of Measures, was progressed in consultation with the *River Basin Management Plan and Programme of Measures Strategic Environmental Assessment Steering Group*.

4.4 PROPOSED CONSULTATION ON DRAFT PLAN, POM AND ENVIRONMENTAL REPORT

This Environmental Report does not form the final step in the SEA process. The consultation programme on the draft RBMP and POM will also provide an opportunity for statutory bodies and stakeholders to comment on the findings of the SEA. The requirements for consultation under both the WFD and the SEA Directive, as transposed, are outlined in **Table 4.3**.

Table 4.3 Consultation Requirements under the WFD and SEA Directive

Water Framework Directive	SEA Directive	Comments
6 months (Article 14(2))	In Ireland, a consultation period of not less than 4 weeks is required for the Environmental Report (S.I. 435/2004 Article 13(2)(a))	Consultation on the Environmental Report prepared as part of the SEA will last for 6 months and run in parallel with the consultation on the draft Plan.

The development of the consultation programmes for the draft Plan / POM and the SEA are currently underway. Please see the RBD website for details of these which will be posted as they become available. Following consultation on the draft Plan / POM and Environmental Report, the comments received will be considered and a revised Final Plan / POM and SEA statement will be completed. Section 11 outlines the next steps in the SEA and Plan making process.

4.5 HABITATS DIRECTIVE ASSESSMENT CONSULTATION

Consultation on the methodology used for the Habitats Directive Article 6 assessment and the results from the assessment was held with the National Parks and Wildlife Service (NPWS) (part of the DoEHLG), who are the competent Authority for conservation of habitats and species in Ireland, and also with the NIEA who are the competent Authority for the conservation of habitats and species in Northern Ireland. Comments were received on the proposed assessment methodology. In addition, two one-day workshops were held with the NPWS and the NIEA to review the outcomes of the stage one screening, and to discuss suggested changes to the draft RBMP as a result of findings. Potential mitigation measures arising from the POMs were also discussed and recommendations made for future plans or projects. For further information please see the Article 6 report.

5 BASELINE ENVIRONMENT

5.1 INTRODUCTION

This section examines the relevant aspects of the current state of the environment within the Western RBD in relation to biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, cultural heritage, landscape, material assets and the interrelationship between these factors.

As this strategic environmental assessment deals with a plan for the Western RBD, the baseline data is focused at the RBD level. The baseline has been compiled using available datasets and indicators suggested during scoping. The main sources of data used in the compilation of this baseline are listed in the references section of this document.

5.2 CURRENT STATE OF THE ENVIRONMENT - IRELAND

According to recent EPA publications (EPA, 2008), Ireland's natural environment, although under increasing pressure, generally remains of good quality and represents one of the country's most essential national assets. In the EPA's *2020 Vision – Protecting the Irish Environment* document it is noted that pressures on the environment have increased significantly. As Ireland's economy has grown in the past 10 yeas these pressures have accelerated at a rate that far exceeds that observed in other EU countries.

The fourth EPA *State of the Environment Report* (2008) (the most recent such assessment carried out by the EPA) identified four priority challenges for the environment, which, if addressed successfully, should benefit the present and future quality of Ireland's environment. These comprise: limiting and adapting to climate change; reversing environmental degradation; mainstreaming environmental considerations; and complying with environmental legislation and agreements, all of which are highly relevant to the WFD and the current river basin management planning process. These challenges are summarised as follows:

Challenges	Components	Relationship to WFD
Limiting and Adapting to Climate Change	Mitigating the causes and effects of climate change Adapting to climate change impacts Improving our understanding of climate change	The measures in the Plan have been assessed, to determine the potential impacts on them from climate change and their ability to adapt, based on European recommendations.

Challenges	Components	Relationship to WFD
Mainstreaming Environmental Considerations	Incorporating environmental considerations into policies and plans Ensuring environmental responsible business Changing behaviours	Through the need for development plans to consider the objectives and precepts of the River Basin Management Plan the WFD ensures that water management issues are brought forward into the overall planning process.
Reversing Environmental Degradation	Preventing eutrophication and other water pollution Protecting natural habitats and species populations Remediation of contaminated land	The purpose of the WFD and the River Basin Management Planning process is to prevent and reduce impacts to water quality from pressures, such as eutrophication and contaminated land, as well as protect ecological resources.
Complying with Environmental Legislation and Agreements	Building a culture of environmental compliance Enforcement of legislation at national and local level Meeting EU and other international obligations	The WFD reinforces the requirement to implement and enforce existing environmental protection legislation as well as providing a coordinated approach to the management of water resources in order to meet EU and other international obligations in this area.

In *2020 Vision – Protecting the Irish Environment* (EPA, 2007) the EPA outlines six environmental goals which reflect on the main challenges identified in the State of the Environment reports as well as key issues at the global and EU level as reflected in the 6th Environmental Action Plan (EAP). These goals, which in the majority have relevance to the RBMP and POMs, are:

- Limiting and adapting to climate change;
- Clean air;
- Protected waters;
- Protected soils and biodiversity;
- Sustainable use of natural resources; and
- Integration and enforcement.

These goals are identified as a means of realising the vision of protecting and improving Ireland's environment.

5.3 BASELINE AND RELEVANT ENVIRONMENTAL PROBLEMS IN THE WRBD

5.3.1 Flora, Fauna and Biodiversity

5.3.1.1 Designated Sites

Ireland has designated sites and species of conservation value and/or concern in an effort to protect its biodiversity resource. Designated conservation areas are areas containing habitats or species of national or international conservation importance. There are four types of designation considered here for the Western RBD; Special Areas of Conservation, Special Protection Areas, Ramsar sites and Natural Heritage Areas. Special Areas of Conservation (SAC) are protected under the European Union (EU) Habitats Directive (92/43/EEC) and Special Protection Areas (SPA) are designated under the EU Birds Directive (79/409/EEC), and together these form the backbone of the Natura 2000 network. Ramsar sites are wetlands of international importance designated under the Ramsar Convention, an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. Natural Heritage Areas (NHAs), are protected under the Wildlife Act 1976 (as amended 2000). NHAs are areas considered important for the habitats present or which hold species of plants and animals whose habitat needs protection. **Table 5.1** gives the numbers and types of each designation present in the District, while the locations of these sites are shown on **Figures 5.1 and 5.2**.

Table 5.1 Number and Types of Designated Sites in the District

Designation Type	Number*
Special Areas of Conservation	121
Special Protection Areas	37
Ramsar	1
Natural Heritage Areas	246

* *includes proposed / candidate sites*

5.3.1.2 Water Dependent Habitats

Article 6 of the Water Framework Directive (2000/60/EC), requires each Member State to establish a register of water dependent habitats or species including Salmonid waters, Special Areas of Conservation and Special Protection Areas. The protected areas for Salmonid species are listed in the Salmonid Regulations (S.I. 293 / 1988), which designate “waters capable of supporting salmon (*Salmo salar*), trout (*Salmo trutta*), char (*Salvelinus*) and whitefish (*Coregonus*)” as protected. The

Habitat Regulations (S.I. 94 / 1997) separately protect the habitats of Atlantic Salmon. In total there are two salmonid designated water bodies in the Western RBD, one river and one lake.

There are 121 SACs and 33 SPAs designated as water dependent within the Western RBD. Only the SACs that contain water dependent species and habitats have been included within the Register.

5.3.1.3 Freshwater Pearl Mussel (*Margaritifera margaritifera*)

The Freshwater Pearl Mussel is a bivalve and can be up to 140mm with an oval-shaped heavy black shell. They are filter feeders associated with Salmonid waters, but they require higher water quality than Salmonids. They have a complex life cycle with a fish host usually required during the larval stages. In Ireland, native salmon (*Salmo salar*) and trout (*Salmo trutta*) are used as hosts. The fish provides the essential step in the mussel's life cycle and adult mussels are an indicator of good clean water. Each mussel can filter up to 50 litres of water per day. For more information on the Pearl Mussel see the appendix to this chapter.

There has been a considerable decline in species distribution and numbers. Within the Western RBD, *Margaritifera* is now confined to 4 river systems (**Table 5.2**). See **Figure 5.3.**

Table 5.2 SACs designated for *Margaritifera* within the WRBD.

SAC Site Code	SAC Site Name	Rivers (including tributaries) containing *Margaritifera*	River Systems designated for *Margaritifera*
001932	Mweelrea/Shreefry/Erriff Complex	Bundorragha	Bundorragha
000297	Lough Corrib	Owenriff	Corrib
002031	The Twelve Bens/Garraun Complex	Dawros	Dawros
002144	Newport River	Newport	Newport

5.3.1.4 Shellfish Growing Areas

The following shellfish growing areas are found in the Western River Basin District as delineated by the Sea-Fisheries Protection Authority:

- Drumcliff Bay;
- Ballysodare Bay;
- Blacksod Bay (Belmullet);
- Sligo Harbour;
- Killala Bay;
- Achill North;

- Achill South;
- Killary Harbour;
- Streamstown Bay;
- Mannin Bay;
- Clew Bay;
- Ballinakill;
- Clifden Bay Inner; and
- Galway Bay.

5.3.1.5 Existing Environmental Pressures / Problems: Biodiversity, Flora and Fauna

Urban growth on the island of Ireland has been accelerating at a greater rate over recent years as increased development expands city and town limits into the countryside. Artificial land cover throughout Ireland remains relatively low; however, the constant encroachment on natural habitats will undoubtedly have an impact on natural flora, fauna and biodiversity.

Throughout the island of Ireland there has been a decline in many of the native species through habitat loss, competition, development and agriculture. Irish legislation protects some of these species. In Ireland there are 18 species of plant and animal identified as endangered and a further 52 recorded as vulnerable.

The *Water Matters – Have Your Say* document for the Western RBD highlighted the main pressures/problems facing the water environment within the river basin. These pressures are listed in **Section 5.3.3, Water**.

Each of these pressures may potentially impact directly or indirectly on the biodiversity of water dependent habitats and species. Wastewater discharges, runoff from agriculture, leachate from landfills and contaminated sites and nutrient input from forestry can all have detrimental effects on water quality resulting in subsequent impacts to biodiversity.

Species listed in Annex II of the Habitats Regulations, such as freshwater pearl mussel and salmon are particularly sensitive to pollution. *Margaritifera* requires extremely oligotrophic conditions, preferably rivers with a biotic quality index of Q5 (Ireland). The EPA uses these Q5 to indicate the highest quality status categories. Salmon need very good water quality typical of that found in upland streams. The species needs pool, glide and riffle so there is a requirement for rivers where dredging is not on-going and there are no abrupt changes to the current patterns as might occur through physical modifications.

Widespread development on shorelines and floodplains and the associated infilling of wetlands, is a potential environmental problem within this District. This can have a direct effect on dependent habitats, such as machair and turloughs. There is the potential for impacts to occur related to the

sustainability of water supplies in light of development and growing demand in the Western RBD. Surface water abstraction can result in a direct impact on rivers and lakes and their associated flora and fauna. Indirect impacts may occur through abstraction of groundwater and the resultant effect on groundwater dependent habitats, such as alkaline fens and petrifying springs.

Invasive non-native plant and animal species are one of the greatest threats to biodiversity in Ireland. Invasive alien species negatively impact Irish biodiversity through competition, herbivory, predation, habitat alteration and introduction of parasites or pathogens and poses a risk to the genetic integrity of native species. Terrestrial and aquatic habitats can be negatively affected, resulting in severe damage to conservation and economic interests, such as agriculture, fisheries, forestry and various recreational activities. Despite this some invasive aquatic plant species continue to be imported onto the island for sale in garden centres.

Three particular species of concern in the Western RBD are the Zebra Mussel (*Dreissena polymorpha),* Japanese knotweed (*Fallopia japonica)* and Curly Leaf Pondweed (*Lagarosiphon)*. Zebra mussels have been found recently in Upper and Lower Lough Erne. They out-compete native mussels and attach to firm surfaces, boat hulls, rock, gravel, other mussels and plants and spread easily into other systems. Japanese knotweed out competes local species such as sea grasses and kelp for space and light and is found in coastal waters of the Western RBD. Curly leaf pondweed has been identified in the Upper Lough Corrib basin. Originally from South Africa it has become a serious nuisance, colonising entire bays and building up in dense mats dramatically altering the natural ecology of an area.

5.3.2 Population and Human Health

5.3.2.1 Introduction

This section provides baseline data on population and human health Ireland as it relates to water quality issues. Principally it relates to drinking water and bathing water quality.

The population of Ireland was over 4.2 million in 2006, and has been increasing at ever growing rates. However the population density is still relatively low from a European perspective and the overall population remains below that of the island in the early 19th century.

The Western RBD encompasses parts of counties Galway, Mayo, Sligo and Leitrim, small parts of counties Clare and Roscommon, and includes Galway City. Offshore islands, such as the Aran Islands, Inishboffin, Clare Island and Achill Island are also included in the RBD. The geographic scope of the Western RBD is shown in **Figure 5.4**. Over 400,000 people live in the District and this population is growing every year. The population of the region as a whole has increased by 16% in

the last ten years, while the largest urban centre in the district, Galway City, has experienced a growth rate of over 25%.

5.3.2.2 Population

Table 5.x below shows the population of each County within the Western RBD. The table shows that during the intercensal periods of 1996 to 2002 and 2002 to 2006, all counties experienced population increases with a significant increase in population in County Galway (8.8% between 1996 and 2002, and 11.2% between 2002 and 2006).

Table 5.3 Trends in population for counties, part or all of which lie within the WRBD

County	1996	2002	% Change '96 – '02	2006	% Change '02 – '06
Galway	131,613	143,245	8.8	159,256	11.2
Mayo	111,524	117,446	5.3	123,839	5.4
Sligo	55,821	58,200	4.3	60,894	4.6
Roscommon	51,975	53,774	3.5	58,768	9.3
Clare	94,006	103,277	9.9	110,950	7.4
Leitrim	25,057	25,799	3.0	28,950	12.2

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

For additional information on the main cities, towns, minor towns and villages within the WRBD please see the appendix to this chapter.

Most of the study area has a relatively low population density, with highest population densities present around Galway City, Castlebar and Ballina. These urban areas are located on the Rivers Corrib, Castlebar and Moy.

5.3.2.3 Drinking Water Quality

The European Communities (Drinking Water) Regulations (No. 2), 2007 came into force in March 2007. In accordance with these regulations, the local authority must notify the EPA where there has been a failure to meet a quality standard. **Table 5.4** below information on the overall drinking water compliance rate within the various counties throughout the Ireland, as recorded in the EPA (2008) report, *The Provision and Quality of Drinking Water in Ireland, A Report on the Years 2006 - 2007*. Specific information on microbiological and chemical compliance is included in the appendix to this chapter.

Table 5.4 Overall drinking water quality compliance within WRBD

County	Overall Compliance Rate of Drinking Water
Galway City	Overall compliance rate of 99.1%. Above the national average.
Galway	Overall compliance rate of 95.0%. Below the national average in 2006, and reduced by 0.7% since 2005.
Mayo	Overall compliance rate of 91.7%. Well below the national average.
Sligo	Overall compliance rate of 96.5%. Slightly below the national average and fell from 97.2% in 2005.
Roscommon	Overall compliance rate of 94.3%. Down from 95.2% in 2005.
Clare	Overall compliance rate of 98.2%. Above the national average and an improvement from 97.7% in 2005.
Leitrim	Overall compliance rate of 96.4%. Below the national average, improved from 94.8% in 2006.

Source: The Provision and Quality of Drinking Water in Ireland 2006-2007, EPA 2008

5.3.2.4 Risk of Cryptosporidium Contamination

Cryptosporidium is a protozoal parasite that causes a diarrhoeal illness in humans. Both humans and animals are potential reservoirs. Surface water supplies with inadequate treatment (chlorination only) are at risk of failing to remove *Cryptosporidium* oocysts in the treatment process if present in the raw water.

In March of 2007 the largest outbreak of Crytosporidium in Ireland was detected in Galway City, with elevated levels detected in the water supply and a huge increase in the number of cases of cryptosporidiosis in the Galway City, and environs, region. While it is likely that there were multiple sources of the parasite in Lough Corrib the reason the outbreak occurred was due to insufficient water treatment, hence the ooycsts of the parasite in Lough Corrib directly entered the water supply in Galway. In total, the residences of Galway City were subjected to a boil water notice for over 5 months, while 242 people were officially affected by the parasite (although the actual figure is likely to be over 1,000).

In response, the EPA has required local authorities to carry out risk assessment on all water supplies in relation to *Cryptosporidium*. From this plants with very high and high risk have been identified. The results of this risk assessment process is guiding local authorities both in terms of their monitoring programmes and investment prioritisation under the Water Services Investment Programme. The use of turbidity meters on filtering systems has been a requirement of this programme from a monitoring perspective together with an increase in sampling and monitoring level. The EPA has also introduced the remedial action list (RAL) and this allows for the tracking of remedial action on plants identified as at higher risk from *Cryptosporidium*. A review of the counties within Ireland identified a number of plants in the WRBD as having risk of *Cryptosporidium* contamination, if they are not upgraded (EPA, 2007). A number have been upgraded and work is ongoing.

5.3.2.5 Elevated Lead Levels in Drinking Water

A recent issue throughout several counties in Ireland has been the presence of elevated lead levels in drinking water. The permitted level of lead in drinking water is 25 micrograms per litre (due to reduce to 10 micrograms per litre in 2013), compared to some of the measured levels between 35 micrograms per litre to upwards of 80 micrograms per litre in some parts of Ireland. Older lead pipes are at this time thought to be responsible for the contamination due to lead being dissolved out of pipes bringing in mains water and internal plumbing in older homes.

Water supplies within the District have been identified as having lead issues (EPA, 2008); these issues are currently being dealt with. The HSE, EPA and DOEHLG are developing a national strategy to deal with lead piping and measures to deal with this are anticipated.

5.3.2.6 Bathing Waters

Monitoring of water quality in the WRBD in designated bathing sites is carried out in accordance with the provisions of the European Council Directive concerning the quality of bathing water (76/160/EEC). The purpose of this directive is to ensure that bathing water quality is maintained, and if necessary improved, so that it complies with specified standards designed to protect public health and the environment. Overall water quality appears to be good, with only six non-compliances found for the EU Guide level for Good Quality out of 32 bathing waters. More detail as to bathing water quality areas within the WRBD is provided in the appendix to this chapter.

5.3.2.7 Existing Environmental Pressures / Problems: Population and Human Health

Ireland's economy has experienced unprecedented economic growth since the early 1990's. Traditionally based around agriculture, particularly livestock farming, it is now dominated by services and industry. Ireland has also seen expansion in other sectors: construction and consumer spending have increased and tourism, including recreational fishing and golf holidays, is a major growth industry throughout the island.

New individual houses and housing clusters, reliant on septic tanks, threaten water quality. The Census 2006 Preliminary Report indicates that significant growth in population has occurred in rural areas adjacent to towns. This growth is resulting in individual houses in the countryside and housing clusters in small villages throughout much of the basin. Coastal counties; Galway, Mayo, Sligo and Clare have an ever increasing number of holiday homes.

More people and increased household water usage have required bigger water supply schemes and produced larger volumes of wastewater to treat and dispose. Demand for more food and industrial

goods has led to more intensive or expanded activities with higher water demand and pollution threats. Additional homes mean the spread of urban areas and an increase in rural housing, with the associated threat of more water pollution. Development on floodplains also risks having adverse effects on both water quality and flooding behaviour.

Other potential constraints include possible human activities influencing flooding and climate change. These include agricultural activities such as drainage and the development of settlements and industries in the flood plains of rivers and coastal area. Additionally, pressure from abstractions can reduce flow in springs and lower water levels in lakes, wetlands and wells. This can make the water supply itself unsustainable and have an indirect impact on aquatic plants and animals as well as wetland areas. In extreme cases riverbeds may dry up, lakeshores can become exposed and, in coastal areas, salt water may intrude into groundwater. Although water supplies in terms of quantity are not at present seen as a major issue in the Western River Basin District, the development of some regional water supply schemes may have a future impact. In addition, the introduction of water charges for the farming sector may see a return to the use of private wells, which may give rise to localised abstraction issues.

5.3.3 Water

5.3.3.1 Surface Waters

The Western RBD is made up of 89 river catchments, with the principal river systems being the Corrib, Moy, Ballysadare, Dunkellin and Bonet rivers (**Figure 5.5**).

From the EPA's *Water Quality in Ireland: Key Indicators of the Aquatic Environment* reports (2007 and 2005), the river water quality in Ireland between 2004 and 2006 showed some improvement over the 2001 to 2003 period, with 71.4% unpolluted, 18.1% slightly polluted, 10.0% moderately polluted and 0.6% seriously polluted. Based on the same EPA reports, the rivers of the WRBD showed no significant change in quality over the reporting periods.

The Western RBD is rich in lakes with over 5,600 ranging in size from less than 1ha to 165km^2 (Lough Corrib). It includes many of the country's larger lakes, such as the Great Western Lakes: Corrib, Mask, Carra and Conn. The WFD reporting threshold for lakes is a minimum of 50 hectares in surface area or to be located in a protected area. There are 381 in the WRBD that meet this threshold. **Figure 5.5** shows the main lakes in the WRBD.

Marine waters in the WRBD account for 4,683km^2. The entire coastline of the District is approximately 2,700km and incorporates the full coastlines of County Mayo, County Sligo and County Galway. There are 68 transitional water bodies in the WRBD and 30 coastal water bodies.

A new "water status" assessment approach has been implemented over the past year on the island of Ireland as part of the WFD. The approach incorporates chemical and biological monitoring into a status grade for each waterbody. These early results are based solely on one year's data, reflecting the best current understanding of status; however, it is expected that this will improve over time as monitoring data, and the scientific tools used to interpret it, expand and improve in future river basin planning cycles. **Table 5.4** demonstrates the existing surface water quality in the Western District.

Table 5.5 Surface Water Status in the Western District*

Surface Water Category	High	Good	Moderate	Poor	Bad	Unknown
Rivers and Canals % of total number of bodies	15.3%	45.9%	23.4%	15.0%	0.4%	0.0%
Lake (% of total area)	7.3%	27.9%	63.9%	0.5%	0.3%	0.1%
Transitional (% of total area)	45.7%	25.3%	28.2%	0.0%	0.0%	0.7%
Coastal (% of total area)	9.8%	4%	<0.1%	0.0%	0.0%	86.2%

Updated from Table 1: Surface water ecological status/potential in the Western District on p. 21 of the draft Plan

The results show that the majority of the river water bodies in the WRBD are within the good to moderate classifications. A summary of the WRBD's water status is provided in **Figure 5.7.** Lake water bodies are mostly of good to moderate status; transitional water bodies seem generally to be of a high to moderate status, while coastal water bodies are of either of high, good or unknown status. Based on the current water status results 39% of rivers, 64.8% of the lakes and 29% of the transitional water bodies in the WRBD will need to have their status improved to meet the requirements of the WFD. All coastal water bodies within the WRBD were meeting the requirements of the WFD.

5.3.3.2 Groundwater

Groundwater includes several important aquifers (water-bearing rocks) in the eastern part of the basin, with mainly limestone's underlying the lowland areas. Groundwater is an important source of drinking water but also makes an important contribution to river flows and lake levels. **Figure 5.6** shows the aquifer distribution in the WRBD. In the WRBD there were four groundwater body types identified, based on flow regime of the aquifer, with the two main being poorly productive bedrock (40% of total area) and karstic (45% of total area). The classification resulted in 95 groundwater bodies being delineated.

Groundwater status in the WRBD is given in **Table 5.6**, based on the new water status classification (2008). **Figures 5.8a and b** show the groundwater status in the WRBD. The chemical and

quantitative groundwater status in the Western RBD was found to be good for all the groundwater bodies within the District, therefore meeting the requirements of the WFD.

Table 5.6 Groundwater Status in the WRBD*

Groundwater	Good	Failing to Achieve Good
Chemical Status (% of total area)	66%	34%
Quantitative Status (% of total area)	100%	0%
Combined Status (% of total)	66%	34%

Updated from Table 3: Groundwater status in the Western District on p. 26 of the draft Plan

In the WRBD groundwater status has been found to be generally good with 66% of the groundwater area achieving good chemical status and 100% of the area achieving good quantitative status. In order to meet the requirements of the WFD all groundwater bodies must achieve good chemical and quantitative status, meaning an improvement in chemical status of 34% of the groundwater body area in the RBD.

5.3.3.3 Important Water Resources

Register of Protected Areas

All of the areas requiring special protection in the District have been identified, mapped and listed in a register of protected areas. Areas included in the register are Silverstrand, Lough Corrib and the Castlebar River. Article 6 of the WFD requires each Member State to establish a register of protected areas. This register was split into six categories. **Table 5.7** summarises the existing protected areas throughout the RBD. Each of these categories is discussed in further detail in other related sections.

Table 5.7 Areas of the WRBD designated under the Register of Protected Areas

Protected Area	Total Designated Areas	Related Section in Chapter 5
Drinking Waters	304	5.3.2
Economically Significant Aquatic Species	5	5.3.7
Recreational and Bathing Waters	32	5.3.7
Nutrient Sensitive Waters	1	5.3.8
Protection of Habitats		
Salmonid and Shellfish waters	2	5.3.1
Water Dependent SACs	122	5.3.1
Water Dependent SPAs	28	5.3.1

Source: Western RBD Characterisation –Summary Report 2005

Heavily Modified Water Bodies

Some surface waters in the District have been substantially changed in character to allow certain uses such as navigation (for example ports), water storage, public supply, flood defence or land drainage. To recognise that the benefits from such modifications need to be retained, these waters are designated as heavily modified. The same reasoning applies to artificial waters (for example canals) created for human activities. There have been a number of large-scale schemes in the Western District involving physical modifications. For example, the Corrib weir and main channel, Cong Canal, the Moy, Robe, Clare and Dunkellin river drainage schemes, Galway and Sligo ports and more localised engineering works such as flood protection schemes. New developments are also proposed such as the new Corrib Bridge at Galway.

Artificial Water Bodies

Artificial water bodies (AWB) are surface water bodies, which have been created in a location where no water body existed before and which, have not been created by the direct physical alteration, movement or realignment of an existing water body. Within the WRBD these waters include the Cong and Eglington Canals.

5.3.3.4 Existing Environmental Pressures / Problems: Water

The main pressures on surface and groundwater quality within the WRBD can be summarised into the following categories. More details as to each of these are included in the previous Water Matters booklet for the District.

Wastewater and Industrial Discharges

Inadequately treated effluents and spills or leakage from sewerage networks can lead to unacceptable levels of pollutants in receiving waters. These pollutants can damage water quality and downstream uses (for example bathing waters, shellfish waters or waters supporting sensitive species). In the Western District, estimates indicate that municipal and industrial discharges produce over 16% of the yearly phosphorus load and 3.5% of the nitrogen load. There have been cases of rivers and coastal areas (such as Galway City) that have been seriously polluted by this type of discharge and in response facility improvements are being put in place in many urban areas.

Landfills, Mines, Quarries and Contaminated Sites

Waste disposal sites (including old un-lined landfills), quarries, mines, gasworks sites and industrial lands produce lesser discharges to waters than wastewater plants and industries; however, subsurface residues or waste may continue to threaten groundwater and surface waters.

Agriculture

Two main water quality problems relating to agriculture have been identified; these are enrichment of water by nutrients (phosphorus and nitrogen), from substances such as fertilisers (both organic and inorganic) as well as erosion of nutrient enriched soils, and organic pollution from animal slurry/manure and silage effluent. A third, pesticides, is covered under dangerous substances. Agriculture is the principal land use activity in the eastern part of the Western District, with 67% of land used for this purpose. Estimates of nutrient input into waters in the Western District indicate that agriculture produces over 45% of the yearly phosphorus load and 80% of the nitrogen load but this is spread in a diffuse manner over the entire basin.

Wastewater from Unsewered Properties

In rural areas many houses and businesses are not connected to public systems that collect, treat and dispose of wastewater, and they rely mainly on on-site systems (conventional septic tanks or proprietary systems) via soil percolation areas, which if not designed, installed or operated properly can result in water pollution. Two of the four counties with the highest percentage of one-off housing in Ireland are in the WRBD; Galway (52%) and Roscommon (43%). In addition, the ever increasing number of holiday homes being constructed in the coastal counties (Galway, Mayo, Sligo and Clare) and their associated septic tanks pose a potential problem to the District's waters. As many properties are spread over wide areas, provision of public sewerage systems, especially ahead of new development, is very difficult and often very costly.

Forestry

Forest cover now accounts for just over 10% of Ireland's land area, with an objective to expand cover to 17% in the next 30 years. Forestry in the Western District covers about 10% of the land area. Forests can have both positive and negative impacts on the environment. Negative impacts are largely related to poor management or to planting on unsuitable soils. Forestry can cause acidification of water through the capture of sulphur and nitrogen compounds from the atmosphere by forest canopies. Rain become more acidic as it passes through the canopies into the ground below and may worsen the chemical balance of receiving waters. Nutrient enrichment can also occur through the introduction of extra nutrients, which in naturally nutrient–poor areas, can lead to problems such as algal growth. Road-making and stream crossing as well as felling activities can cause erosion and

sedimentation on susceptible soils, reducing water quality. Incorrect pesticide usage can also result in contamination of waters. Some forested areas in the District are located in sensitive catchments with habitat protected species such as the freshwater pearl mussel, salmon and trout spawning areas. Many of the current water problems associated with afforestation are a legacy of old practices, which have been subsequently amended.

Discharge of Dangerous Substances

Some dangerous substances can be toxic to aquatic plants and animals. They can persist in waters and sediments, and slowly build up in the bodies of aquatic organisms, poisoning them and causing problems higher up the food chain or interfering with natural breeding processes.

Physical Modifications

Physical modifications can impact waterways by directly affecting habitats, or by indirectly changing natural processes through altering plant and animal communities, by reducing their variety or numbers. Land drainage, overgrazing, de-forestation and cattle access can have an indirect effect, changing how much and how fast water drains off the land, resulting in an increased risk of property flooding. There have been a number of large-scale schemes in the Western District involving physical modifications. Stretches of the drained river systems need to be dredged from time to time removing silt build-up to reduce flooding risk and ensure that the system is navigable. In addition, widespread development on the floodplains in the basin and in particular the potential effects on water quality and flooding behaviour as a result of the physical modifications to flood plains are of concern. Localised drainage by landowners can also lead to local flood problems.

Climate Change

The impact of climate change is difficult to predict, however there is the potential for heavier winter rainstorms to cause more flash flooding, resulting in an increase in diffuse pollution loads from soil run-off and increasing demand for flood controls. Summer droughts are considered likely and recent reports have indicated that the effects of climate change in Ireland will have serious consequences for water resources, resulting in a potential 40% reduction in drinking water supplies by mid-century. Also, temperature changes may give invasive alien species a competitive advantage.

Local Issues

Excessive nutrients in natural waters can lead to the growth of algae and weeds. This enrichment of water is called eutrophication and it is recognised as a major threat to the quality of Irish waters. Algal blooms and weeds can disrupt the normal functioning of an ecosystem, causing a variety of problems. They reduce the value of the affected waters for fishing, swimming and boating and can also interfere

with the treatment of drinking water. Increased algal growth has been observed around the shores of Lough Corrib and algal blooms have occurred on Lough Carra, Carrowmore and other western lakes.

5.3.4 Air and Climate

5.3.4.1 Introduction

The EU has introduced several measures to address the issue of air quality management in Member States. The Air Quality Framework Directive (96/62/EC) set out the principles of the approach, and set out the limit values for pollutants in four "daughter" directives.

The National Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002) transpose the first and second "Daughter" directives 1999/30/EC which relate to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air and 2000/69/EC which relate to limit values for benzene and carbon monoxide in ambient air.

Under the respective Regulations, the EPA and Local Authorities are responsible for ambient air quality monitoring in Ireland. There is continuous monitoring carried out throughout the island, with three monitoring stations in the WRBD, being at Bodkin Roundabout in Galway City, Mace Head in County Galway and Castlebar in County Mayo. The EPA compiles annual reports on air quality.

The EU has recently adopted the CAFÉ Directive (2008/50/EC), which incorporates all the main air quality limits and measurements techniques into one Directive. In addition to the previous Directives, the CAFÉ Directive includes a target value for $PM_{2.5}$. As yet, the Directive has not been transposed into Irish law.

5.3.4.2 Air Quality

The EU Air Framework Directive requires that member states divide their territory into zones for the assessment and management of air quality. The zones adopted in Ireland are as follows:

- **Zone A** - Dublin City and Environs.
- **Zone B** - Cork City and Environs.
- **Zone C** - 16 Urban areas with populations greater than 15,000.

  Note: Zone C includes Galway, Limerick, Waterford, Clonmel, Kilkenny, Sligo, Drogheda, Wexford, Athlone, Ennis, Bray, Naas, Carlow, Tralee and Dundalk.

- **Zone D** is the remainder of the state excluding Zones A, B and C.
-

The WRBD lies in Zone C and D. Air quality in Zone C areas tends to be typical of towns and urban locations with the main sources of pollutants including traffic, commercial/domestic space heating and some industry. EPA monitoring results for 2006 at Zone C locations illustrate compliance with the Air Quality Standards limit values for all pollutants.

Air quality in Zone D areas is generally very good with low concentrations of pollutants such as NO_2, PM_{10}, CO. Concentrations of ozone are higher in rural areas than is urban areas due to the absence of the nitrogen oxide in rural areas as an ozone scavenger. Ozone is also a transboundary pollutant with locations on the West Coast having the highest concentrations in Ireland.

In addition to the legislated air pollutants, nuisance such as dust deposition and odour can impact on amenity of the environment. Nuisance can occur at a local level in the vicinity of industrial, waste and wastewater treatment facilities. The EPA records all complaints relating to IPPC and Waste licensed facilities.

The European Communities (Waste Water Treatment)(Prevention of Odours and Noise) Regulations 2005 (S.I. 787 of 2005) require that waste water treatment plants are designed, constructed and maintained as to avoid causing nuisance through odours and noise. The EPA audits the facilities to assess compliance with the Regulations. The recent EPA report on 'Urban Waste Water Discharges in Ireland for Population Equivalents Greater than 500 Persons, A Report for the Years 2004 and 2005 details the findings of these audits.

- Galway County Council, Loughrea WWTP: Foul odours reported. Sewage scheme is to be included in the Water Services Investment Programme.

5.3.4.3 Baseline Climatic Factors

The existing climate on the island of Ireland is dominated by the Atlantic Ocean. Consequently, Ireland does not suffer from the extremes of temperature experienced by many other countries at similar latitude.

According to Met Eireann, average annual temperature is about 9°C. In the middle and east of the country temperatures tend to be somewhat more extreme than in other parts of the country. For example, summer mean daily maximum is about 19°C and winter mean daily minimum is about 2.5°C in these areas.

Mean annual wind speed varies between about 4 m/sec in the east midlands and 7 m/sec in the northwest. Strong winds tend to be more frequent in winter than in summer. Daily sunshine duration is highest in the southeast of the country. Average annual rainfall varies between about 800mm in the southeast and 2,800mm in the northwest.

With south-westerly winds from the Atlantic dominating, rainfall figures are highest in the northwest, west and southwest of the country, especially over the higher ground. Rainfall accumulation tends to be highest in winter and lowest in early summer.

Greenhouse gases in the atmosphere (including carbon dioxide, methane, nitrous oxides and a number of gases that arise from industrial processes) are rising, as a result of human activity.

Under the Kyoto Protocol, Ireland's target is to limit emissions to 13% above 1990 levels over the five-year period from 2008 through 2012, within the overall EU target to reduce emissions to 8% above 1990 levels in the same timeframe.

For the period beyond 2012, the EU Council of Ministers has recently committed to achieving at least a 20 per cent reduction of greenhouse gas emissions by 2020, compared to 1990 levels. The Council also agreed to extend this target to a 30 per cent reduction if other developed countries commit to comparable reductions. Ireland's share of the reduction target has yet to be agreed

5.3.4.4 Existing Environmental Pressures / Problems: Air and Climate

Currently there are no significant concerns with regard to air quality at the District level. Poor wastewater treatment infrastructure can lead to odour nuisance issues at specific plants. Dust and PM_{10} can also be an issue locally during construction and operation.

With regard to climate, inputs of greenhouses gasses from water management activities in the District, which require the use of fossil fuels, add to the carbon dioxide emissions produced on the island. The emission of greenhouse gases in general is currently the focus of emission reduction programmes under Ireland's Kyoto Protocol agreements. In addition, the potential changes in climate predicted as a result of anthropogenic greenhouse gas emissions are expected to result in pressures on water quantity and precipitation regimes, as discussed in the previous section.

5.3.5 Cultural Heritage

5.3.5.1 Introduction

The sites, structures and features considered as part of the cultural heritage baseline include: water related features (sites or features of which the water and water body is an essential part of the site, for example, water mills or canals) and non-water related features (sites or features in close proximity to existing water bodies, where although water is not part of the site, they could be adversely affected by alteration or changes in the existing water body). Coastal and marine heritage is also considered.

5.3.5.2 Record of Monuments and Places

The Record of Monuments and Places is a statutory list of all known national monuments in Ireland. In the Western District, within 10m of rivers (see **Figure 5.9**), these Within the WRBD there are 240 sites, both water and non-water related, listed on the database within 10m of rivers. These sites generally consist of a range of megalithic tombs, ring forts, ritual sites and bridges. The proximity of these features to water means that these sites are at greatest risk of potential impacts from the implementation of the river basin management plans.

5.3.5.3 Engineering Heritage

In addition, there are a number of water-related sites listed for their engineering importance within the National Industrial Engineering Heritage (NIEH) maintained by the Engineering Department of Trinity College. The NIEH database is not fully available for the Western District, however there are a number of water related engineering features listed within the region, such as water mills, bridges and weirs.

5.3.5.4 Marine Heritage

In general the majority of marine archaeological features occur beyond the RBMP limits for transitional and coastal water bodies (one mile). The Underwater Heritage database is currently being compiled for Ireland. Hydrographical charts for the region mark numerous wrecks and seabed obstructions; however, these are primarily for navigational rather than cultural heritage importance.

Much of Ireland's inshore cultural marine heritage is unrecorded. There are estimated to be thousands of wrecks in Ireland's inshore waters. Most of these are currently unknown and difficult to

detect, especially those of wooden construction, though most of these wrecks and structures are thought to be associated with historic ports and harbours and their approaches.

5.3.5.5 Sites and properties

In addition to the monument registers, there are a number of properties and areas managed by cultural heritage groups within the WRBD. These are structures or areas that have been passed to the care of responsible bodies for restoration, public access and amenity value. Two examples within the WRBD, which contain water related elements, are:

- Connemara National Park (covers 4942 acres of scenic countryside and coastal habitats); and
- Aughnanure Castle (c. 1500 castle positioned on a rocky island, with ruins of quays and artificial harbour).

5.3.5.6 International

There are two UNESCO proposed areas of international importance for cultural heritage within County Mayo in the WRBD, being Ceide Fields (fossilised Neolithic landscape under blanket bog) and the North West Mayo Bog complex. Within the North West Mayo Bog complex are three areas of bog at Owenboy, Owenduff and Glenamoy.

5.3.5.7 Existing Environmental Pressures / Problems: Cultural Heritage

Development resulting from economic growth and increasing population is placing pressure on sites or features of architectural, archaeological or cultural heritage interest. Individually these developments, including development of water-related infrastructure, puts direct pressure of architectural heritage, where it is in proximity, or increases the potential to interact with known or previously unknown archaeological sites and features. This is particularly important, as water environments are often an important source of previously unknown archaeological material, as they can preserve organic matters often missing from dry-land sites. For example, the rivers of the WRBD are potentially rich in previously unknown archaeological features, as both settlement and ritual activity (in the form of the deposition of artefacts) are often associated with these. Cumulatively, this results in impacts on the overall cultural heritage resource.

5.3.6 Landscape

5.3.6.1 Introduction

The Western RBD is one of Ireland's largest river basin districts, covering about one fifth of the country with a land area of nearly 12,000km^2, a coastline of some 2,700km and further 4,630km^2 of marine waters. The Western RBD encompasses parts of counties Galway, Mayo, Sligo and Leitrim, small parts of counties Clare and Roscommon and also includes Galway City. Offshore islands, such as the Aran Islands, Inishboffin, Clare Island and Achill Island are also included in the basin.

5.3.6.2 Protected Landscape Areas - Ireland

In terms of landscape and visual amenity, local authorities in Ireland conserve and protect scenic value as Areas of High Amenity, Areas of Outstanding Natural Beauty and Protected Views. Each local authority is responsible for the designation of these within their individual jurisdictions, with each Development Plan providing objectives to protect such views. Specific landscape features within the counties Therefore, a summary description of the landscape character of each of the counties in the RBD is provided in the appendix to this chapter along with specific examples where available. A summary of the designated landscape features within the study area is also included in the appendix to this chapter of this document.

5.3.6.3 Existing Environmental Pressures / Problems: Landscape and Visual

Existing pressures on landscape and visual resources as a result of water management activities are limited and are primarily related to impacts to sensitive views and landscapes resulting from the siting of development, including water related infrastructure, without sensitivity to these resources.

5.3.7 Material Assets

5.3.7.1 Introduction

The following is a summary of the baseline environment within the WRBD in relation to Material Assets. The summary below includes both water-related material assets, such as wastewater treatment works, coastal defences, harbours and ports, as well as non-water related material assets, such as roads and rail. The purpose of including water and non-water related material assets is to

characterise those facilities whose operations may be affected either by measures included in the Plan or who need measures implemented to alleviate impacts occurring in the absence of the Plan.

5.3.7.2 Water Related Material Assets

Water Supply

Abstractions within the WRBD are taken from a mix of groundwater, lake and river sources and are used for both public and private water supplies. There are 306 known abstraction locations and 18 registered impoundments in the WRBD. There are also 64 water treatment works within the WRBD (**Figure 5.10**).

Wastewater Treatment Plants

There are 53 wastewater treatment plants (WWTP) within the WRBD. The highest level of wastewater treatment in the District is secondary with no plants operating tertiary treatment systems. The majority of these WWTP discharge to rivers; however, a few discharge to lakes, transitional and coastal waters. The locations of the WWTP within the District are shown on **Figure 5.10**.

Coastal Defences

Coastal defences with the WRBD consist of a 20km network of seawalls, boulders, and rock armour. These defences within the WRBD are mainly located in Galway bay and around the Aran Islands.

Flood Defences

No river flood defence data could be sourced for the WRBD.

Dams, Weirs and Hydroelectric Power

Within the WRBD there are 44 weirs. No data was available on dams and hydroelectric power in the Western River Basin District.

Navigable Waters and Canals

The main navigation system in the WRBD is on Lough Corrib in County Galway. The River Corrib, which is almost 6.5km in length, connects Lough Corrib to Galway Bay at Galway City. One lock enables this navigation, which was established under the provisions of the Drainage Acts. The Upper

and Lower Loughs are almost 175km^2 in total area and together make the second largest lake in Ireland. The Cong and Eglington Canals are also present within the WRBD.

Commercial Fishery and Aquaculture Areas

In the WRBD there are 450 commercial aquaculture activities, which are located within the numerous bays and inlets on the west coast of the District. These aquaculture operations are mainly for abalone, oysters, mussels and clams. There are also 103 main fisheries areas off the western coast within the RBD, ranging from large crustacean and shrimp pots, which are generally closer to shore, to the pelagic trawling further offshore of the north, west and south coast of the RBD. **Figure 5.11** shows the location of aquaculture and commercial fisheries within the WRBD.

Harbours and Ports

The two commercial ports in the Western District are Galway and Sligo. There are three fishery harbours within the RBD; one at Carna, one at Achill and one at Belmullet. The numerous islands off the Western District coast means there are many local ferry ports and routes, such as Clare Island – Roonagh Quay, Roonagh Quay – Inishturk Island, Inishbofin Island – Cleggan, Roassaveel – Inishmore, Inishmore – Doolin, Inishmore – Galway, Inishmaan – Galway and Inishmaan – Rossaveel. There are also 328 slipways, quays or piers on the coastline of the Western RBD.

Recreational Use of Waters

There are 32 protected bathing waters within the WRBD, located mainly around Achill Island, Galway Bay and Clew Bay. Twenty of these beaches were awarded Blue Flag status in 2008, with ten failing to achieve Blue Flag Status. Lough Rea also achieved Blue Flag status in 2008, as an inland bathing area. The waters of the Western District are used extensively for recreational activities, with the region being popular for angling, sea and shore fishing, sailing and windsurfing. The region is also becoming famous for its world class surfing breaks, such as those at Strandhill and Easky, in County Sligo.

5.3.7.3 Non-Water Related Material Assets

Roads and Rail Infrastructure

There are approximately 8,500km of road in the WRBD. Of these, 5% are classed as National Primary or Routes, 7% are classed as National Secondary Routes or A Roads, and 17% are classed as Regional or B Roads. The remaining road infrastructure within the WRBD is comprised of minor

roads and unclassified urban roads. In addition, there are approximately 530km of existing rail infrastructure in the Western District, of which some 180km are still in active use.

Landfills, Mines and Quarries

There are 12 existing licensed waste facilities within the WRBD. Included in this number are four landfills: Carrowbrowne near Galway; East Galway Residual landfill near Kilconnell; Derrinumera landfill near Newport; and Rathroeen landfill near Ballina.

There are also a number of pits and quarries within the WRBD. The potential for mineral and sand and gravel resources in the WRBD is discussed in detail in **Section 5.3.8, Soil, Geology and Land Use**.

5.3.7.4 Existing Environmental Pressures / Problems: Material Assets

Increased development including residential and industrial expansion continues to put pressure on existing water sources with regards to quantity as well as on the treatment facilities used to treat both drinking water and wastewater. In addition, existing water quality issues are resulting in pressures on economic shellfish and aquaculture activities along with fisheries used for recreational purposes. Some of the physical modifications identified as material assets, such as dams and weirs, may also be resulting pressures on fisheries used for recreational and commercial purposes.

5.3.8 Soil, Geology and Land Use

5.3.8.1 Soils

The soils of the WRBD district vary. The western area of the RBD is dominated by poorly drained blanket peats and excessively drained Lithosols. The remainder of the district is mainly comprised of well-drained brown earths and grey brown podzols, with smaller areas of blanket and basin peats.

Soil Suitability

Soil suitability classification essentially consists of outlining the range of uses to which a given soil is adaptable, including determining the production potential of each soil for the normal range of farm or forest crops. This classification provides the link between the physical and economic aspects of the use of soils. An evaluation of soils was carried out as part of the National Soil Survey of Ireland (now known as Teagasc) for a number of counties in Ireland over a period of many years. Clare is the only county in the RBD that has been mapped as part of this work. The survey found that 18% (57,660 ha)

of the soil in County Clare is Class A suitability, meaning it is well adapted to new techniques and is mainly suitable for cultivated crops, pasture or forestry, while 6% (19,457 ha) is Class B suitability, meaning it has a more limited use-range than those in Class A and are generally of only moderate suitability for cultivated crops, pasture and forestry.

Nitrate Vulnerable Zones

Within Ireland, a Nitrates Action Programme has been prepared in accordance with Article 5 of the Nitrates Directive and is to be applied to the state as a whole.

Soil Contamination

In April 2007, the EPA published a Code of Practice that provides a framework for the identification of contaminated sites, the assessment of the potential risks associated with them and the identification of the appropriate remedial measures or corrective actions required to minimise risk to the environment and human health. Following the publication of the Code, the EPA trained local authority staff on its use and application. Local authorities are now implementing the Code and the EPA is overseeing its implementation; however, a list of contaminated sites within the District is not centrally compiled.

Slope Stability and Landslide Potential

Ireland is fortunate not to be a high-risk area for landslides, though landslides do occur, however infrequently, with the most occurrences in coastal, upland and peat bog areas. Though the potential for major destructive landslides is slight, there have been instances of severe events in Ireland in the past.

The GSI Irish Landslides Working Group (ILWG) is currently in the process of compiling a landslide database in order to assess the scale of the landslide problem historically and also to assess the susceptibility of areas to landslide hazard in the future. This has direct relevance to the sustainable development of the landscape in terms of housing, infrastructure etc. and is therefore an important issue for the planning process. This national landslide susceptibility database is not currently complete, though information on specific areas is available.

5.3.8.2 Geology

The majority of the RBD, being most of the east, south and north of the region, is underlain by Lower and Middle Carboniferous limestone and calcareous shale. While in the west of the district there are smaller areas of granite, greywackes, schists and sandstones.

Groundwater Vulnerability and Protection Zones

The vulnerability of groundwater to pollution can be related back to both soil permeability and depth, i.e. the thicker and less permeable the overlying subsoil layer the lower the risk of pollution. Groundwater vulnerability zones have been mapped in Ireland by the Geological Survey of Ireland, as shown on **Figure 5.12**. Groundwater vulnerability ranges across the District, with large areas subject to extreme groundwater vulnerability (31% of all RBD area), particularly in the west and south of the region. It should be noted that a very large proportion (64% of all RBD area) of the district has not yet been mapped, and is thus classed as an area of high / low vulnerability, until mapping is complete.

Source protection zones have been established across the island. These are zones around groundwater sources such as wells, boreholes and springs used for public drinking water supply, which show the risk of contamination from any activities that might cause pollution in the area, i.e., the closer the activity, the greater the risk. Three source protection zones are currently mapped within the WRBD. It should also be noted that the entire island of Ireland has been designated as a Protected Area for Groundwater under the WFD.

Mineral Potential

The island can be divided into a number of mineral provinces that are endowed with a diverse suite of base and precious metals, as well as industrial minerals. The WRBD is contained within the Mayo-Curlew Basin, North-Western Basement, and Central Ireland Basin mineral provinces of the island.

Significant gold deposits are known from Lower Palaeozoic rocks at Lecanvey and Cregganbaun in south County Mayo. Other deposits in this province include talc-magnesite at Westport and the sub-economic Charlestown copper deposit.

This province contains some of Ireland's oldest rocks, with Proterozoic gneisses overlain by metamorphosed sandstones, limestone's and volcanic rocks. These are intruded by Palaeozoic granites. Demonstrated potential for base metals is shown by widespread 18th and 19th century workings, with many small mines and "trials" to be found. Quartz veins and shear zones are prime gold targets (e.g. Curraghinalt and Cavanacaw, both in Northern Ireland) and gold is also associated with massive sulphides (e.g. Glentogher, Co Donegal). Molybdenum-copper mineralization is associated with the Palaeozoic granites. Diamond and other gemstone targets have been identified in the far north of the province, in the Inishowen Peninsula. A number of types of dimension and ornamental stone have also been exploited from this province, including the famed green Connemara marble.

Thick Lower Carboniferous limestone's in a number of sub-basins are the host in this important zinc-lead province. Known zinc-lead deposits contain some fourteen million tonnes of zinc metal. Target

horizons are strata bound Irish-type deposits in the basal Carboniferous (e.g. Navan, Tatestown, Oldcastle, Keel, Moyvoughly), the overlying Waulsortian limestone's (Tynagh, Silvermines, Ballinalack, Galmoy, Lisheen) and stratigraphically higher crosscutting deposits (Harberton Bridge). Vein and massive replacement copper-silver deposits (Gortdrum, Aherlow, Mallow) are associated with the structurally controlled southern margin of the Basin. Other significant deposits include barite (Ballynoe, Tynagh), gypsum (Glangevlin), calcite (Kilbreckan) and dolomite (Bennettsbridge).

Within the Western District there are 1,774 identified mineral locations, with the most common being copper, pyrite and iron. There are 32 quarries and 26 pits in the RBD. **Figure 5.13** illustrates the known mineral deposits located within the WRBD.

Sand and Gravel Potential

Unlike most other forms of development, minerals can only be worked where they are found. This means that the spatial distribution of mineral resources and thus the potential for workings is dictated by geological considerations and not by the demands of human geography. The GSI Minerals Section has begun a programme of mapping of Aggregate Potential on a county-by-county basis. Schemes for four counties have been carried out, with further mapping being carried out on a prioritised regional basis. However, this level of information is not yet available for all the counties within the District.

5.3.8.3 Land Use

Agriculture, which is mainly pasture with some tillage, predominates in the east of the District and currently accounts for between 8 to 15 % of employment in the region. Industry in the region is concentrated in the major cities and towns. The extensive areas of mountain and peat land to the west provide natural habitats, with large areas being designated as protected areas. Forestry in the RBD is an important contributor to the timber sector in Ireland. The extensive coastline and sea provide for significant sea fishery and aquaculture activity, such as native oyster production and farmed salmon and trout. Areas such as Kilkierin Bay, Killary Harbour and Clew Bay are designated shellfish growing areas.

The primary land cover within the WRBD is agriculture; however, relative to the other seven RBDs in Ireland, the proportion of land used for agriculture is low at around 45%. Pastures form the greatest proportion of this land use type, contributing to 73% of total agricultural land. Wetlands comprise 35% of total land cover, peat bogs making up 98%. Forests and semi natural areas form 15.2% of the overall land use, of which scrub and herbaceous vegetation form 65%. The Western District has the lowest proportion of artificial surfaces of all RBDs at less than half a percent (0.45%). **Figure 5.14** shows the distribution of land uses in the WRBD.

As discussed in **Section 5.3.2, Population,** the largest urban area within the WRBD is Galway City, which is located in the southern portion of the study region. In addition, there are smaller urban centres in the towns of Sligo, Ballina, Castlebar, Westport, Tuam and Loughrea.

5.3.8.4 Existing Environmental Pressures / Problems: Soil and Land Use

Predictions have been made about the impact of global warming on Ireland, with these predictions indicating a change to wetter winters and drier summers (Sweeney, 1997). In addition there may be an increase in frequency of high intensity rainfall events. Such precipitation changes could have serious implications for slope stability and landslides and their resultant impacts on water management activities.

Eroded soil washed into rivers during heavy rainfall contains an increased nutrient content, which can damage the balance of nutrient poor, aquatic ecosystems by shifting their species composition, supporting more nutrient-loving species. This can lead to the eutrophication of rivers and lakes. If contaminated soils are eroded and transported to the sea, aquatic plants and animals can be severely damaged.

As discussed previously, extraction activities, when mismanaged, are resulting in pressures on water quality. In particular, peat cutting can be damaging to vegetation, hydrology and landscape. Localised cutting has little long-term impact, but commercial extraction removes an irreplaceable resource. Alternately, the extractability of mineral, sand and gravel resources is also being curtailed and/or reduced by the encroachment of residential development into rural areas and the conflicts between people and the impacts associated with these activities, e.g. noise, traffic. The additional restrictions associated with water management activities is a cumulative pressure on these resources.

5.3.9 Inter-relationships

The interrelationship between the SEA environmental topics is an important consideration for environmental assessment. **Table 5.8** highlights the key interrelationships identified in this SEA. These potential interrelationships will be taken into account in the assessment of the different alternatives.

Of particular note is the primary interrelationship between water (quality and quantity) and biodiversity, flora and fauna, soils, human health and population. Flora and fauna rely directly on the aquatic environment as a habitat but the terrestrial environment can also be strongly impacted by the aquatic environment. Habitats, such as machair and fens, rely on the aquatic environment for their formation and terrestrial fauna and birds can rely on it as a source of food. Water quality is also of particular importance with regard to human health as it provides a source of drinking water and it yields

foodstuffs (e.g. fish and shellfish). Water is also used for leisure and recreational purposes, providing a material asset both for local populations and as part of the tourism economy.

Another key interrelationship is between water and climate. Greenhouse gas emissions associated with energy use during water management activities, such as treatment of drinking water and wastewater, have the potential to negatively impact on climate through increased contribution to climate change. This in turn can result in more frequent and more intense flooding and drought conditions affecting material assets and human health as well as biodiversity.

In carrying out the assessment these important direct and indirect relationships have been taken into account fully to ensure a robust and complete assessment.

Table 5.8 Potential Inter-Relationships Between SEA Topics

	Biodiversity Flora, Fauna	Population / Human Health	Soil	Water	Air	Climatic Factors	Material Assets	Cultural Heritage
Population / Human Health	√							
Soil	√	√						
Water	√	√	√					
Air	√	√	√	√				
Climatic Factors	√	√	√	√	√			
Material Assets	√	√	√	√	X	√		
Cultural Heritage	X	√	√	√	√	√	√	
Landscape	X	√	√	√	X	√	√	√

5.4 EVOLUTION OF THE ENVIRONMENT IN THE ABSENCE OF THE PLAN

The Western RBD Plan incorporates the requirements of existing directives, daughter directives and measures to reduce pollution. It provides for the coordination of these controls to reduce impacts to the water environment in the region and examines how human activities are impacting the water environment in a holistic fashion. In the absence of the Plan, water resources in the District would continue to be managed in an uncoordinated manner. In particular within the WRBD there could be repeat occurrences of the Cryptosporidium outbreak that occurred in 2007, as there are still insufficient water treatment and management systems for some public supplies. Also, in an area with a budding tourism trade, any decline in water quality in the region could impact upon the attractiveness of the region.

According to a recent EPA report (2008) trends in water quality in Ireland show an overall improvement; however, the rate of this improvement in surface waters is not sufficient to meet the requirement of having good status in all waters by 2015 as required by the Water Framework Directive. In the absence of the Plan, the pressures identified in the 2007 *Water Matters – Have Your Say* report would continue to impact on water quality and quantity, perpetuating the indirect impacts associated with these on biodiversity, flora and fauna, population and human health, as discussed in the previous sections. For instance, the proposed strategies to target waters listed on the Register of Protected Areas under the WFD, e.g. plans to protect water dependent habitats and species, such as *Margaritifera margaritifera,* would lack the impetus provided by the RBMP / POM.

In the absence of the Plan, development may continue to take place in a dispersed manner with increasing numbers of one-off houses and associated septic tanks being developed, which may continue to contribute to reductions in surface and/or groundwater quality. Also, those urban areas currently experiencing unsustainable development pressure would continue to grow though some control would be provided by existing controls in plans such as the National Spatial Strategy and the National Development Plan.. This growth would place further pressure on water and wastewater services in those areas, leading to adverse impacts on human health and population from poor water quality, in the form of possible cryptosporidium outbreaks, e-coli contamination and deterioration of bathing water quality.

The trend in air quality in Ireland is a year on year improvement in air quality with a reduction in the main pollutant concentrations (with the exception of ozone). The absence of the Plan is not expected to affect this trend.

As a result of manmade greenhouse gas emissions, climate change is predicted to occur in the future regardless of action. The UN Intergovernmental Panel on Climate Change (IPCC) in their *Climate Change 2007: Climate Change Impacts, Adaptation and Vulnerability Report* predict sea level rise, changes in rainfall patterns and temperatures as well as changes in the frequency of droughts and extreme weather events. The potential impacts from sea level increases, increased flooding, summer droughts, etc., will impact on water management.

According to the EPA report "Implications of the EU Climate Protection Target for Ireland", '*water supply and quality are highly sensitive to climate variability and change. Future changes in climate are likely to have major impacts on water resources in Ireland. Recent research by Murphy and Charlton (2006) outlines spatial changes in run-off for Ireland in future downscaled scenarios. The results highlight the importance of individual catchment characteristics in controlling response to climate change. Reductions in groundwater storage and recharge will increase the risk of drought in some areas. The likelihood and magnitude of flood events are also likely to increase, which has important implications for infrastructure and development on affected flood plains. Also, there will be impacts upon the reliability of existing flood defences, and, in the future, increased insurance costs. Water*

quality is another area for concern as in certain areas it may be impacted by the contamination of coastal aquifers from saline intrusion'.

Therefore, evolution of the climatic environment in the absence of the Plan is likely to be heavier winter rainstorms causing more flash flooding, resulting in an increase in diffuse pollution loads from soil run-off and increasing demand for flood controls. These types of flood events (though not directly addressed by the Plan) would continue to pose a risk to soils as a result of erosion and release of contaminants, thus potentially leading to further water quality problems.

Summer droughts are also likely and recent reports have indicated that the effects of climate change in Ireland will have serious consequences for water resources, resulting in a potential 40% reduction in drinking water supplies. Also, temperature changes may give invasive alien species a competitive advantage.

In the absence of the Plan some cultural heritage features would continue to be at risk from water pollution. In addition, the uncoordinated approach to provision of water management infrastructure to meet demands could result in unnecessary impacts on existing cultural heritage resource and designated landscapes. However, planned changes to the morphology of certain water bodies as part of the Plan would not occur, potentially avoiding interference with water dependent features, such as mills and weirs.

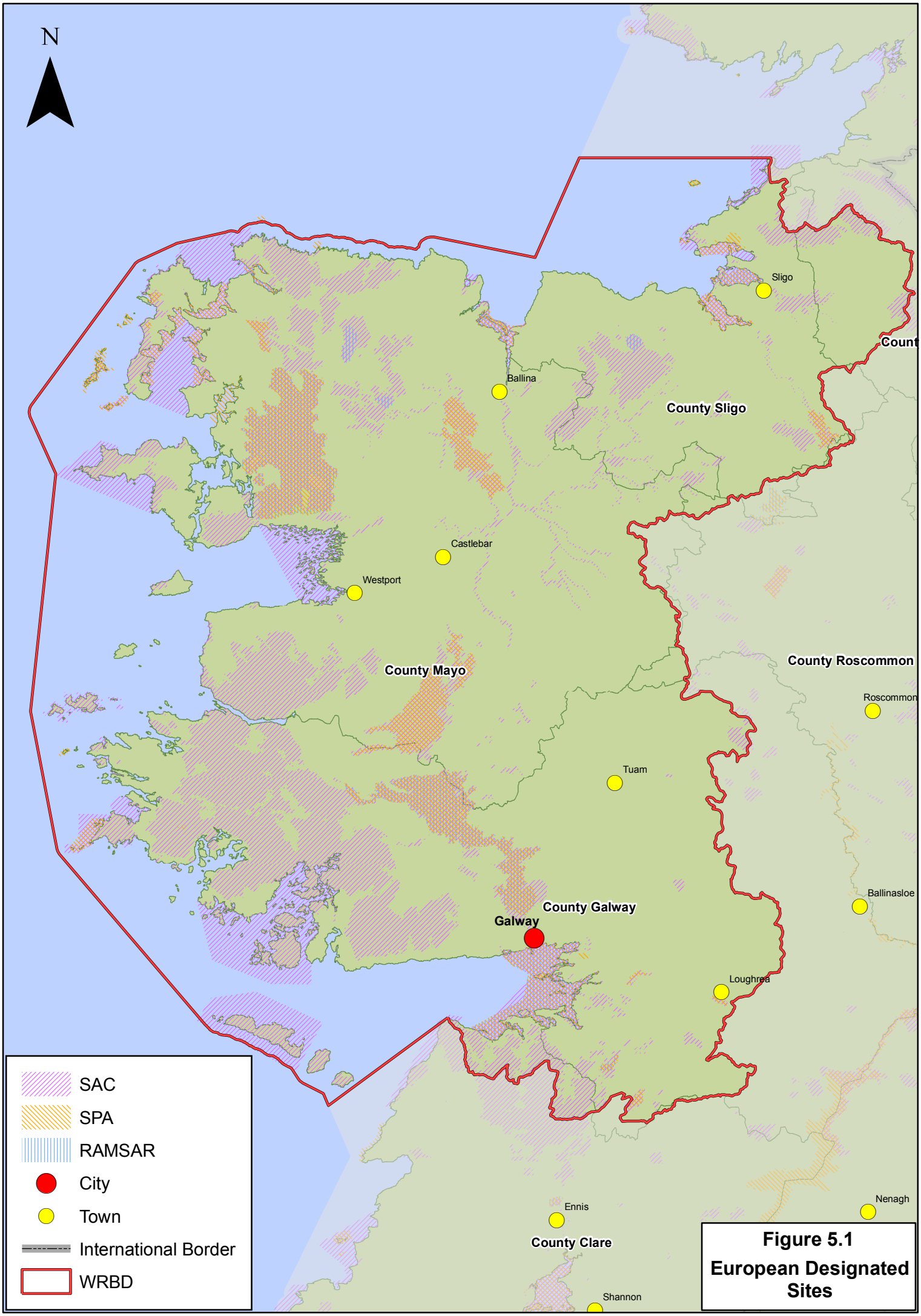

Figure 5.1

European Designated Sites

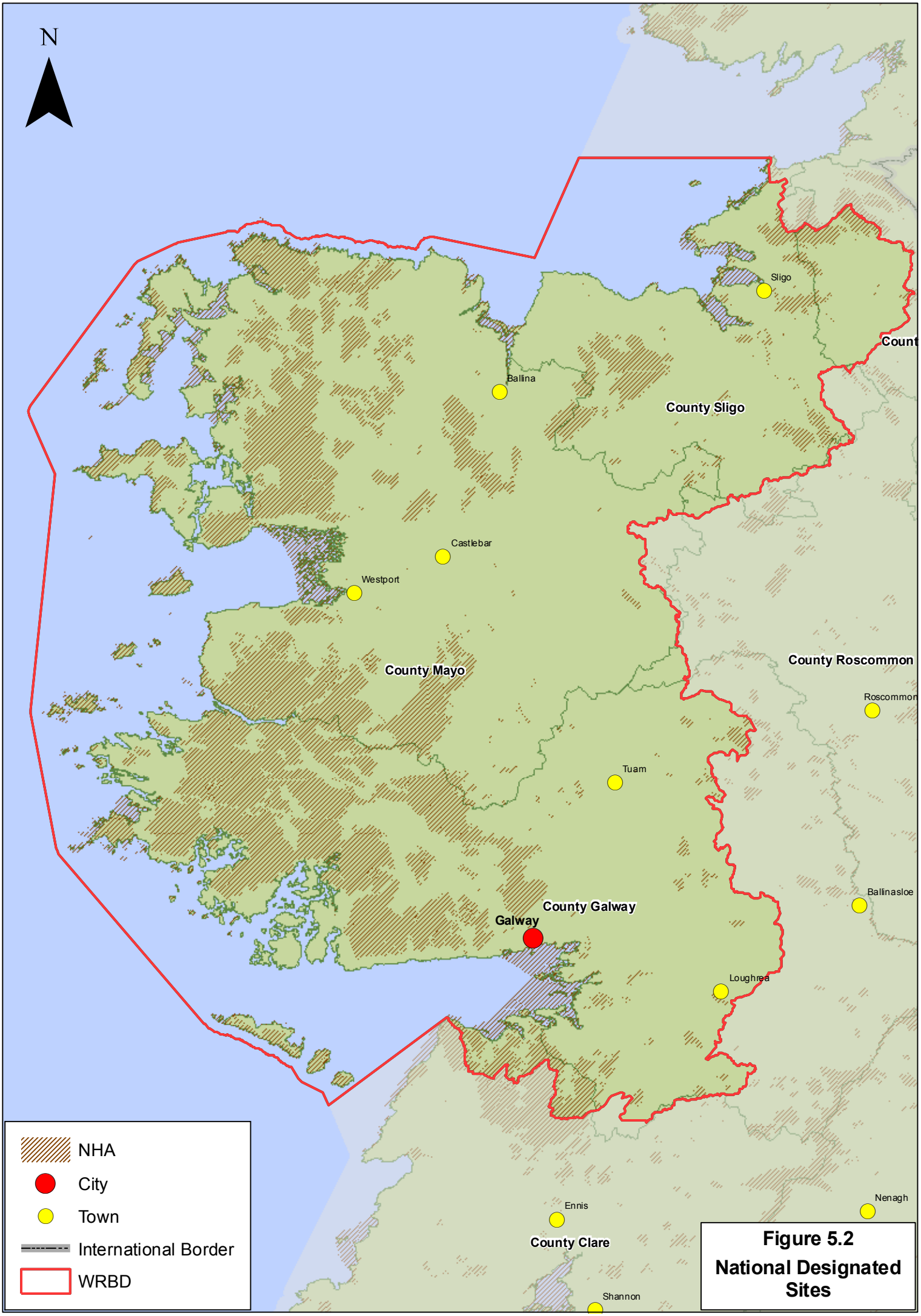

Figure 5.2
National Designated Sites