

Water Matters: Our Plan!



Shannon River Basin Management Plan (2009-2015)

Foreword

Clean water is one of our most important national resources. Human activities have led to deterioration in water quality over many years. The Water Framework Directive was adopted by the EU in order to halt and reverse the decline in water quality. The Directive sets very strict deadlines for meeting water quality objectives, especially in protected areas. This plan sets out how we aim to achieve the objectives of the Directive in the Shannon International River Basin District.

Informed by pilot projects from the 1990's and through extensive research carried out since 2003, local authorities have developed this plan to provide an objective scientific approach to meeting the required water standards. In preparing the plan all known pressures on waters have been identified and quantified at the level of individual water bodies. Measures to address the pressures have been examined and the likelihood of water quality recovery has been assessed. All public bodies and other stakeholders have been consulted extensively in the process.

The plan's targets are ambitious yet they are no more than we are obliged to do by EU and national legislation. Further legislative change may be required to control specific activities. Responsibility for taking measures lies with all public bodies whose activities impact on water quality or who regulate such activities. Local authorities must perform their own activities in a way that will promote achievement of objectives and additionally must carry out a range of environmental monitoring and enforcement activities to ensure that other stakeholders' actions will lead to water quality improvements.

Local authorities today face an immense challenge to meet an ever increasing demand for services across all of their functions. We are required to work within tight resource constraints and depend heavily on funding provided by the Department of Environment, Heritage and Local Government for capital works and indeed day to day expenditure. Under the circumstances it is ever more important that we plan carefully for the application of resources to satisfy obligations placed upon us by national legislation and to lead the general development of our administrative areas.

Following adoption of this plan, local authorities will develop implementation programmes and identify all resource implications and funding requirements. It is likely that the resource requirements will exceed the current capacity of local authorities. Meeting the commitments contained in the plan will depend on the Department of Environment, Heritage and Local Government together with other Government Departments making provision for the required resources and funding.

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Glossary and Abbreviations

AA:	Appropriate Assessment for Natura 2000 sites as required under the Habitats Directive.
Acidification (artificial):	The rough canopies of mature evergreen forests are efficient scavengers of particulate and gaseous contaminants in polluted air. This results in a more acidic deposition under the forest canopies than in open land. Chemical processes at the roots of trees, evergreens in particular, further acidify the soil and soil water in forest catchments. When the forests are located on poorly buffered soils, these processes can lead to a significant acidification of the run-off water and consequent damage to associated streams and lakes.
ACP:	Agricultural Catchment Programme
Artificial water body:	A body of surface water created by human activity.
Biodiversity:	Word commonly used for biological diversity and defined as assemblage of living organisms from all habitats including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part.
CFB:	The Central Fisheries Board
Coastal waters:	That area of surface water on the landward side of a line, every point of which is at a distance of one nautical mile on the seaward side from the nearest point of the baseline from which the breadth of territorial waters is measured, extending where appropriate up to the outer limit of transitional waters.
DAFF:	Department of Agriculture, Fisheries and Food.
DCENR:	Department of Communications, Energy and Natural Resources.
DEHLG:	Department of Environment, Heritage and Local Government.
DETE:	Department of Enterprise, Trade and Employment.
Diffuse sources (of pollution):	Non-point sources primarily associated with run-off and other discharges related to different land uses such as agriculture and forestry, from septic tanks associated with rural dwellings and from the land spreading of industrial, municipal and agricultural wastes.
EC:	European Commission
Ecological status:	An expression of the structure and functioning of aquatic ecosystems associated with surface waters. Such waters are classified as being of good ecological status when they meet the requirements of the Water Framework Directive.
Ecology:	The study of the relationships among organisms and between those organisms and their non-living environment.
Ecosystem:	A community of interdependent organisms together with the environment they inhabit and with which they interact; community and environment being distinct from adjacent communities and environments
EPA:	Environmental Protection Agency.
EU:	European Union
Eutrophic:	Having high primary productivity, the result of high nutrient content.
Eutrophication:	The process of enrichment of water by nutrients (principally phosphorus and nitrogen). The nutrients accelerate plant growth, disturbing the balance of aquatic plants and animals and affecting water quality.
Good status:	A collective term used to refer to the status achieved by a surface water body when both its ecological status and its chemical status are at least good or,

for groundwater, when both its quantitative status and chemical status are at least good.

Groundwater:	All water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil. This zone is commonly referred to as an aquifer, which is a subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow a significant flow of groundwater or the abstraction of significant quantities of groundwater.
GSI:	Geological Survey of Ireland.
Heavily modified water body:	A water body that has been changed substantially in character as a result of physical alterations by human activity.
HSE:	Health Service Executive
Hydromorphology:	A study of the quantity and dynamics of water flow within a water body that has variations in its width, depth, structure and substrate of bed and riparian zone.
Inland surface waters:	All standing or flowing water on the surface of the land (such as reservoirs, lakes, rivers) on the landward side of the baseline from which the breadth of territorial waters is measured.
Invasive alien species:	Invasive alien species are non-native plants or animals that successfully establish themselves in aquatic and fringing habitats and damage natural flora and fauna.
Leachate:	The liquid containing dissolved and suspended contaminants that is formed as percolating water passes through potentially polluting materials. The term is generally associated with landfills.
Mitigation measures:	Measures to avoid, prevent, minimise, reduce or, as fully as possible, offset or compensate for any significant adverse effects on the environment, as a result of implementing a plan or programme.
NAP:	National Action Programme
NPWS:	National Parks and Wildlife Service.
On-site system:	Septic tank or other system for treating wastewater from unsewered properties.
Oligotrophic:	Water bodies that are poorly nourished or unproductive.
OPW:	The Office of Public Works
PRP	Pollution reduction programme
Programme measures:	of Those actions, defined in detail, which are required to achieve the environmental objectives of the Directive within a river basin district.
Protected area	Water protected by European legislation including drinking waters, shellfish waters, bathing waters, urban wastewater nutrient sensitive areas or sites designated as Special areas of Conservation or Special Protected Areas
Quantitative status:	An expression of the degree to which a body of groundwater is affected by direct and indirect abstractions. If this complies with Directive requirements the status is good.
River Basin District (RBD) & International River Basin District (IRBD):	Administrative area for coordinated water management, composed of multiple river basins (or catchments), with cross-border basins (i.e. those covering the territory of more than one Member State) assigned to an international RBD.
River basin:	The area of land from which all surface water run-off flows, through a sequence of streams, rivers and lakes into the sea at a single river mouth,

	estuary or delta.
SEA:	Strategic Environmental Assessment
Sedimentation:	The deposition by settling of a suspended material.
SNIFFER:	Scotland Northern Ireland Forum for Environmental Research.
Special Area of Conservation (SAC):	Site designated according to the Habitats Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora).
Special Protection Area (SPA):	Area designated under the European Directive on the Conservation of Wild Birds.
Statutory Instrument (SI):	Any order, regulation, rule, scheme or bye-law made in exercise of a power conferred by statute.
Surface water:	Inland waters on the land surface (such as reservoirs, lakes, rivers, transitional waters, coastal waters) within a river basin.
SWAN:	Sustainable Water Network
Transitional waters:	Bodies of surface water in the vicinity of river mouths which are partly saline in character as a result of their vicinity to coastal waters, but which are substantially influenced by freshwater flows.
Water body:	A coherent sub-unit in the river basin (district) to which the environmental objectives of the directive must apply. Hence, the main purpose of identifying “water bodies” is to enable the status to be accurately described and compared to environmental objectives
Water Framework Directive (WFD):	The Water Framework Directive is European legislation that promotes a new approach to water management through river basin planning. It covers inland surface waters, estuarine waters, coastal waters and groundwater.
WMU:	Water Management Unit – geographical sub unit of a river basin district consisting of a number of water bodies relevant to a particular sub catchment.

Executive summary

The Shannon IRBD is the largest in Ireland at more than 18,000 km² in area. It stretches from the source of the River Shannon in the Cuilcagh mountains in counties Cavan and Fermanagh to the tip of the Dingle peninsula in north Kerry. As well as the natural drainage basin of the Shannon river itself, which drains an extensive area of central Ireland, it also includes coastal parts of Kerry and Clare which drain to the sea. It drains 18 local authority areas and is also an international district as a small portion of County Fermanagh in Northern Ireland drains underground to the source of the Shannon where it rises to the surface at the Shannon Pot in County Cavan. The Shannon IRBD is a largely rural district with many protected sites that depend on water (54% of rivers have protected areas associated with them). Water is critical to the economy of the Shannon IRBD, generating and sustaining wealth through activities such as agriculture, forestry, aquaculture, power generation, industry, services, transport and tourism. However, water is a fragile resource that needs to be protected.

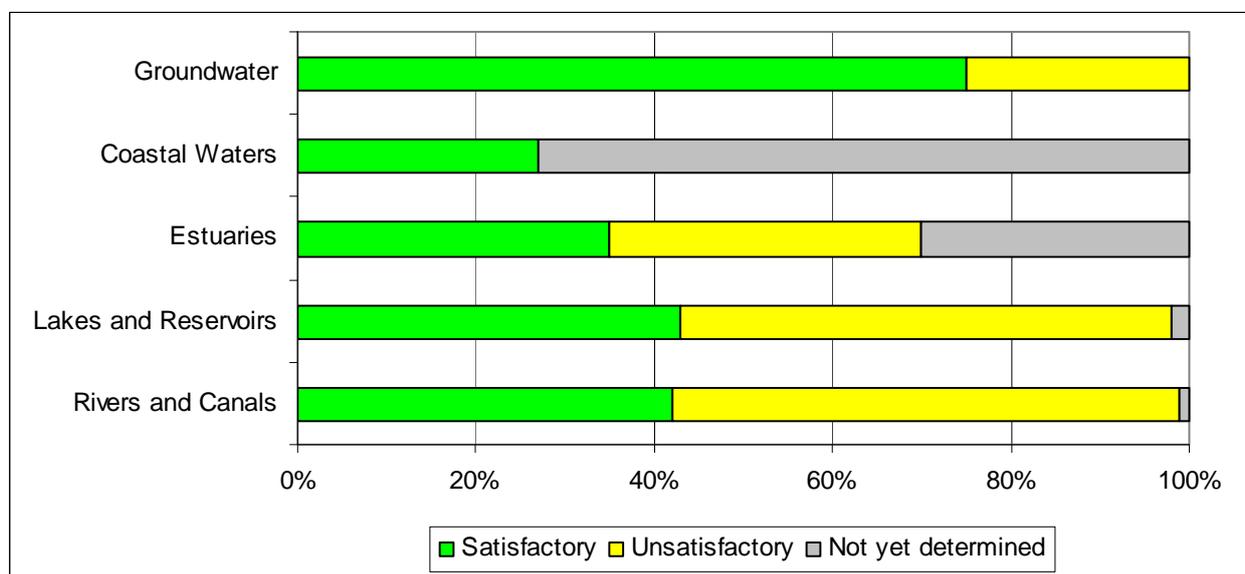
The Water Framework Directive (WFD) was adopted in 2000. It requires governments to take a new approach to managing all their waters: rivers, canals, lakes, reservoirs, groundwaters, protected areas (including wetlands and other water-dependent ecosystems), estuaries (transitional) and coastal waters. Member states must ensure that their waters achieve at least good status, generally by 2027 at the latest, and that status doesn't deteriorate in any waters. To achieve good status and preserve the best waters, it is necessary to prepare and implement management plans for those waters.

This plan is for the Shannon IRBD. It covers the period 2009–2015 and has been prepared in consultation with all stakeholders. It sets out the measures to be taken by all stakeholders and the tools to prioritise the application of available resources to those measures, with the aim of achieving the objectives of the directive. The key parties in its implementation are:

- the district's local authorities (Limerick (county and city), Cavan, Clare, Cork, Galway, Kerry, Laois, Leitrim, Longford, Meath, Mayo, Offaly, Roscommon, Sligo, Tipperary North, Tipperary South and Westmeath), which acted jointly to make the plan; Limerick County Council, as the coordinating local authority in the district will aim to coordinate the work of the authorities and public participation in the district and to coordinate work with the Northern Ireland Environment Agency;
- the Environmental Protection Agency, which is responsible for reporting to the European Union, coordinating activities at national level and certain other tasks such as assigning status, monitoring programmes and review of the plan;
- the Department of the Environment, Heritage and Local Government which has a coordinating role in relation to implementation of the Water Framework Directive, and through the Local Government Fund and Water Services Investment Program plays a significant role in determining priority for investment in infrastructure and the availability of resources to local authorities;
- other public authorities identified under the 2003 Water Policy Regulations, which are required to exercise their functions in a manner which is consistent with the objectives of the river basin management plan;
- the Water Framework Directive National Advisory Committee which will oversee implementation of the plan at national level. It is chaired by the Department of the Environment, Heritage and Local Government and involves representatives from the Department of Agriculture, Fisheries and Food, the Environmental Protection Agency, the City and County Managers Association (representing local authorities) and other Government Departments as appropriate.

The Environmental Protection Agency has, in an interim status assessment based on the results of the monitoring up to 2008, classified the surface waters in the Shannon IRBD according to their ecological status and chemical status; groundwater is classified based on a system combining chemical and quantitative status:

- 42% of rivers and canals, 43% of lakes, 35% of estuaries and 27% of coastal waters are satisfactory, with high or good ecological status (percentage calculated by number);
- 57% of rivers and canals, 55% of lakes, and 35% of estuaries are less than good (moderate, poor or bad);
- 1% of canals, 2% of lakes, 30% of estuaries and 73% of coastal waters are yet to have status assigned;
- most of the surface waters tested so far have good chemical status;
- 75% of groundwaters have good combined status.

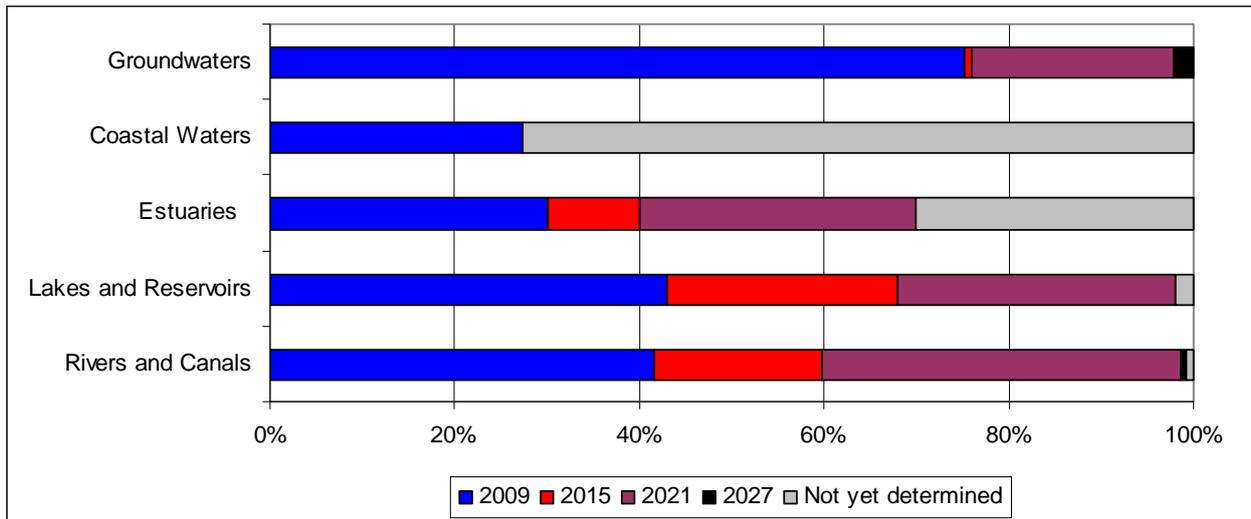


The final status assessment based on the data collected during the first monitoring cycle (2007-2009) will be presented by the Environmental Protection Agency in 2011.

The Water Framework Directive sets out four core objectives to be achieved by 2015:

- prevent deterioration;
- restore good status;
- reduce chemical pollution;
- achieve protected areas objectives.

The Water Framework Directive also allows alternative objectives to be set for certain waters. It is estimated that implementation of the measures in this plan will result in good status being achieved by 2015 in 60% of rivers, 73% of lakes, 40% of estuaries, 27% of coastal waters and 76% groundwaters, with further improvements during the second and third planning cycles. The expected trends in status expected over three planning cycles to 2027 are:



The principal suspected causes of less than satisfactory water in the state are discharges, principally of nutrients, from agricultural activities and from municipal wastewater treatment works. Industrial discharges, wastewater from unsewered properties and discharges from several other activities have also been identified as contributing. Action should concentrate in the first instance on these issues which pose the greatest threat to the water environment, but it is also important to address other possible sources of water pollution and impact, including issues such as water abstraction and physical modification and issues specific to the Shannon IRBD. This plan identifies a programme of measures to protect and restore water status by addressing the main pressures (that is sources of pollution or status impact) in the district.

Many of the measures are already provided for in national legislation and are being implemented. These include, for example, the Urban Waste Water Treatment Regulations 2001 to 2010 and the Good Agricultural Practice for the Protection of Waters Regulations of 2009. Other measures have been recently introduced (for example new Bathing Water Regulations, 2008) or are under preparation (for example proposed authorisation regulations for abstractions and physical modifications). The key measures include:

- Control of urban waste water discharges;
- Control of unsewered waste water discharges;
- Control of agricultural sources of pollution;
- Water pricing policy;
- Sub-basin management plans and programmes of measures for the purpose of achieving environmental water quality objectives for Natura 2000 sites designated for the protection of Freshwater Pearl Mussel populations;
- Pollution reduction programmes for the purpose of achieving water quality standards for designated shellfish waters; and
- Control of environmental impacts from forestry.

The action programme intended to achieve the plan’s environmental objectives sets out:

- what the measure is;
- where and when it will be applied;
- who will take the action.

More detailed information is also set out in a series of water management unit (WMU) action plans. WMUs are at a smaller geographical scale than river basin districts, and allow for more focussed planning and implementation. There are seventeen water management units for the rivers and lakes in the Shannon IRBD plus action plans focusing on groundwaters and estuary and coastal waters. These action plans will be developed further to become implementation programmes and will be revised to reflect any updates (for example in relation to status) as implementation of the plan proceeds.

1 Introduction

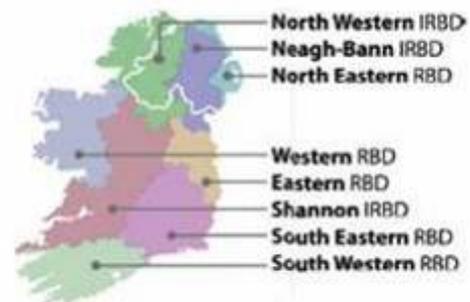
This River Basin Management Plan for the Shannon International River Basin District, covering the period 2009 to 2015, aims to protect all waters within the district and, where necessary, improve waters and achieve sustainable water use. Waters include rivers, canals, lakes, reservoirs, groundwaters, protected areas (including wetlands and other water-dependent ecosystems), estuaries (transitional) and coastal waters.

In accordance with the EU Water Framework Directive, Ireland is committed to manage all waters through a catchment based process, and the River Basin Management Plan is the mechanism for achieving this.

The implementation of the plan will bring incremental improvement leading to the majority of waters reaching at least “good status” by 2027 at the latest, benefiting the whole community by providing long-term sustainable access to and use of those waters. Where waters are currently at less than good status, they must be improved until they reach good status and there must be no deterioration in the existing status of waters.

1.1 The Shannon International River Basin District

Planning is based on river basins or catchments, so that all activities with a potential to impact on waters are managed in an integrated manner. Individual river basins are grouped into river basin districts; the districts cross administrative boundaries and are defined by the catchment areas of rivers. There are eight river basin districts (RBDs) covering the island of Ireland: four wholly within Ireland, one in Northern Ireland and three cross border. These cross-border districts are called International River Basin Districts (IRBDs).



Map 1.1 Ireland's River Basin Districts

The Shannon District is the largest in Ireland at more than 18,000 km² in area. It stretches from the source of the River Shannon in the Cuilcagh mountains in counties Cavan and Fermanagh to the tip of the Dingle peninsula in north Kerry. As well as the natural drainage basin of the Shannon river itself, which drains an extensive area of central Ireland, it also includes coastal parts of Kerry and Clare which drain to the sea. It drains 18 local authority areas and is also an international district as a small portion of County Fermanagh in Northern Ireland drains underground to the source of the Shannon where it rises to the surface at the Shannon Pot in County Cavan.

The Shannon District encompasses large areas of counties Limerick, Clare, Tipperary, Offaly, Westmeath, Longford and Roscommon as well as significant portions of counties Kerry, Galway, Leitrim and Cavan. Other counties that have smaller portions in the Shannon District include Sligo, Mayo, Cork, Laois, Meath and Fermanagh. All of Limerick City is located within the District.

The distribution of people and the types of activities that take place vary throughout the District. Although more than 670,000 people (CSO, 2006) live in the Shannon District, the population density is lower than in eastern Ireland. The largest urban area is Limerick City (90,800, including its suburbs and environs) but other sizable towns include Athlone (17,500), Ennis (24,300), Mullingar (18,400), Tralee (22,700) and Tullamore (12,900). Urban areas have a lot of industries and most of them are centered on rivers or along the coastline. Many people live in small villages or in one-off houses in rural areas.

Agriculture is widespread throughout the Shannon District. Over 70% of the land area is farmed. Livestock grazing on pasture land is the most widespread type of farming. There is a healthy milk and meat processing industry in the District. There are also more intensive agricultural enterprises in several areas. Though much of the land area is agricultural, there are also areas of forestry and peatlands. Peat has been used since the 1940s as fuel in local power stations to generate electricity. The District boasts scenic landscapes and offers great opportunities for fishing and boating which attract many tourists.

1.2 The authorities and their roles

A detailed list of the authorities involved in the management of the Shannon IRBD is included in the *contacts background documents* available at www.wfdireland.ie.

This plan has been developed by the local authorities of counties Limerick (county and city), Cavan, Clare, Cork, Galway, Kerry, Laois, Leitrim, Longford, Meath, Mayo, Offaly, Roscommon, Sligo, Tipperary North, Tipperary South and Westmeath. These local authorities, acting jointly, are the competent authorities for making this plan as defined by the *European Communities (Water Policy) Regulations 2003 (SI 722 of 2003)*. Similar plans have been drawn up by local authorities in the adjoining districts (the Western, South Western, South Eastern, Eastern, and North Western River Basin Districts).

Public bodies, identified in the 2003 *Water Policy Regulations*, are required to exercise their functions in a manner which is consistent with the objectives of the river basin management plan.

Limerick County Council is the coordinating local authority in the Shannon IRBD. Public authorities at district level have been coordinated through a Management Group and public participation has been facilitated through an RBD Advisory Council.

The Environmental Protection Agency is the competent authority for reporting to the European Union, coordinating certain activities and for other tasks assigned in the 2003 *Water Policy Regulations*. In relation to the plan's development the Agency's particular responsibilities include assigning status, monitoring programmes and the review of the plans. Under Section 63 of the Environmental Protection Agency Act (No 7 of 1992), as amended by the Protection of the Environment Act (No 27 of 2003), the Environmental Protection Agency is authorised to supervise the performance of all public authorities with statutory functions in relation to environmental protection.

The Department of the Environment, Heritage and Local Government which has a coordinating role in relation to implementation of the Water Framework Directive, and through the Local Government Fund and Water Services Investment Program plays a significant role in determining priority for investment in infrastructure and the availability of resources to local authorities.

Implementation of the plan will be overseen at national level by a National Advisory Committee chaired by the Department of the Environment, Heritage and Local Government with representatives from the Department of Agriculture, Fisheries and Food, Department of Enterprise, Trade and Employment, the Environmental Protection Agency, the City and County Managers Association (representing local authorities), and other Government Departments as appropriate.

This plan has been prepared in consultation with all stakeholders. Implementation of the plan will be challenging and will place obligations on all relevant authorities and stakeholders. Local authorities, through this plan, are committed to achieving the aims and objectives of the Water Framework Directive by implementing the measures specified to the best of their ability.

1.3 The development of the plan

Public authorities have in preparing this plan, been undertaking technical work, coordination and consultations since 2000.

1.3.1 Investigation and technical work

River, canal, lake, reservoir, estuary and coastal water bodies and ground water bodies in the district have been delineated based on physical characteristics (typology). Potential sources of pollution (pressures) were identified and impacts assessed. Monitoring was carried out and the status of waters was classified based on the results of this monitoring. The *characterisation report* and *monitoring programme background documents* are available from www.wfdireland.ie.

A draft of this plan was published in December 2008. The main technical studies undertaken to finalise the plan during 2009 included:

- An assessment of the timescales for water quality to recover once remedial measures are implemented in order to determine likely restoration timescales. This included an investigation of the rate of nutrient loss from agricultural lands and the likely timescales for status recovery following implementation of the *Good Agricultural Practice Regulations (SI 101 of 2009)*;
- Prioritisation of wastewater treatment plants for investigation and, where necessary, remedial works based on an assessment of compliance with the urban wastewater treatment regulations, current operational performance and known impacts on water quality. Protected areas (for example bathing waters, shellfish waters and water dependent Natura 2000 sites) were also taken into account, where impacted by discharges ;
- Preparation of catchment management plans for designated freshwater pearl mussel populations and Pollution Reduction Programmes for designated shellfish waters in order to develop measures for these protected areas;
- An assessment of the cost of measures for wastewater discharges and on-site systems.

During 2009 the Environmental Protection Agency updated the delineation of water bodies. This involved splitting some water bodies in order to better represent their status. The Agency also updated status classification based on 2008 monitoring information.

The outputs from the above studies were used to modify and update the objectives and measures presented in this final plan. Detailed action plans were prepared for more locally focused catchment areas called Water Management Units. These extract the key measures and objectives in the overall plan, presenting them for the geographical areas in which implementation will be coordinated.

1.3.2 Consultation

Consultation has been an important aspect throughout the development of this plan. The following *public participation background documents* (at www.wfdireland.ie) were produced:

- the administrative arrangements for implementing the Water Framework Directive, *Managing our Shared Waters [2003]*;
- the process of characterising basins and assessing the impacts of human activity on them, including an economic analysis of water uses, *The Characterisation and Analysis of Ireland's River Basin Districts [2004]*;
- the milestones for developing river basin management plans, *Timetable and Work Programme for making a River Basin Management Plan for the Shannon International River Basin District in Ireland [2006]*;

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- the identification of the most significant water issues and how they affect waters, including what is being done and what is planned to do about them, *Water Matters – Have Your Say! Shannon International River Basin District [2007]*;
 - a summary of consultations and stakeholder engagement, *Digest of submissions and responses to Significant Water Management Issues Reports for Ireland, and the Shannon International River Basin District [2008]*;
 - the strategic environmental assessment scoping process, *Strategic Environmental Assessment for the Water Framework Directive River Basin Management Plans and Programmes of Measures - Shannon IRBD – Scoping Document [2008]*;
 - the draft river basin management plan, *Water Matters “Help Us Plan!” Draft River Basin Management Plan for the Shannon International River Basin District [2008]*;
 - the strategic environmental assessment environmental report, *Strategic Environmental Assessment for the Water Framework Directive River Basin Management Plans and Programmes of Measures - Shannon IRBD – Environmental Report [2008]*;
 - the digest of submissions on the draft plan which details the comments made and their responses and summarises where these have been addressed in the preparation of the final plan, *Digest of submissions and responses to the draft River Basin Management Plan for the Shannon International River Basin District [2010]*.

The management plan was considered during its preparation by the RBD Advisory Council, which consists of representatives from local authorities (County and Town Councilors) and community and stakeholder groups (agriculture, angling, industry and non-governmental organisations).

Voluntary groups are also involved in River Basin Planning activities primarily through the activities of SWAN (Sustainable Water Network) www.swanireland.ie. SWAN is an umbrella network of 25 of Ireland’s leading national and local environmental organisations specifically constituted to address public participation requirements of the Water Framework Directive.

The plan was also considered by the Shannon District’s Management Group which facilitates information exchange, consultation, cooperation and liaison within and between Ireland’s public authorities.

Significant water management issues were discussed with interest groups and county councils and at a series of public consultation events in 2007 and 2008. Draft plan public consultation events were held between December 2008 and June 2009 including the following information events:

Date	Location	Venue	River Basin Districts
27 April 2009	Sligo*	Sligo Park Hotel	Western & Shannon
28 April 2009	Portlaoise*	Council Chamber, Aras an Chontae	South Eastern & Shannon
28 April 2009	Ennis	Clare County Council Foyer	Shannon & Western
30 April 2009	Galway	County Hall	Western & Shannon
5 May 2009	Cavan*	Cavan Crystal Hotel	North Western, Neagh Bann, Shannon, Eastern
5 May 2009	Limerick	Limerick County Council Foyer	Shannon & South Western
6 May 2009	Athlone	Sheraton Hotel	Shannon
7 May 2009	Carrick-on-Shannon	Bush Hotel	Shannon and Western
7 May 2009	Mallow*	GAA Sports Complex	South Western & Shannon
12 May 2009	Killarney*	Killarney Library	South Western & Shannon

*denotes event being hosted by other River Basin Districts adjacent to the Shannon IRBD

A total of 66 written submissions were received in relation to the draft River Basin Management Plan for the Shannon IRBD across the following sectoral interest groups: local and public authorities; non-governmental organisations; business; and private individuals. A summary of the issues raised and responses is contained in the draft plan submissions digest in the *public participation background documents* which can be available at www.wfdireland.ie.

1.3.3 Planning

This plan is the result of a systematic process of identifying risks to waters, assessing the status of waters, setting objectives and developing measures to achieve those objectives. It has resulted from a significant body of technical preparatory work and public stakeholder participation. This plan establishes water status objectives and identifies the measures to achieve those objectives. It also identifies the organisations that are responsible for implementing measures. The plan will remain in force until 2015. The data used to develop the plan (for example status assessments and the results of research and investigation programmes) will be continually updated and reviewed to ensure that measures achieve their objectives. A second plan will be prepared to cover the period 2015–2021 and a third, covering the period 2021–2027.

Much of the detailed information behind this plan has been incorporated into a computer-based interactive plan tool, *Water Maps* on www.wfdireland.ie. The plan is also supported by a large number of background documents, also on www.wfdireland.ie. They provide in-depth information about technical and detailed aspects of the plan including pressures, status, economic analysis, public participation arrangements, competent authorities and related plans and programmes.

1.4 Layout of this plan

Chapter 2 describes the Shannon IRBD identifying its waters, protected areas and the key water management issues.

Chapter 3 establishes the status of the waters in the district summarising the monitoring programme and classification of waters.

Chapter 4 covers the objectives for protecting and restoring waters during the first and, where necessary, subsequent planning cycles.

Chapter 5 identifies the measures to achieve the objectives, the Shannon IRBD action programme is supported by a series of more locally focused Water Management Unit action plans.

Chapter 6 considers the linkages of this plan with other plans and describes the wider climate change and environmental assessments of this plan.

This river basin management plan sets out a realistic approach to securing environmental objectives, and is in compliance with the requirements of the Water Framework Directive. Its contents have been checked against the Directive's requirements to ensure that the plan provides all the information needed. The *compliance statement background document* is available at www.wfdireland.ie.

2 Description of the Shannon IRBD

2.1 The waters of the Shannon IRBD

2.1.1 Surface waters

The River Shannon is the largest river in Ireland. It rises in County Cavan and flows for 260 km before entering the Shannon Estuary at Limerick City. An unusual feature of the Shannon river is that it is remarkably flat, with the majority of the fall in height taking place on the 24 km stretch between Killaloe and Limerick. The first hydro-electric power generation station in Ireland was constructed on this stretch, at Ardnacrusha, in the 1920s. In winter, seasonal flooding occurs and the flood plains on either side of the river, called “callows”, are world famous for the plants and animals found there. The main tributaries of the Upper Shannon are the Rivers Suck, Inny and Brosna while the main tributaries of the Lower Shannon are the Rivers Fergus, Maigue, Deel and Mulkear.

There are more than 1,600 lakes in the Shannon District but less than 50 of them are over 1 km² in area. The largest lakes are Lough Derg (120 km²), Lough Ree (100 km²) and Lough Allen (30 km²) - these large lakes are all on the River Shannon itself.

The Shannon estuary is the largest estuary in Ireland with an area of approximately 1500 km². The Fergus, Deel and Maigue rivers all flow into the Shannon Estuary. The District's coastline incorporates most of the coastline of County Clare and about one third of the coastline of County Kerry. There are a number of ports and harbours, the main ones are at Limerick and Foynes.

2.1.2 Groundwaters

There are 242 groundwater bodies in the Shannon IRBD ranging in size from less than 1 km² to over 1320 km². Limestone rocks dominate the geology of the Shannon District (up to 70% of the area). The Burren in County Clare is probably one of the best known landscapes internationally. The karstified limestone creates unique groundwater features including seasonal lakes (turloughs) and disappearing rivers during prolonged dry spells. Swallow holes form where the limestone bedrock is dissolved along fissures and cracks allowing the surface streams to disappear into the ground to emerge, sometimes miles away, as springs. The districts more productive aquifers, that contribute approximately half the flow in surface waters, are located mainly in east Galway and Roscommon. There are also a number of gravel aquifers that are fairly significant throughout the district, particularly in Offaly and Westmeath.

2.1.3 Heavily modified and artificial waters

Six surface waters in the district have been heavily modified for uses such as navigation (for example ports), water storage, and public drinking water supply. These are: Foynes Harbour, Limerick Dock, Doo Lough (Clare), Lough Derg (from Killaloe bridge to Parteen weir) and the River Fergus tidal barrage. Sixteen other waters are man-made (artificial): they include the Grand canal, Royal canal and Shannon Erne waterway. These modified and artificial waters provide important uses and benefits to society, which cannot be replaced by other means and need to be retained. Therefore, these waters are subject to a different set of objectives.

2.1.4 Protected areas

A significant proportion of waters in the district are protected under existing EU legislation and they require special protection due to their sensitivity to pollution or their particular economic, social or environmental importance. All of the areas requiring special protection in the Shannon IRBD have been identified, mapped and listed in a *register of protected areas background document* (available at www.wfdireland.ie). They include drinking water sources such as Drumcliff (Ennis) and Ballinaguard (Roscommon town), shellfish waters such as Inner Tralee Bay (Maherees), bathing waters such as Kilkee and Lough Derg, nutrient sensitive areas such

as the Brosna and the Upper Feale estuary, and Special Areas of Conservation and Special Protection Areas such as the River Shannon Callows (qualifying interests include otter, corn crake, bewick's swan, and black-tailed godwit), the Lower Shannon Estuary (qualifying interests include coastal lagoons, freshwater pearl mussel, sea lamprey and salmon), Clara Bog (qualifying interest - active raised bog), and Lough Ree (qualifying interests include natural eutrophic lakes, alkaline fens, otter, Greenland white fronted goose, and whooper swan).

Table 2.1 Water dependent protected areas in the Shannon IRBD

Protected area	Implementing Legislation	Number
Drinking waters	The European Communities (Drinking Water) (No. 2) Regulations 2007 (SI 278 of 2007)	110 surface 242 groundwater
Shellfish waters	European Communities (Quality of Shellfish Waters) Regulations 2006 (SI 268 of 2006) as amended in 2009	6
Bathing waters	Bathing Water Quality Regulations SI 79 of 2008	21
Nutrient sensitive areas	Urban Waste Water Treatment Regulations 2001 (SI 254 of 2001) as amended in 2004 and 2010.	16
Special areas of conservation	European Communities (Natural Habitats) Regulations, SI 94 of 1997 as amended in 1998 and 2005. Environmental Objectives (Freshwater Pearl Mussel) Regulations (SI 296 of 2009)	132
Special protection areas	European Communities (Natural Habitats) Regulations, SI 94 of 1997 as amended in 1998 and 2005	35

A full list of all the protected areas in the Shannon IRBD is presented in Appendix 3. Map 2.2 provides an overview of the protected areas.

2.2 Key Issues for the Shannon IRBD

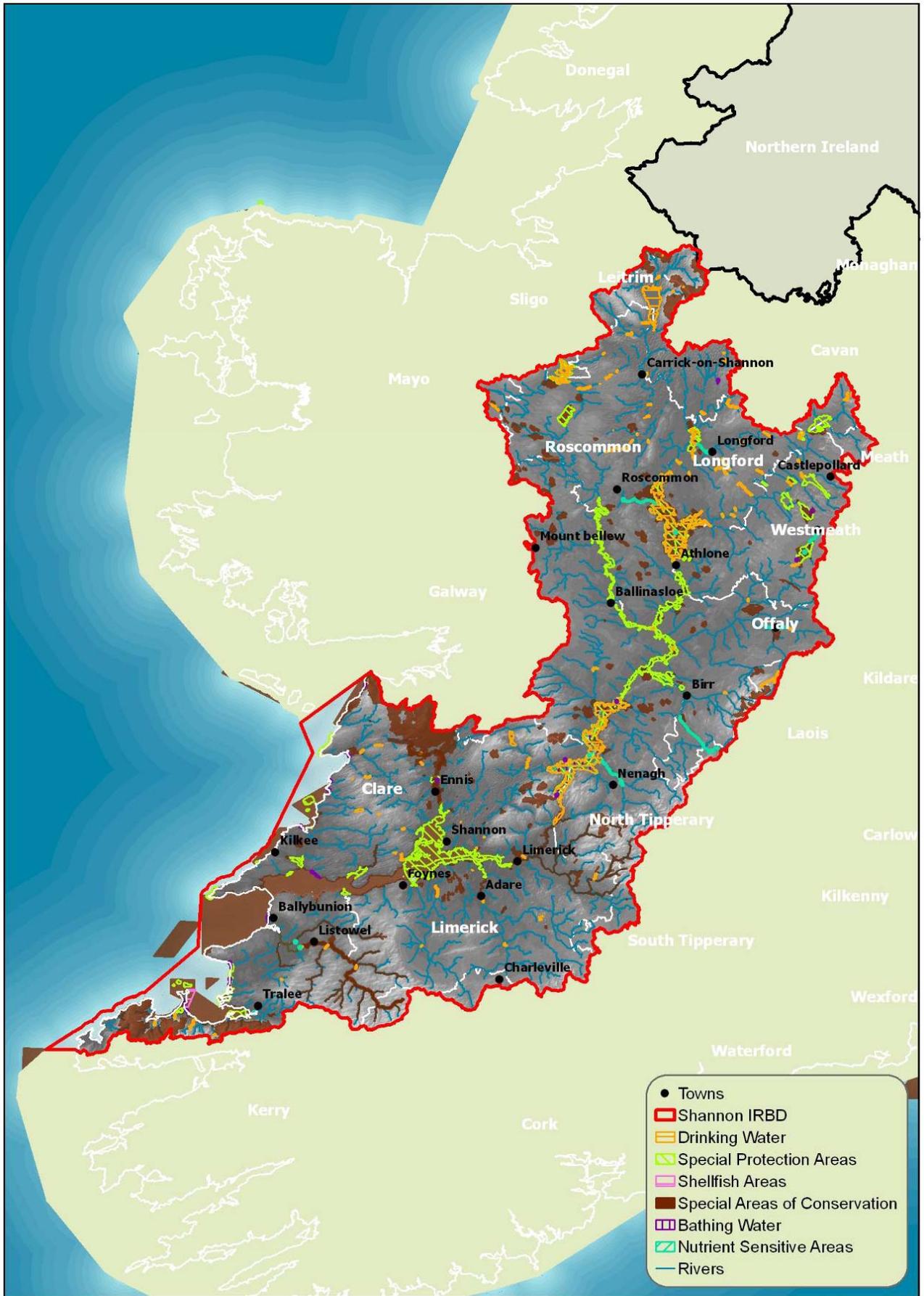
The key water management issues in the Shannon IRBD and their possible effects on water status are set out in this section. The locations of these impacts and pressures are shown on Maps 2.3 to 2.9.

2.2.1 Protecting high quality areas

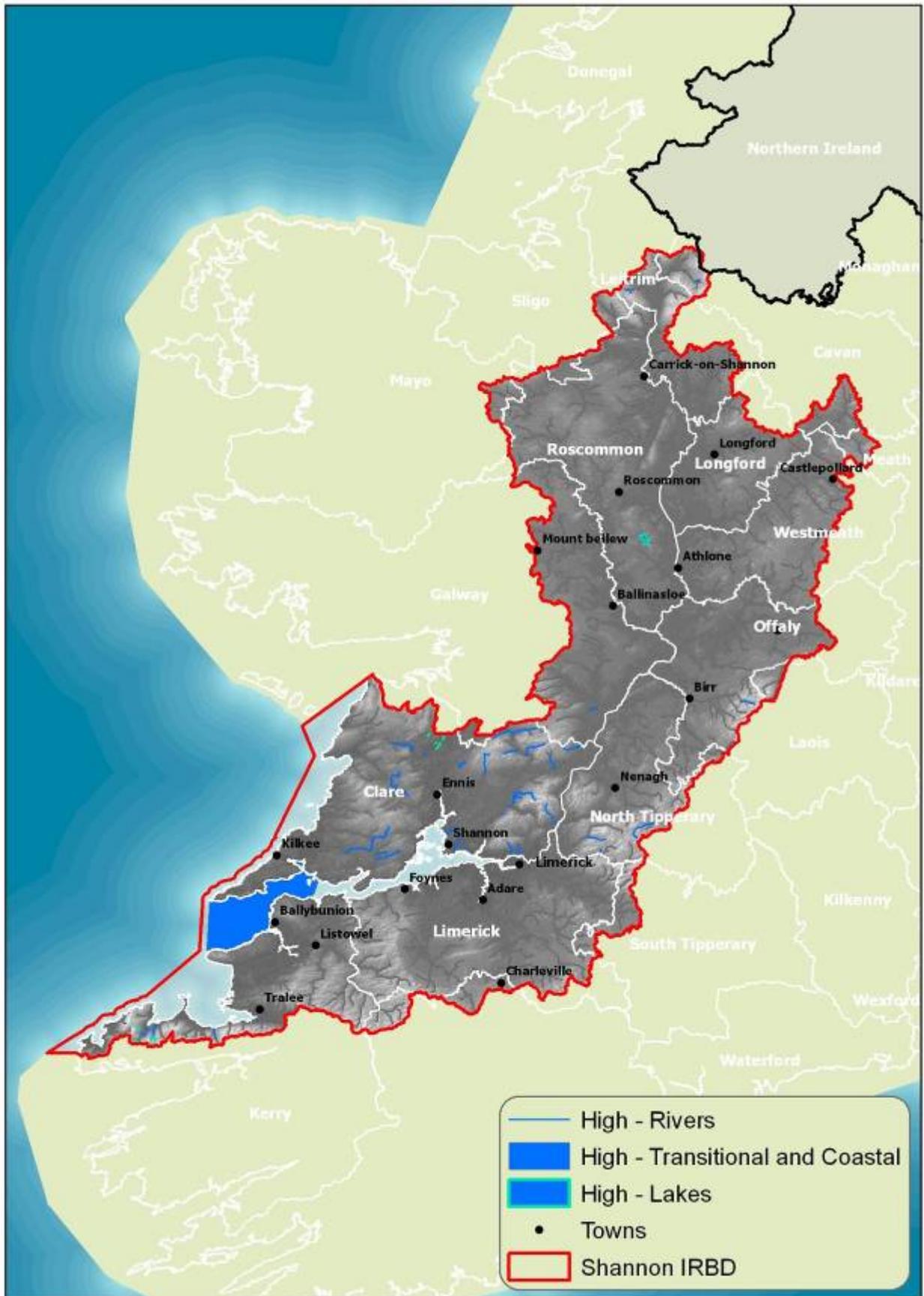
In the Shannon IRBD there are 46 rivers (5%), 16 lakes (14%), and 1 coastal water (9%) that are classified by the Environmental Protection Agency as high status. According to the 2009 Environmental Protection Agency indicators report the number of high quality river sites, nationally, has almost halved over the last 20 years and the Shannon IRBD is one of the districts that has seen the greatest decline in high quality river sites. High quality areas include rivers, lakes, estuarine and coastal areas little affected by human activity; they are still at or near unimpacted natural conditions, supporting a naturally diverse mix of aquatic wildlife. These sites are important for supporting aquatic species which are sensitive to enrichment or siltation such as the protected, but declining, freshwater pearl mussel (*Margaritifera margaritifera*) and juvenile salmon (*Salmo salar*). The presence of high status sites along a river system can contribute significantly to the overall species diversity and recolonisation of species to rehabilitated stretches. These sites play an important part in conserving individual species and overall catchment biodiversity. The deterioration or loss of high quality and protected areas is often due to their sensitivity to land use changes in surrounding catchments, such as agriculture, forestry, peat harvesting and rural development activities. High quality areas in the Shannon IRBD are shown in Map 2.3.



Map 2.1 The Shannon IRBD main surface waters (including heavily modified and artificial waters)



Map 2.2 Protected areas in the Shannon IRBD



Map 2.3 High Quality Areas in the Shannon IRBD

2.2.2 Pressures

Agriculture

In the Shannon IRBD, the Environmental Protection Agency has modelled diffuse pollution risks from agriculture, forestry, peatland and urban land uses. This has indicated that there are 445 rivers and 64 lakes at risk of failing to achieve the required standards due to diffuse pollution from these sources. Nutrients (phosphorus and nitrogen) can be carried into waters from farmyards, from manure store leaks or from fields treated with nutrient-rich organic and chemical fertilisers. Animal slurry, manure and silage effluent can cause organic pollution. Nutrient enriched water accelerates plant growth and disturbs the balance of aquatic plants and animals and affects water quality. Nutrient enrichment is the most widespread threat to water quality in the Shannon IRBD. The breakdown of organic material uses up oxygen that aquatic plants and animals need to survive, and suspended solids and ammonia can cause fish kills. Slurry can also contaminate drinking water with bacteria, parasites and viruses. Agricultural land uses in the Shannon IRBD are illustrated in Map 2.4.

Wastewater and industrial discharges

In the Shannon IRBD there are 122 rivers, 6 estuaries and 4 coastal waters at risk of failing to achieve the required standards due to municipal wastewater and industrial discharges. According to the Environmental Protection Agency 2009 report on urban waste water discharges, Clarecastle, County Clare is among the 28 agglomerations nationally requiring secondary treatment that did not have the required level of treatment in place and were non-compliant with the requirements of the Urban Waste Water Treatment Regulations. A construction start for this secondary treatment plant is 2012. Urban sewers carry wastewater to treatment plants from homes and industrial or commercial sources, as well as storm water from roads, roofs and recreational areas. The wastewater is treated, to remove many pollutants, then discharged to surface waters or, very occasionally, groundwaters. Inadequately treated effluents and spills or leakage from sewerage networks can impact on receiving waters, damaging water quality and downstream uses (for example bathing waters or shellfish waters). Urban runoff can be contaminated with pollutants (such as from vehicle exhausts) and impact on surface and groundwater quality through direct discharges. Overflows from sewer networks, leaking from defective underground pipes or seepage from containment areas can also lead to surface and groundwater pollution. The location of wastewater and industrial discharges in the Shannon IRBD are illustrated in Map 2.5.

Wastewater from unsewered properties

In the Shannon IRBD there are approximately 83,950 unsewered properties located in areas where the hydrogeological characteristics mean that inadequate percolation is available. There are 42 rivers that have been assessed to be at risk of failing to achieve the required standards due to unsuitable hydrogeological conditions and the high density and location of unsewered properties in these areas. Many rural houses and businesses rely on on-site systems (conventional septic tanks or proprietary systems), via soil percolation areas, to treat and dispose of wastewater. To work properly, these treatment facilities must be located in suitable areas and designed, constructed and maintained to appropriate standards. If they are not working properly, nutrients, organic material, chemicals and bacteria may seep from wastewater into groundwater, contaminating nearby drinking water wells or damaging the quality of receiving rivers, lakes or marine waters. The locations of unsewered properties in the Shannon IRBD are shown in Map 2.6.

Forestry

In the Shannon IRBD there are 93,000 hectares of private forestry and 87,000 hectares of public forestry. A risk assessment of acidification, eutrophication and sedimentation pressures based on percentage forestry cover and underlying geology and soils has identified 23 rivers that are at risk of failing to achieve the required standards due to potential impacts from

forestry. Where mature plantations of evergreen trees have been established on acid-sensitive soils, it can lead to increased acidity and heavy metal concentrations in the run-off waters from such soils. Forestry activities can introduce extra nutrients; in naturally nutrient-poor areas, that can lead to problems such as excessive algal growth. Road-making and stream-crossing can cause erosion and sediment loss on susceptible soils, afforestation and clearfelling of forests may change flow patterns: and pesticides can damage aquatic organisms if applied incorrectly. Map 2.7 shows the locations of private and public forestry in the Shannon IRBD.

Landfills, quarries, mines and contaminated lands

Assessments of groundwaters in the Shannon IRBD indicate: 79 groundwater bodies are at risk of failing to achieve the required standards due to contamination from landfills (there is low confidence in the assessment as impact data is not available); mine risk is associated with 10 groundwater bodies (high confidence); and contaminated/urban areas risk is associated with 7 water bodies (high confidence). The status assessment by the Environmental Protection Agency shows that 75% groundwaters in the Shannon IRBD currently are at good status. Pollutants (mainly metals and fuel) from landfills and urban areas can seep into the ground and travel through groundwaters to enter surface waters, affecting their quality, damaging aquatic plants and animals and impairing water uses. Water table lowering at some quarry sites can affect nearby wetland areas, and the transfer of groundwater to surface waters can change water chemistry. These issues are site specific; knowledge of these sites in the Shannon IRBD (shown in Map 2.5) is being updated by the Environmental Protection Agency and local authorities to assess the extent of the pressures and confirm the scale of any problems or impact.

Physical modifications and damage

In the Shannon IRBD 27% of river channels have been drained and 20% of the coastline is protected against erosion. There are 2 rivers where status is impacted by drainage. There are 238 rivers where status has potential to be impacted also by drainage. Further investigative monitoring is underway to confirm impact on status. Waters are physically modified for water supply, navigation, transport, flood protection, hydropower, aquaculture and land drainage. Such modifications can reduce the diversity of plant and animal communities either directly by affecting habitats or indirectly by changing natural processes. Rivers need a mix of pools and shallow riffles and variation of flow patterns, to provide habitats for fish. Where rivers have been drained these features are often removed. Migratory fish need to access upstream spawning areas. However, weirs can restrict fish access if they are not designed to allow fish passage, consequently spawning success and population sizes can be reduced. Hard structures like ports and harbours can replace or reduce natural habitat. Land drainage and development, overgrazing, deforestation and cattle access can cause impacts such as bank erosion and siltation or increased risk of flooding due to faster runoff. Overgrazing can increase erosion rates, significantly disturbing siltation and hydrology regimes, and can cause physical damage and loss of habitat in rivers. Map 2.8 shows the rivers that have been physically modified and coastline that has been reinforced in the Shannon IRBD.

Water Abstractions

Most water abstractions are currently sustainable in the Shannon IRBD, however abstraction poses a potential risk to 32 rivers and 10 lakes due to their possible impact on river flows and lake levels particularly during periods of low flow. Large amounts of water are abstracted daily for domestic use and for use in agriculture, industry and recreation. Most of this water is treated to a high standard to remove impurities and make it fit for consumption. Too much abstraction reduces flow in springs and rivers and lowers water levels in lakes, wetlands and wells. That can make water supplies unsustainable and adversely affect aquatic plants and animals and wetland areas. In extreme cases river beds may dry up, lake shores can become exposed and, in coastal areas, salt water may seep into groundwater. Future population growth and climate change may reduce the available water resource in some areas in the future. Map 2.9 shows the abstraction locations in the Shannon IRBD and the volumes of water abstracted.

Dangerous substances

Recently introduced dangerous substances monitoring programmes have identified one river water body in the Shannon IRBD, the River Smerlagh (Ford upstream Feale river confluence) in Co. Kerry, which is failing chemical status due to a breach of the Polyaromatic Hydrocarbon standard. There are two failures in estuarine waters – one for the lower Shannon estuary water body, due to lead, and one for the Limerick dock water body due to brominated diphenylethers, anthracene, chloroalkenes and polyaromatic hydrocarbons. The monitoring data for estuarine waters was collated prior to WFD monitoring programmes being put in place. As the monitoring programme is new the extent of the problem with dangerous substances is not known for rivers, lakes and groundwaters. The coastal and estuarine monitoring programmes have yet to be fully implemented. Status will be updated as monitoring information becomes available. A wide range of chemicals, harmful to the aquatic environment and which may be toxic to people, plants and animals, are contained in everyday products used in households, industry, forestry, agriculture, construction sites and water or wastewater treatment works. Runoff from roads and urban areas can contain dangerous substances arising from the combustion of hydrocarbon fuels. Some dangerous substances can be toxic to aquatic plants and animals at very low concentrations. They can persist in waters and sediments and accumulate in the bodies of aquatic organisms, poisoning them and causing problems higher up the food chain or interfering with their natural breeding processes.

Peat extraction

Peat extraction (to fuel power stations and homes and for gardening products) is an important industry in the Shannon District. Bord na Móna is the main commercial organisation, but many private businesses are involved too. Bord na Móna sites operate under Integrated Pollution Prevention Control licenses but smaller private operators are not licensed. Peat extraction can give rise to localised water problems including silt and nutrient release from milled areas.

Aquaculture

The Shannon IRBD has 6 designated shellfish waters and 12 licensed finfish farms. Mussels, pacific and native oysters, clams and scallops are the main shellfish species farmed in Ireland; salmon and rainbow trout are the principal finfish. Counties Galway, Cork and Donegal have the highest numbers of aquaculture licences. Aquaculture activities (including harvesting) unless appropriately managed and controlled, can affect water quality, physical habitat, biodiversity and indigenous species populations. Finfish farming can cause increased nutrient loading and organic pollution around cages. Misuse of authorised chemicals and medicines to control disease and possible infection of wild fish with sea lice if not appropriately managed are other concerns. Map 2.10 illustrates the location of aquaculture activities in the Shannon IRBD.

Invasive alien species

Alien species such as Dace (found in a number of rivers including the Shannon, Maigue and Mulkear rivers), and Zebra Mussels (found throughout the Shannon river and lake system) have been recorded in the waters of the Shannon IRBD. The Environmental Protection Agency has identified eight key aquatic species of non-native animals or plants nationally, that have successfully established themselves in aquatic and fringing habitats and are damaging natural flora and fauna and pose a threat of spreading within the waters the Shannon IRBD. These species pose a major threat to the diversity of native plants and animals, for example by preying on them, out-competing for habitat or food, altering habitat or introducing pathogens or parasites.

Cruising and boating

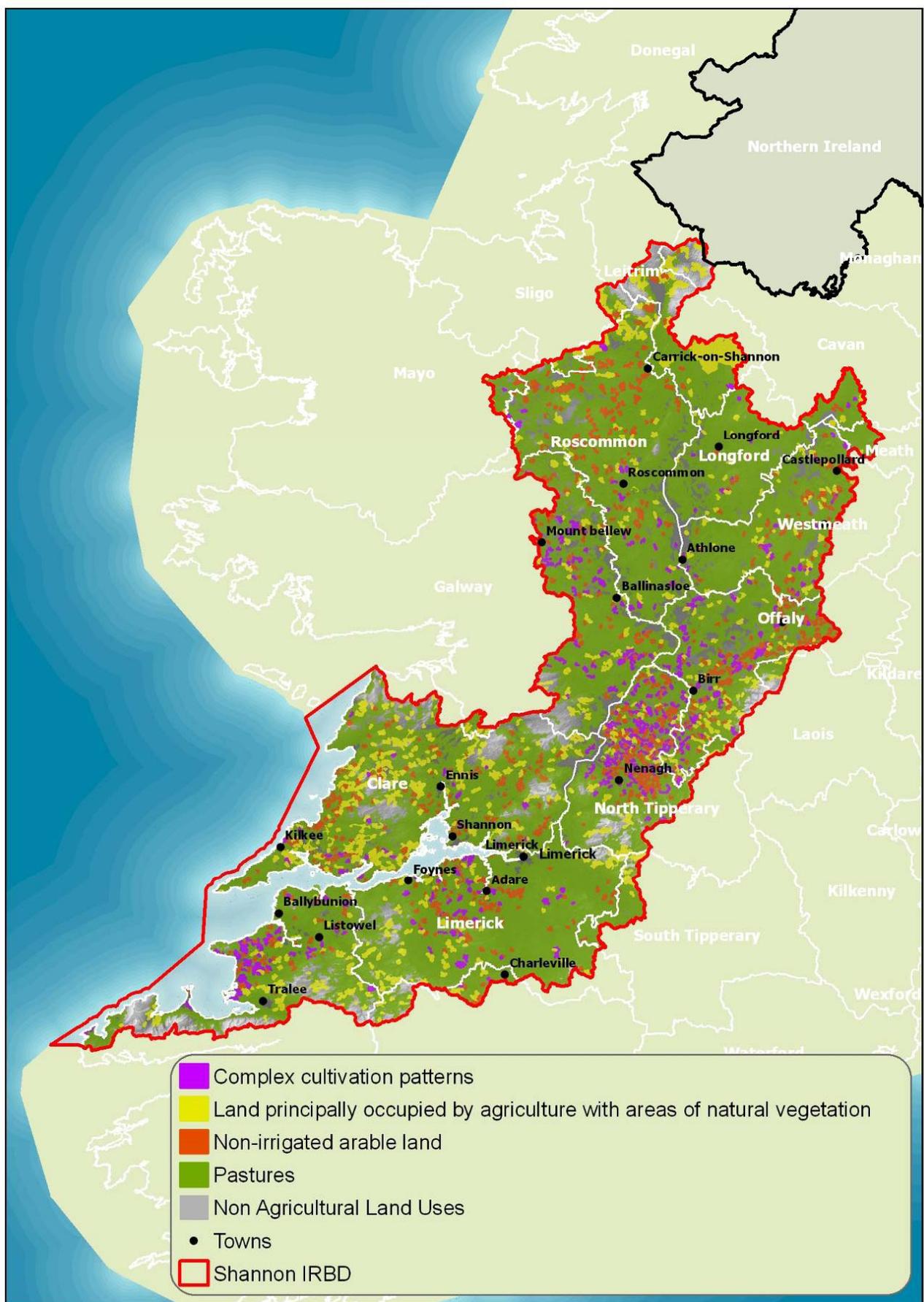
Cruising and boating are important recreational and tourism activities on the Shannon navigation system. These activities can give rise to localised water problems including discharge from onboard toilets, physical disturbance by boat wakes and potential engine oil spillage.

Shared waters issues

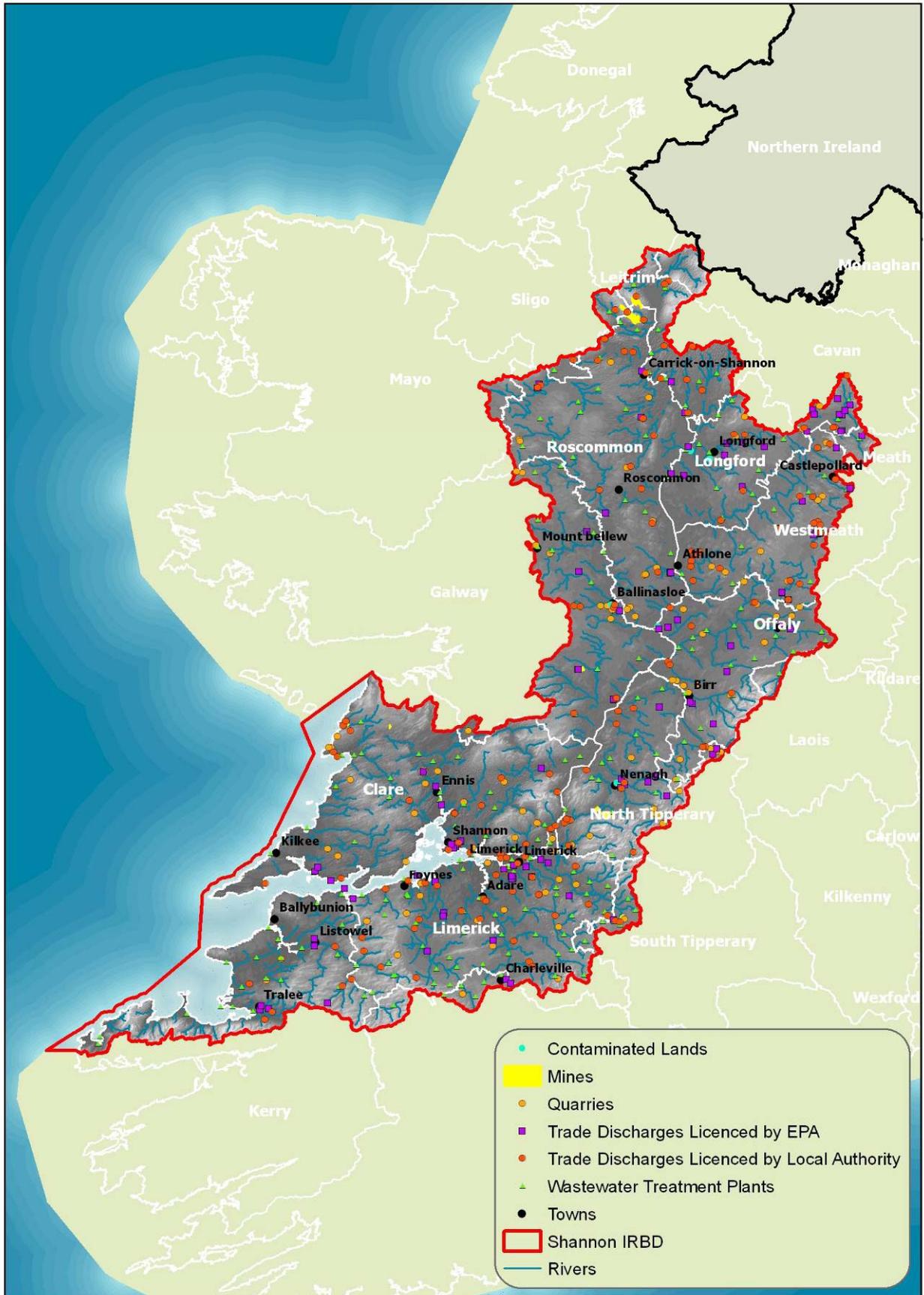
The Shannon IRBD includes 3 cross-border groundwaters shared with Northern Ireland. It is important that efforts to protect shared waters are coordinated between the two jurisdictions. There has been a high level of coordination in developing these plans and this will be continued throughout the implementation phase.

Climate change

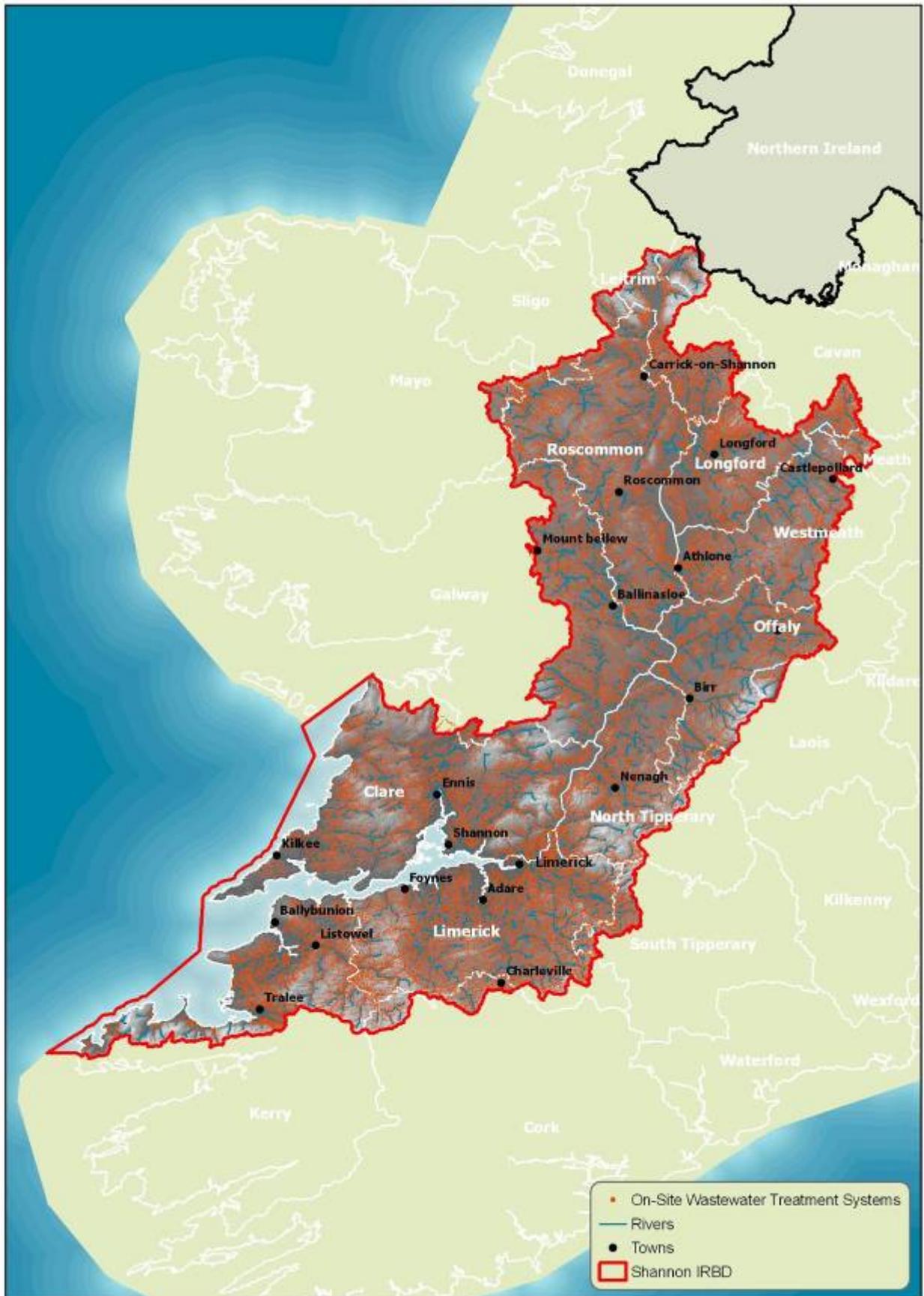
The specific impacts of climate change are difficult to predict, but it is likely that they will add to water management challenges in the future. Heavier winter rainstorms may cause more flash flooding, increasing diffuse pollution loads from soil run-off and raising demand for flood controls. Summer droughts are more likely and there may be a reduction in drinking water supplies. Temperature changes might give invasive alien species a competitive advantage, thus affecting biodiversity. Sea level rise may also impinge on water management. More detail on how climate change has been considered in developing these plans is provided in Chapter 6.



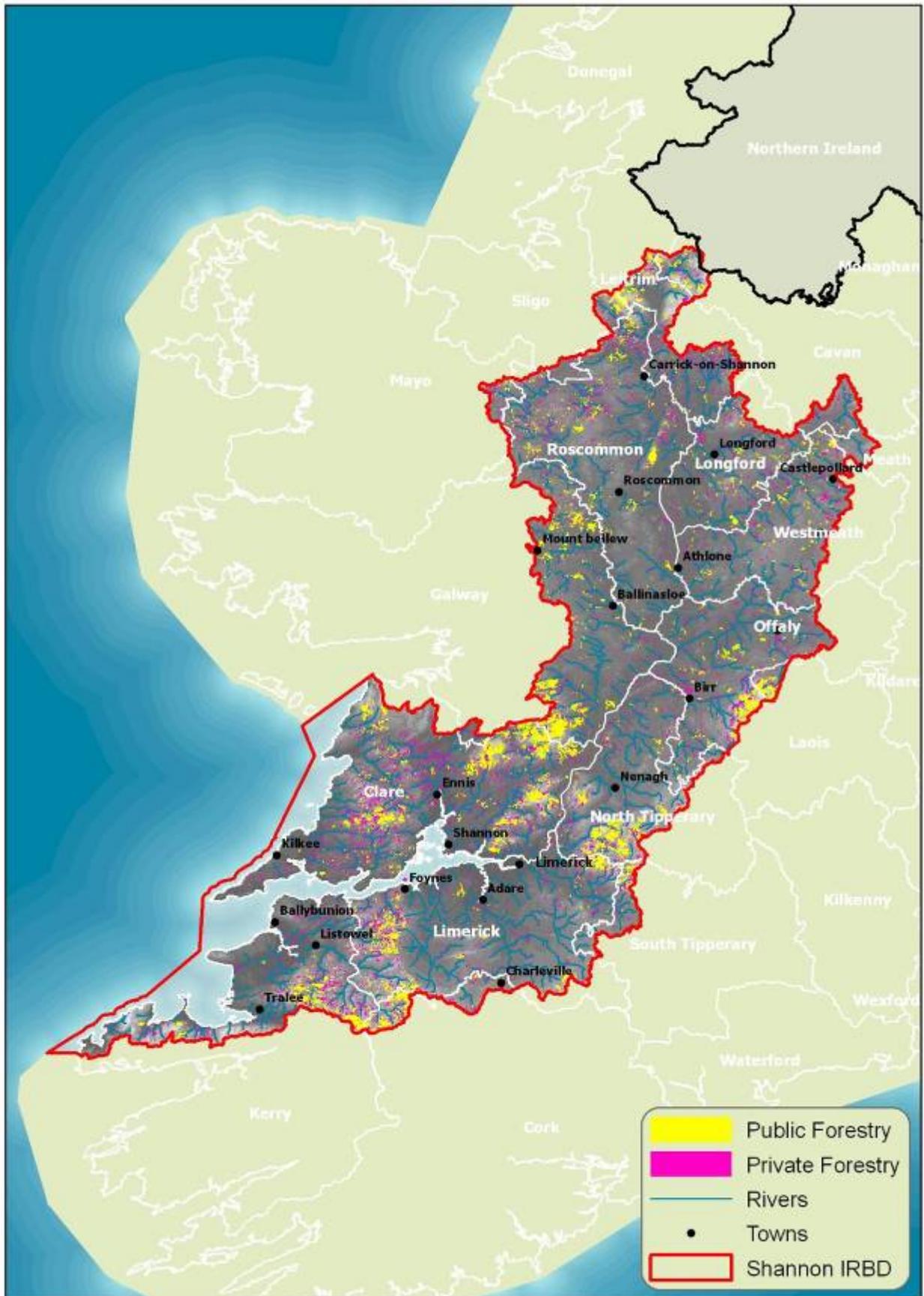
Map 2.4 Agricultural land use in the Shannon IRBD



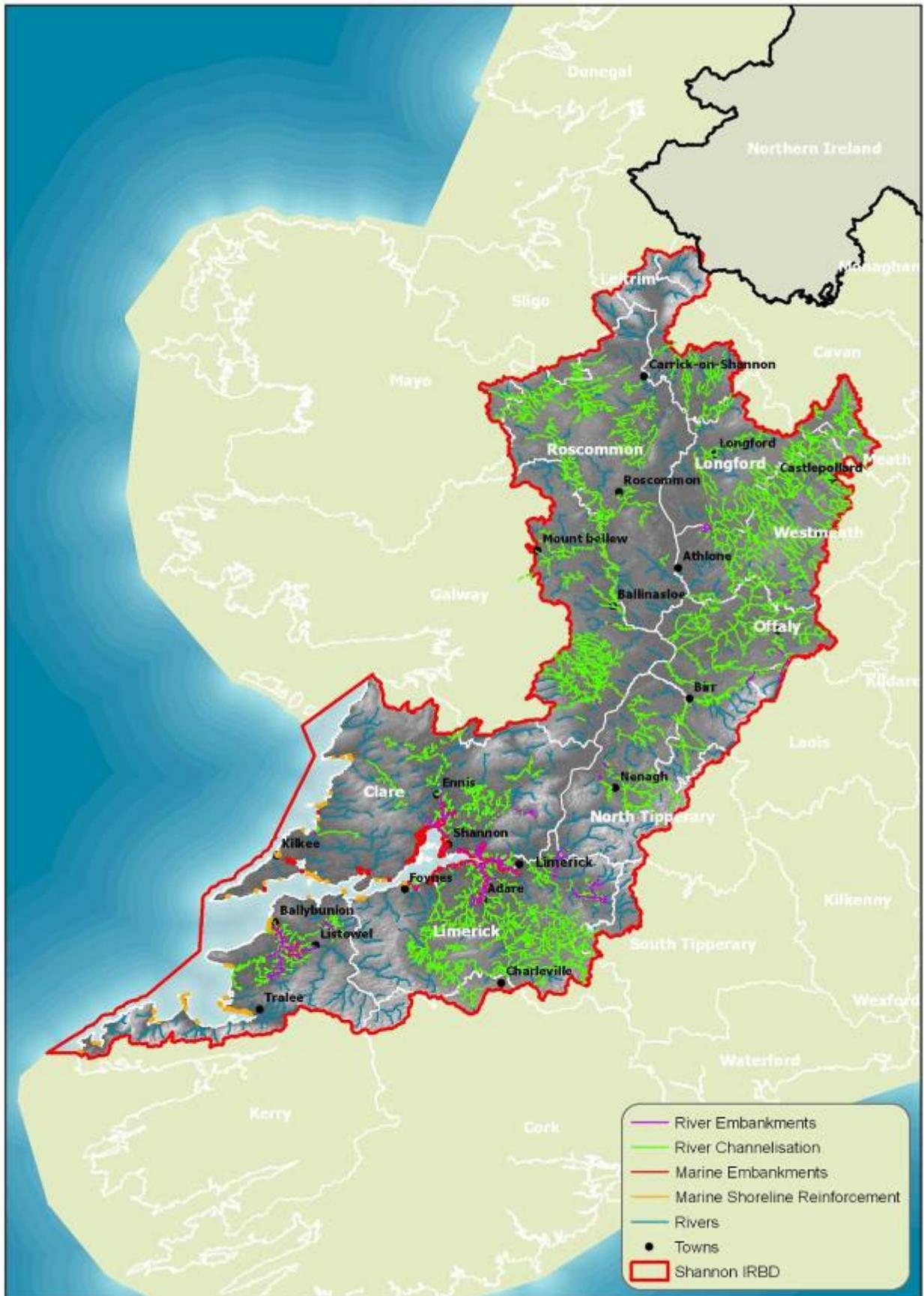
Map 2.5 Point source pollution issues in the Shannon IRBD



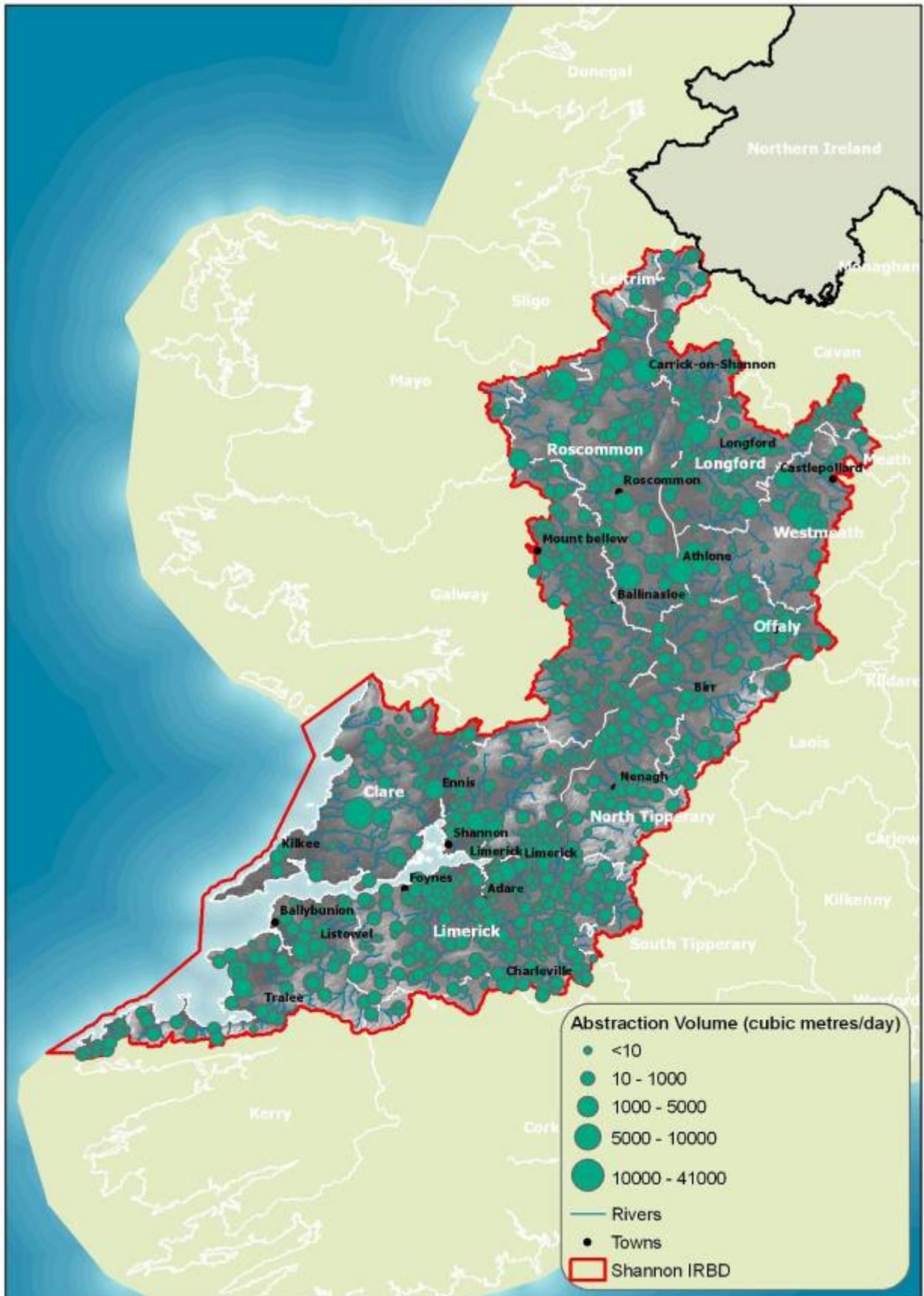
Map 2.6 Unsewered property locations in the Shannon IRBD



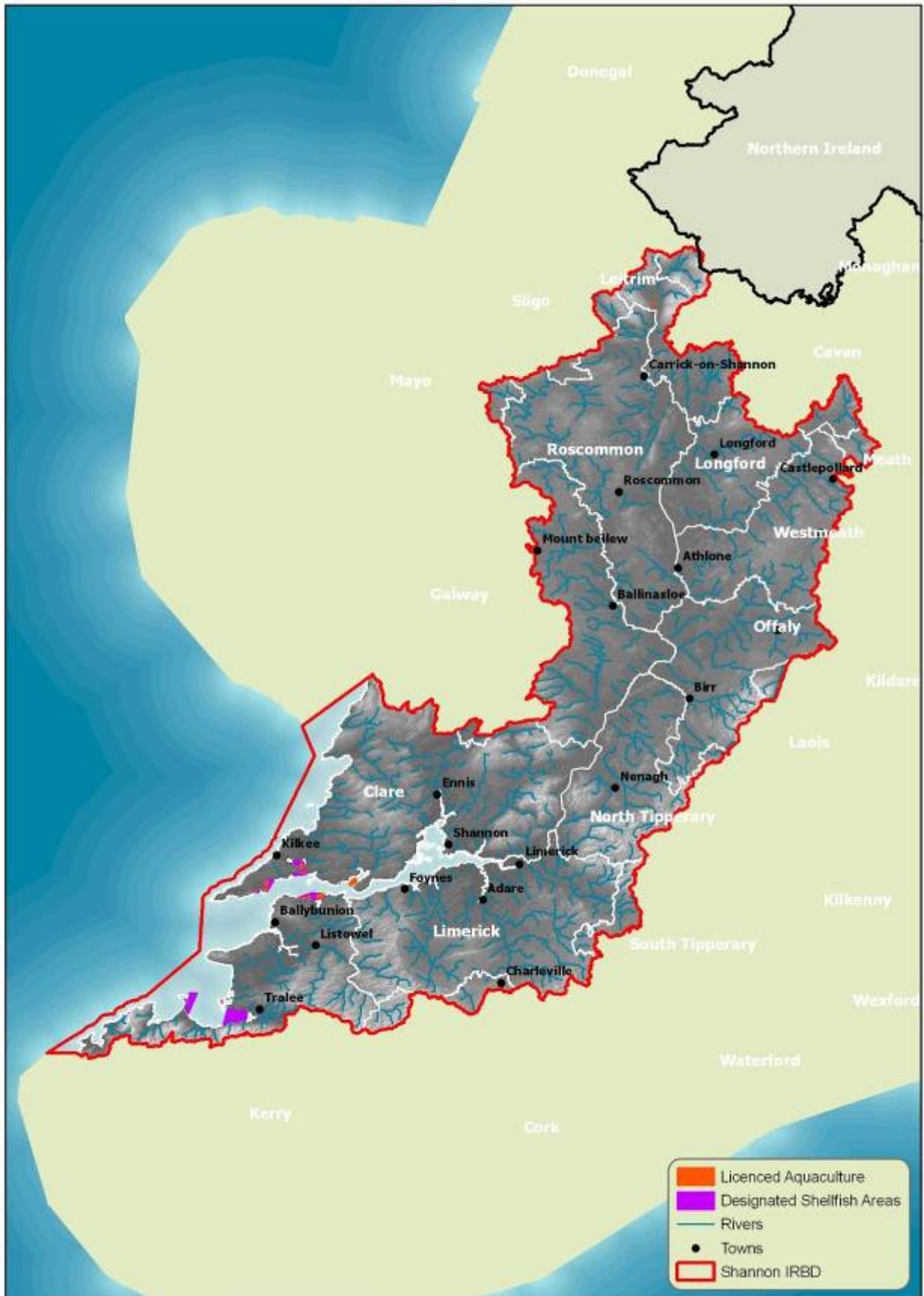
Map 2.7 Forestry in the Shannon IRBD



Map 2.8 Physical modification pressures in the Shannon IRBD



Map 2.9 Abstraction pressures in the Shannon IRBD



Map 2.10 Aquaculture activities in the Shannon IRBD

3 The status of the waters of the Shannon IRBD

3.1 Monitoring and Classification

The Environmental Protection Agency has developed a new, Water Framework Directive compliant, monitoring programme to establish a coherent and comprehensive overview of water status within Ireland. This programme was specifically introduced to implement the Water Framework Directive. It builds on previous monitoring programmes providing a more comprehensive assessment of water quality and quantity. It includes three primary monitoring networks: surveillance, operational and investigative.

- The surveillance monitoring programme is designed to be representative of general status providing data on long term trends, large and significant international waters and validating risk assessments undertaken to characterise water bodies. A full range of parameters are examined at surveillance monitoring sites.
- Operational monitoring is intended to assess the effectiveness of programmes of measures including measures for combating pollution, measures for addressing other impacts and measures for maintaining high or good status. The monitoring programme therefore includes both water bodies that are below good status and water bodies that are at good or high status.
- Investigative monitoring is applied where the reason for status failures is unknown, to ascertain the magnitude and impacts of pollution and to establish the factors causing water bodies to fail to achieve environmental objectives.

Monitoring of surface waters includes ecological and chemical parameters and also water level and rate of flow. For groundwater bodies the programme covers the monitoring of chemical and quantitative status. Protected areas and wetlands are also monitored. The new monitoring programme became operational in 2007. It includes monitoring required under other specific EU Directives and replaces existing programmes for monitoring rivers and lakes, groundwaters, coastal and estuarine waters. The structure and content of the monitoring programme are the outcome of a major research and development process undertaken to implement the Water Framework Directive. Monitoring tasks are assigned to the Environmental Protection Agency, Central Fisheries Board, Marine Institute, Office of Public Works, National Parks and Wildlife Service, Waterways Ireland and local authorities.

The national monitoring programme is 'representative', which means that certain water bodies are considered to be representative of others with similar physical characteristics (typology), and with similar risks to water status. These representative (donor) water bodies are monitored and their status is extrapolated to the unmonitored (recipient) water bodies. Monitored water bodies may have more than one monitoring site in some cases. Nationally, monitoring is carried out at 1,840 out of 4,585 river water bodies (this includes 3,077 sites), 224 out of 816 lake water bodies, 151 out of 757 groundwater bodies (this includes 297 sites) and 117 out of 309 coastal and transitional water bodies (this includes 185 monitoring sites). The Shannon IRBD monitoring programme assesses 442 out of 896 river water bodies (at 642 sites), 59 out of 114 lake water bodies, 37 out of 242 groundwater bodies (at 56 sites) and 14 out of 31 coastal and transitional water bodies.

The Environmental Protection Agency has developed new biological classification systems for seven biological element descriptors (rivers - macroinvertebrates and phytoplankton, lakes - phytoplankton biomass and macrophytes, coastal and transitional waters - phytoplankton biomass, opportunistic macroalgae and rocky shore reduced species list) to assist in the status assessment of surface water bodies. These classification systems have been intercalibrated to ensure comparability of results across EU member states. New standards for seven physico-chemical parameters and 62 chemical substances have also been developed. The new standards have been established by the *Surface Waters Environmental Quality Objectives*

Regulations (*SI 272 of 2009*) and *Groundwaters Environmental Quality Objectives Regulations (SI 9 of 2010)*. The Environmental Protection Agency will continue to develop the required biological classification systems and have them intercalibrated at EU level. The Agency is continuing to review water quality standards and may recommend additional standards where considered necessary. The new classification systems are more rigorous than previous systems as they measure a greater range of biological elements and pollutants. Failure of a single biological element or chemical standard can downgrade the overall status of the waters.

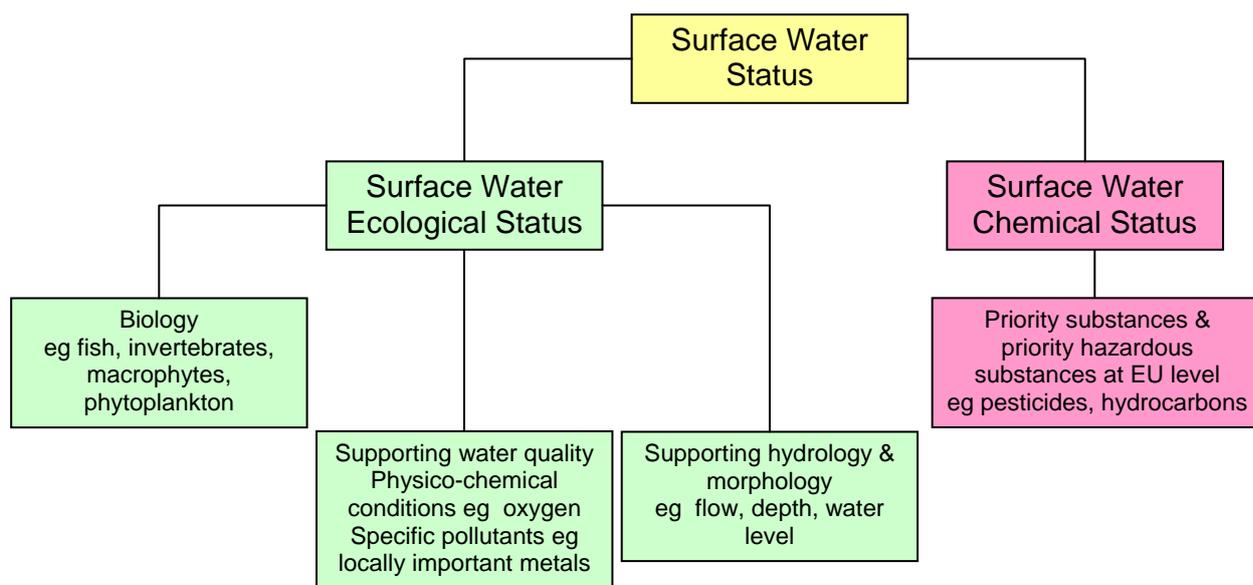
Details of the Water Framework Directive monitoring programme, new classification standards and the status setting process for surface and groundwaters are available in the *monitoring and status background documents* on www.wfdireland.ie.

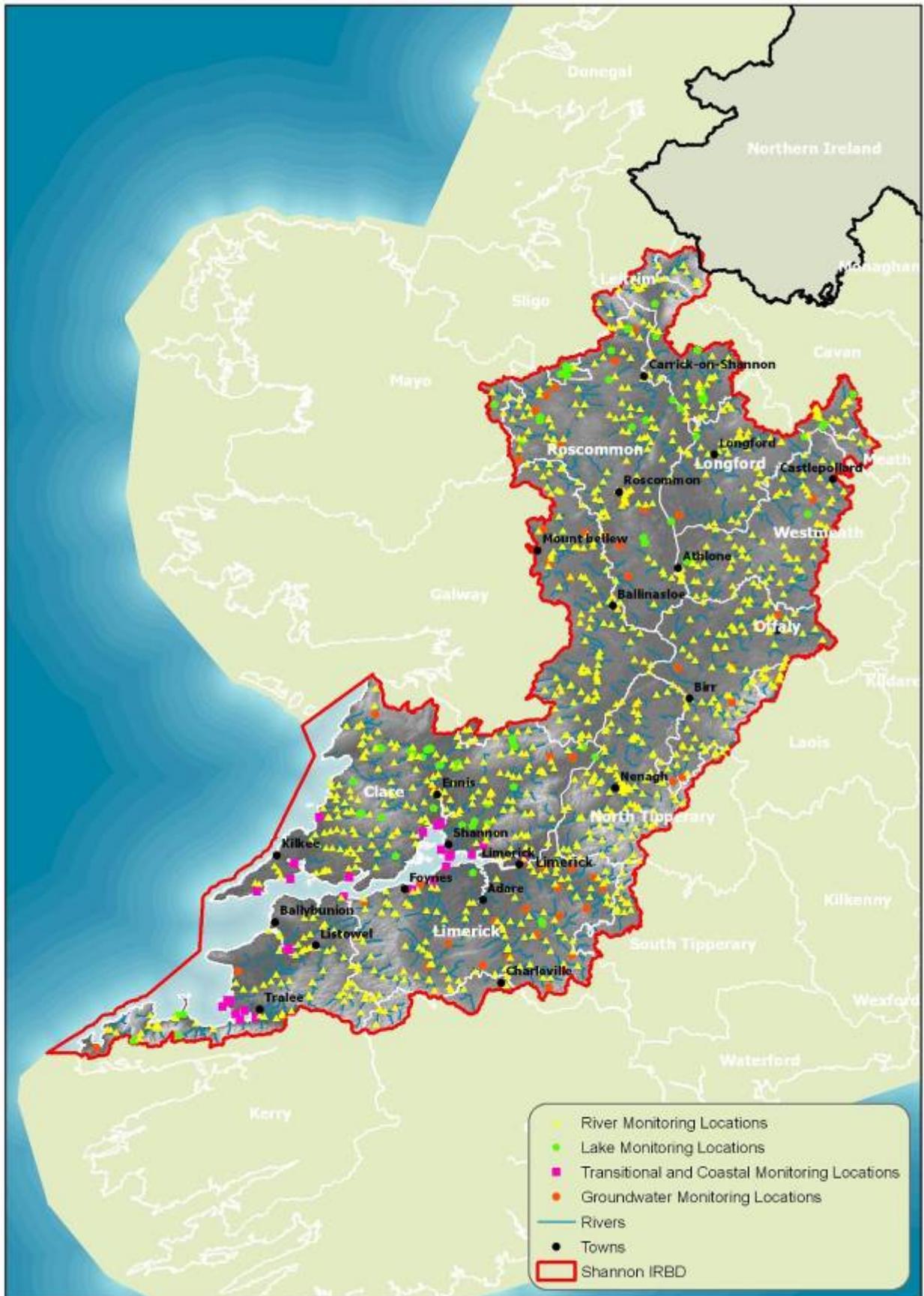
The Environmental Protection Agency has made interim status assessments of surface waters according to their ecological status and chemical status based on the results of the monitoring carried out in 2007 and 2008. Groundwaters have been assessed based on a system that combines chemical and quantitative status. This plan presents the best current understanding of status of the waters in the Shannon IRBD using these new classification systems, standards and monitoring information.

Status will be updated by the Environmental Protection Agency as monitoring data, and the new scientific tools used to interpret it, are applied and improved. Final status based on the results of the completed first monitoring cycle carried out in 2007-2009 will be reported in 2011. Monitoring of inland waters, including rivers, lakes and groundwaters, is now well established. The coastal and estuarine monitoring programmes have yet to be fully implemented. Status will be updated as monitoring information becomes available. The programme of measures will be reviewed and revised if there are significant changes to status as a result of updates.

The detailed status of the district's individual rivers, canals, lakes, reservoirs, estuaries, coastal waters or groundwaters can be viewed using the interactive map *Water Maps* on www.wfdireland.ie; details are also mapped and tabulated in *Water Management Unit action plan background documents* (available at www.wfdireland.ie).

3.2 Surface water status

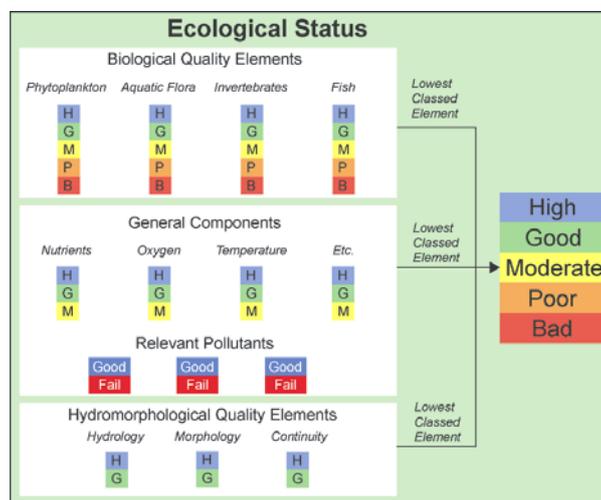




Map 3.1 Surface water and groundwater monitoring sites in the Shannon IRBD

3.2.1 Surface water ecological status

The monitoring programme collects data on certain plants, insects and fish, along with supporting water quality, hydrology and morphological conditions. The results of this monitoring information are used to assign ecological status to waters. Waters are assigned one of five classes of ecological status; high, good, moderate, poor or bad.



In order to make the biological classification systems comparable and consistent with the Water Framework Directive the value for the boundaries between the classes of high and good status, and between good and moderate status were established through an EU intercalibration exercise involving all member states.

Heavily modified or artificial water bodies are classified according to ecological potential which is the expression of the quality of the structure and functioning of their associated aquatic ecosystems. These waters are classified as either good ecological potential or better, that is maximum ecological potential, or moderate ecological potential or worse.

The surface water ecological classification combines three factors:

- biology;
- supporting water quality conditions (general conditions and specific pollutants);
- supporting hydrology and morphology (physical condition).

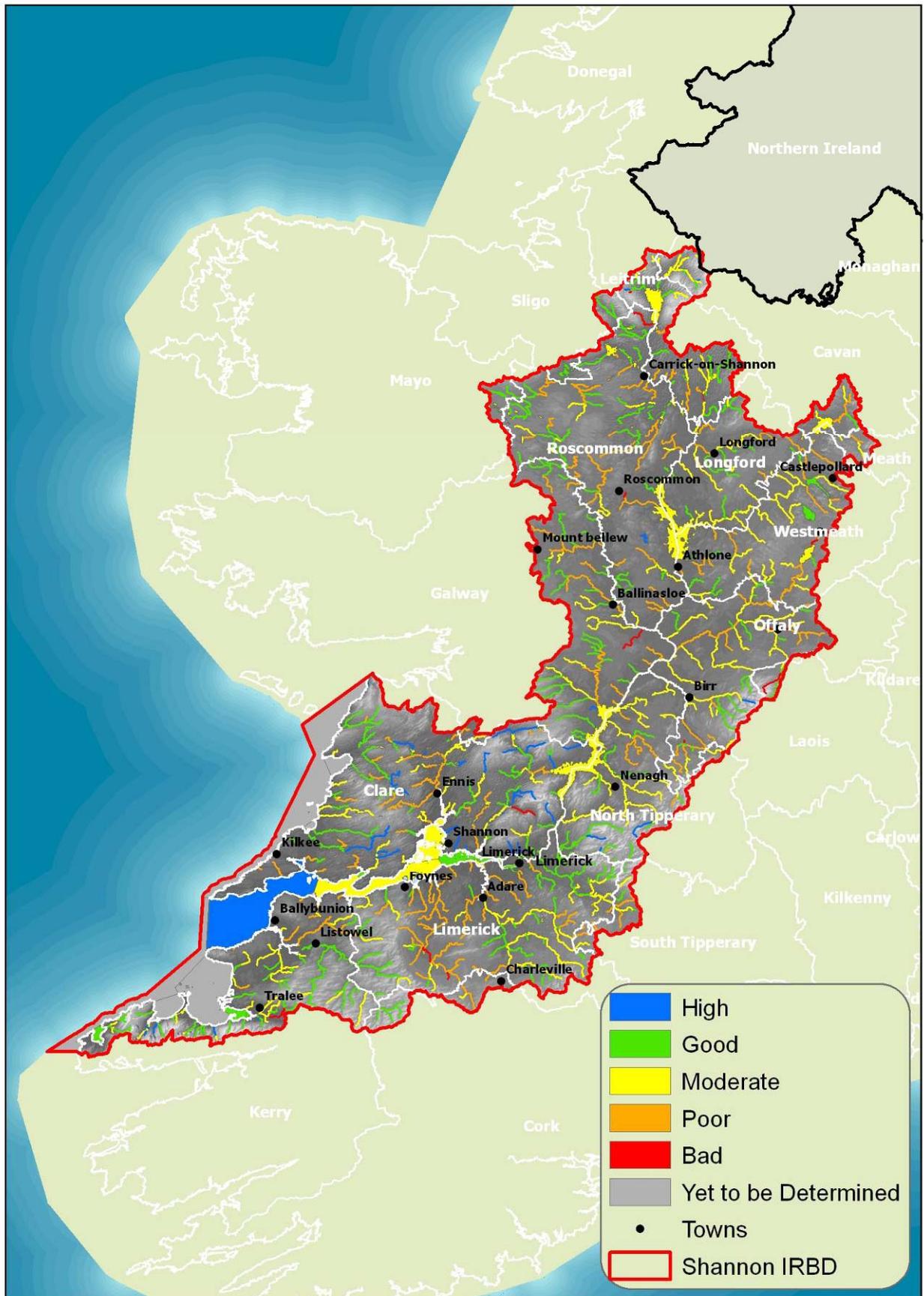
Overall ecological status is determined by the poorest scoring element assessed in the water body.

Biology

The biological classification systems describe the extent to which human activity has altered aquatic animal and plant communities by comparison with undisturbed conditions. The animals and plants are:

Table 3.1 Aquatic plants and animals in the surface water biology classification system

	Rivers and lakes	Marine (estuaries and coastal waters)
Animals	Fish Aquatic invertebrates (for example insects, crustaceans, molluscs, worms)	Fish (in estuaries) Aquatic invertebrates living in soft sediments on the seabed and rocky shores
Plants	Diatoms (microscopic plant organisms) Macrophytes (larger aquatic plants) Filamentous algae Phytoplankton (a microscopic plant containing the green pigment chlorophyll) in lakes and deep rivers	Seaweeds Seagrasses Marine phytoplankton



Map 3.2 Surface water ecological status in the Shannon IRBD

Supporting water quality conditions

Water quality conditions must be adequate to support a healthy aquatic biological community. Environmental standards have been established for general physico-chemical and specific pollutant parameters which aim to protect ecological status. These supporting water quality factors that affect ecological status are:

- general physico-chemical conditions which include oxygen, nutrients, transparency (water clarity), temperature, acid status and salinity;
- specific pollutants of concern in Ireland including; certain metals, pesticides and hydrocarbon compounds.

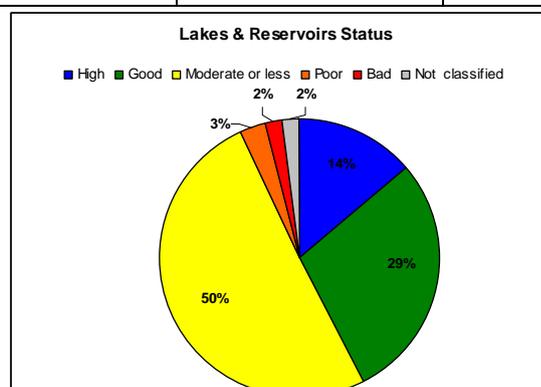
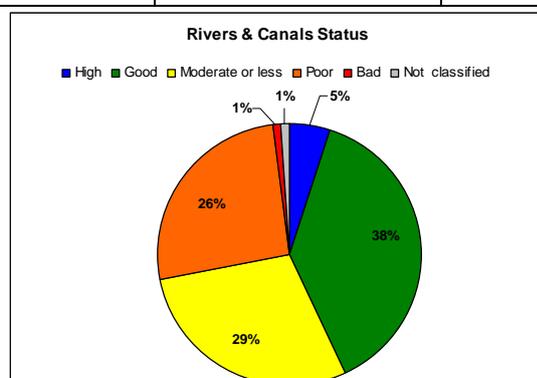
Supporting hydrology and morphology

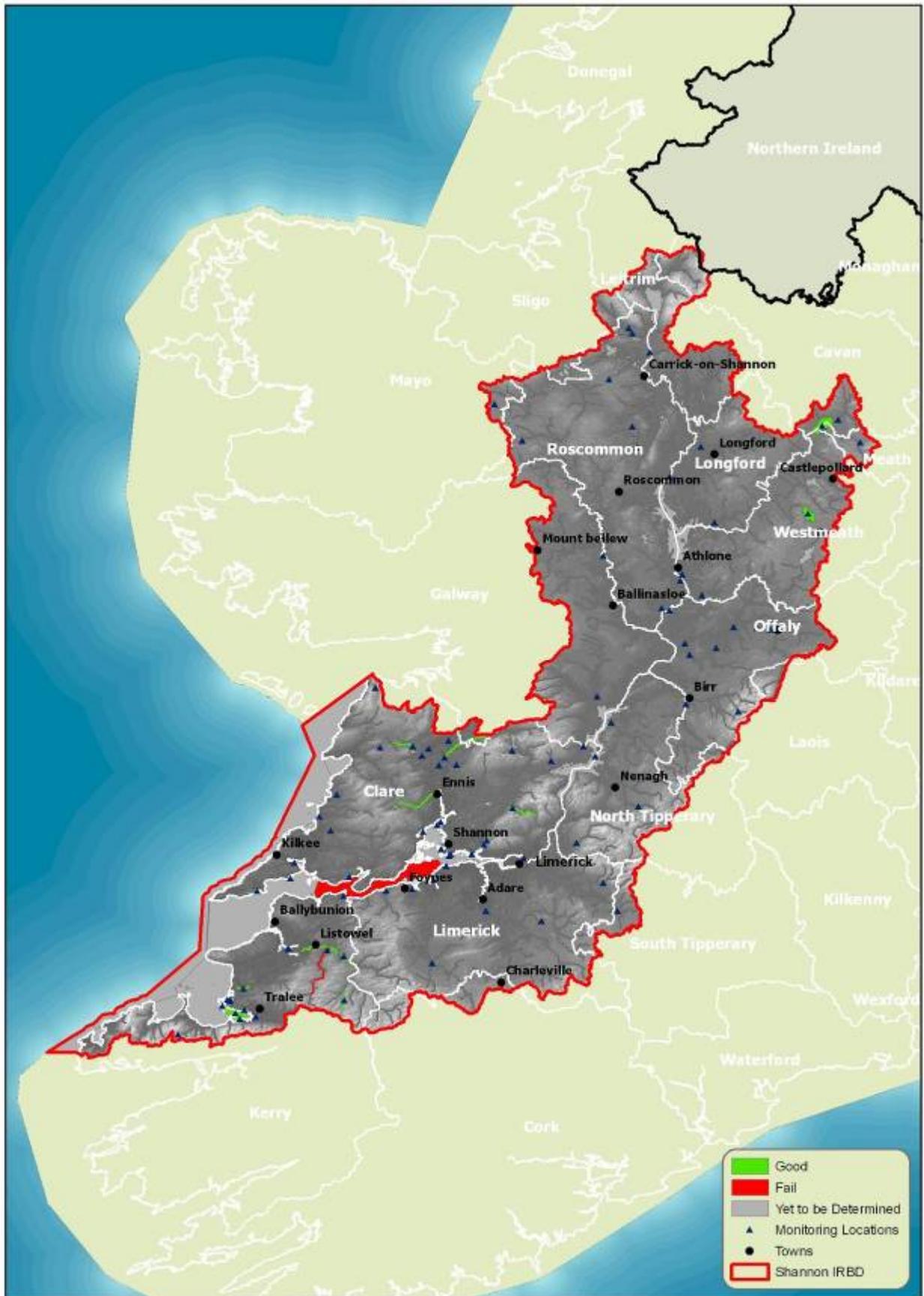
Hydrology and morphology (physical) conditions must be adequate to support a healthy aquatic biological community. Hydrology conditions include river flow, lake level and tidal patterns and are assessed using the national hydrometric monitoring programme. Morphology is assessed by surveying channel, substrate and bed shape using new classification systems developed for the purpose of river basin planning.

The overall ecological status (or ecological potential) of water bodies in the Shannon IRBD based on all three combined factors is summarised in Table 3.2.

Table 3.2 Surface water body ecological status/potential in the Shannon IRBD

	River & canals Number (%) Length km (%)	Lakes & reservoirs Number (%) Area km ² (%)	Estuaries Number (%) Area km ² (%)	Coastal Number (%) Area km ² (%)
High	46 (5%) 211 (4%)	16 (14%) 6 (1.5%)	0 (0%) 0 (0%)	1 (9%) 334 (28%)
Good	344 (38%) 1740 (38%)	33 (29%) 45 (11%)	7 (35%) 50 (20%)	2 (18%) 28 (2%)
Moderate	266 (29%) 1674 (33%)	58 (51%) 340 (86%)	7 (35%) 198 (79%)	0 (0%) 0 (0%)
Poor	237 (26%) 1394 (27%)	3 (3%) 1 (0.24%)	0 (0%) 0 (0%)	0 (0%) 0 (0%)
Bad	13 (1%) 77 (2%)	2 (2%) 2 (1%)	0 (0%) 0 (0%)	0 (0%) 0 (0%)
Yet to be determined	6 (1%) 29 (1%)	2 (2%) 1 (0.21%)	6 (30%) 2 (1%)	8 (73%) 858 (70%)





Map 3.3 Surface water chemical status in the Shannon IRBD

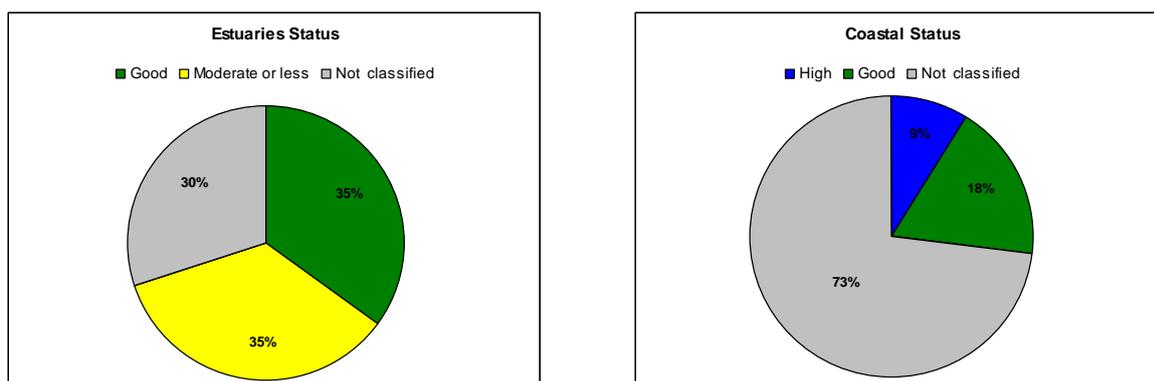


Figure 3.1 Ecological status of surface waters in the Shannon IRBD

3.2.2 Surface water chemical status

EU wide standards have been established for priority and priority hazardous substances which include certain metals, pesticides, hydrocarbons, volatiles and hormone-disrupting compounds. These standards have been transposed in Irish legislation (*SI 272 of 2009*). Exceedance of a standard results in a water body failing good chemical status.

One river, the Smerlagh at the ford upstream of the river Feale confluence, out of 9 sites monitored to date in the Shannon IRBD has failed chemical status (due to a breach of Polyaromatic Hydrocarbon standard); work is underway to identify the source and to determine appropriate measures to reduce chemical pollution. Two estuaries also fail due to historical monitoring data (non-WFD data) – the lower Shannon estuary water body, due to lead, and the Limerick dock water body due to brominated diphenylethers, antracence, chloroalkenes and polyaromatic hydrocarbons.

There are two classes for the chemical status of surface waters: good or fail.

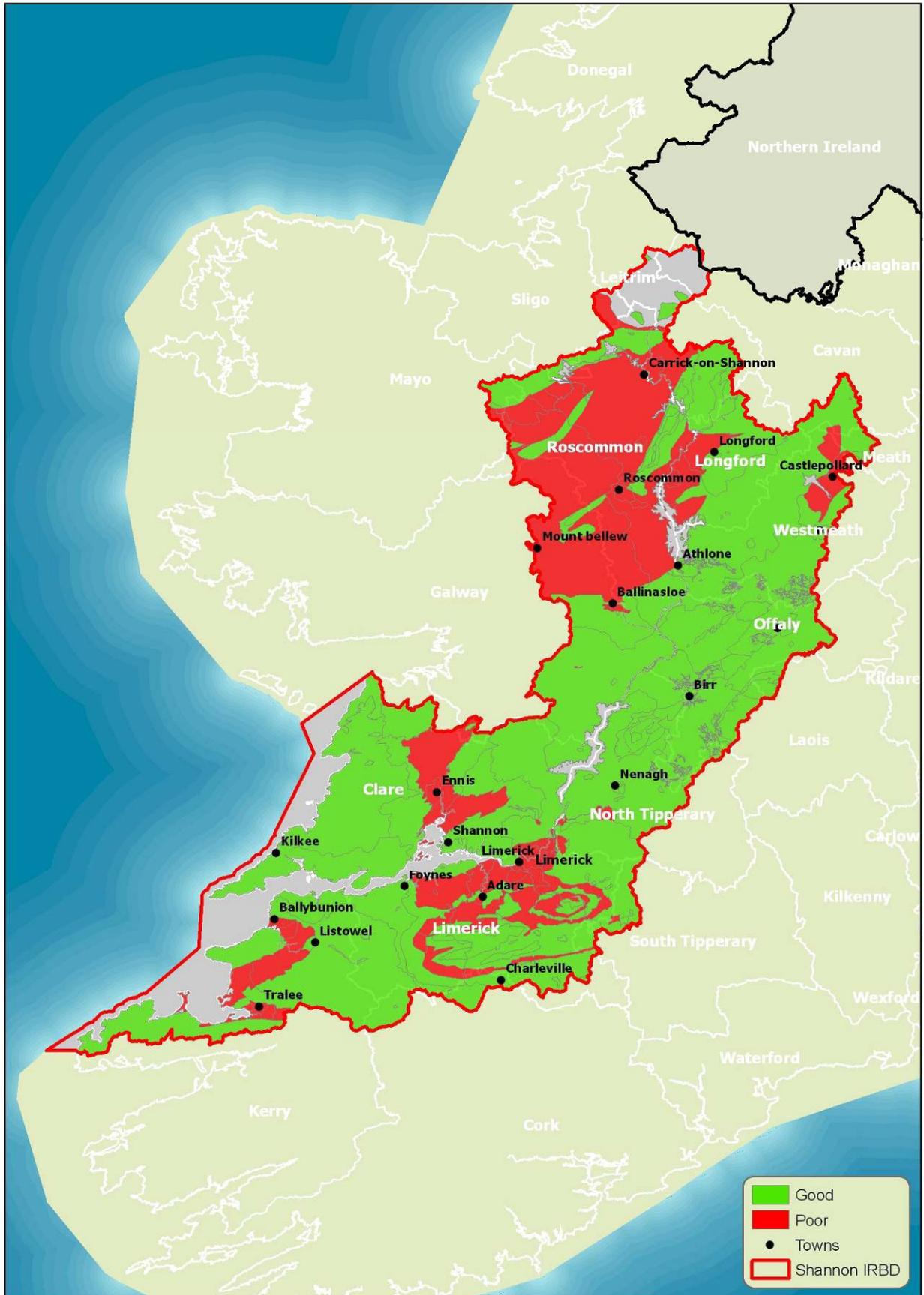
Table 3.3 Surface water body chemical status in the Shannon IRBD

	River & canals Number (%) Length km (%)	Lakes & reservoirs Number (%) Area km ² (%)	Estuaries Number (%) Area km ² (%)	Coastal Number (%) Area km ² (%)
Good	8 (18%) 96 (16%)	3 (3%) 28 (7%)	0 (0%) 0 (0%)	1 (9%) 16 (1%)
Fail	1 (2%) 20 (3%)	0 (0%) 0 (0%)	2 (10%) 126 (50%)	0 (0%) 0 (0%)
Yet to be determined	37 (80%) 475 (81%)	15 (88%) 12 (82%)	4(67%) 192 (60%)	10 (91%) 1204 (99%)

3.3 Groundwater

The groundwater monitoring programme (Map 3.1) has been developed to be representative of such waters in Ireland; to improve knowledge of groundwater quality and quantity, and the links between groundwater and the ecological health of associated surface water receptors. Monitoring points were selected to be representative of the variations in hydrogeology and human pressures across a groundwater body and to reflect the ‘average’ concentrations for pollutants across the whole groundwater body. The monitoring programme includes:

-
- a quantitative monitoring network (based on the assessment of water levels and water balance estimations);
 - a surveillance and operational water quality monitoring network;
 - appropriate monitoring to support the achievement of protected areas objectives, for example drinking water and Habitats protected areas.



Map 3.4 Groundwater status in the Shannon IRBD

The number and location of monitoring points is influenced by the hydrogeological characteristics of the Shannon IRBD. Due to the hydrogeology of the Shannon IRBD, monitoring points (either boreholes or discharges from spring features) are required in various types of aquifers – productive bedrock or gravel and unproductive bedrock along major fault zones. Thirty-seven groundwater quality and seven groundwater level monitoring points are located in areas underlain by productive bedrock and in sand/gravel aquifers (35% of the district is classed as productive aquifer). A further nine karstic springs with large discharges serve as both quality and quantitative (by monitoring discharge) monitoring sites. These nine large springs are mainly located in the East-Galway/Roscommon karst. Poorly productive rocks underlie 65% of the district, and are by their nature, generally unable to yield significant quantities of groundwater for abstraction. Groundwater flow paths are generally short in these aquifers, and water level monitoring is probably only representative of a small area in the vicinity of the monitoring point and achieving a representative network in these rocks is problematical. Consequently, a dispersed network of monitoring in the poorly productive aquifers of the District would not be beneficial and the monitoring network in poorly productive aquifers is focused on monitoring around zones of high transmissivity e.g. major fault zones. Three quality monitoring wells have been located in such zones in the Shannon District. In addition, monitoring in six different poorly productive typology settings around the country is intended to provide high quality groundwater chemistry and level information. This will aid understanding of groundwater in similar rock types in the Shannon IRBD and in other areas of Ireland.

Classification of groundwater bodies differs from that undertaken for surface water bodies, in that the surface water standards relate to ecological status and these standards define the classification boundaries. Groundwater status does not directly assess ecology, but the classification process takes account of the ecological needs of the relevant rivers, lakes and terrestrial ecosystems that depend on contributions from groundwater. Another key component of the groundwater classification is assessment of the impact of pollution on the uses (or potential uses) of groundwater from the groundwater body, for example water supply. Threshold values have been developed by the Environmental Protection Agency for forty pollutants that are causing a risk to groundwater bodies. They include inorganic substances, metals, pesticides and organic substances. Exceedance of a relevant threshold value at a representative monitoring point triggers further investigation to confirm whether the criteria for poor groundwater chemical status are being met. If the criteria for poor chemical status are met a body or a group of bodies of groundwater is classified as being at poor chemical status.

Table 3.4 Groundwater body status in the Shannon IRBD

Groundwater	Chemical status Number (%) Area km² (%)	Quantitative status Number (%) Area km² (%)	Combined status Number (%) Area km² (%)
Good	182 (75%) 13,109 (74%)	242 (100%) 17,607 (100%)	182 (75%) 13,109 (74%)
Poor	60 (25%) 4,498 (26%)	0 (0%) 0 (0%)	60 (25%) 4,498 (26%)

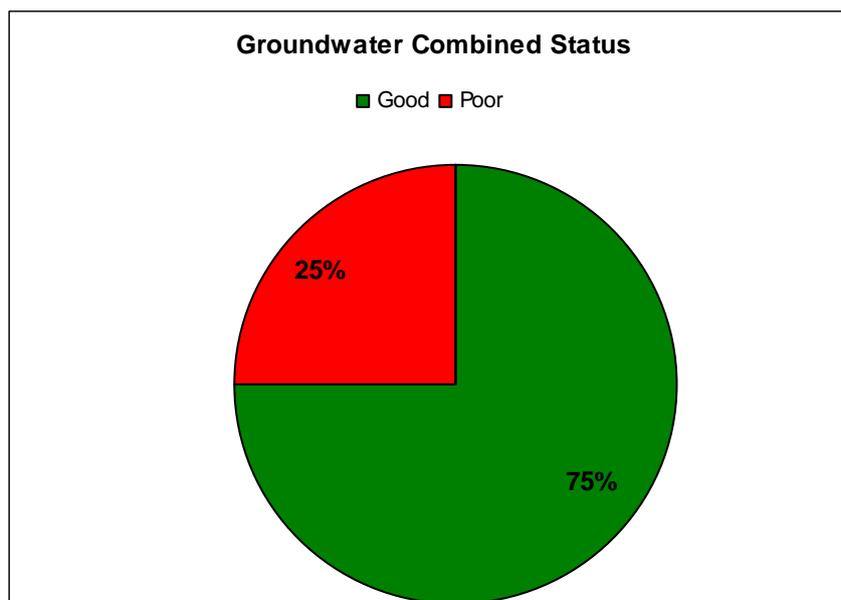


Figure 3.2 Combined status of groundwater in the Shannon IRBD

3.4 Protected areas

For water bodies containing water dependent protected areas, the assessment of status takes into account the water-related objectives set for that protected area by the EU legislation under which the individual protected area was established. Where standards or objectives for protected area water bodies are not met, arising from a failure to meet the required water quality or hydrological standards, then less than good ecological status is assigned by the EPA in accordance with the provisions of the *Surface Water Environmental Objectives Regulations (SI 272 of 2009)*.

Two designated freshwater pearl mussel populations in the Shannon IRBD did not meet their protected area objectives due to water quality conditions and therefore status has been downgraded. The catchments do not achieve favourable conservation status and fail most of the requirements as specified in the *European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations (SI 296 of 2009)*. These freshwater pearl mussel catchments are:

- Cloon - the population is failing due to the deterioration in habitat quality which is evident from the high levels of siltation and macrophyte growth. Its demographic profile is poor as there are not the numbers of juveniles present in the population to provide sustainable replacement of the current adult numbers. Status was downgraded in two river water bodies.
- Owenmore - the population is failing due to the deterioration in habitat quality which is evident from the extensive coverage of filamentous green algae recorded at the majority of sites surveyed for *Margaritifera*. Its demographic profile is poor as no juveniles or small mussels were observed during recent monitoring. Status was downgraded in two river water bodies.

4 The objectives for the Shannon IRBD

Having identified the status of the waters according to the best available information, the next stage is to set environmental objectives for the waters. Objective setting considered waters that require protection from deterioration as well as waters that require restoration and the timescales needed for recovery. This section of the plan sets out the objectives that the plan aims to achieve. The Water Framework Directive has four core environmental objectives; it also allows alternative objectives to be set in certain circumstances.

- The recent *Surface Waters Environmental Objectives Regulations* (SI 272 of 2009) and new *Groundwaters Environmental Objectives Regulations* (SI 9 of 2010) establish the legal basis for setting objectives for waters. These regulations also place a legal obligation on public authorities to aim to achieve these objectives through their functions.

Local authorities have set objectives for all waters in the Shannon IRBD.

4.1 The core objectives

The plan establishes four core environmental objectives to be achieved generally by 2015:

- prevent deterioration;
 - restore good status;
 - reduce chemical pollution;
 - achieve water related protected areas objectives.
- Tables 4.1 to 4.4 show which of the objectives apply to the waters of the Shannon IRBD. More information is available in the *objectives background documents* and the web-based interactive map *Water Maps* on www.wfdireland.ie.

4.1.1 Prevent deterioration

The Directive requires implementation of the measures necessary to prevent deterioration in status of all surface waters and groundwaters.

The Environmental Protection Agency has highlighted, as a key concern, the decline in high status waters over the past two decades. According to the 2009 Environmental Protection Agency indicators report the number of high quality river sites, nationally, has almost halved over the last 20 years and the Shannon IRBD is one of the districts that has seen the greatest decline in high quality river sites.

Table 4.1 Water bodies currently at high or good status

Current status	Rivers & canals Number (%) Length km (%)	Lakes & reservoirs Number (%) Area km ² (%)	Estuaries Number (%) Area km ² (%)	Coastal Number (%) Area km ² (%)	Groundwater Number (%) Area km ² (%)
High or Good	390 (42%)	49 (43%)	7 (35%)	3 (27%)	182 (75%)
	1951 (38%)	51 (13%)	50 (20%)	362 (30%)	13109 (74%)

4.1.2 Restore good status

The objective for surface waters is to improve waters where necessary with the aim of achieving at least good ecological status.

The objective for groundwaters is to restore good status, reversing significant and sustained declining quality trends.

Restoring good status is to be achieved generally by 2015 where it is technically feasible, environmentally sustainable and not disproportionately expensive to do so. However, despite the implementation of measures some waters will take longer than others to reach their target because of the slower natural rates of recovery caused by local conditions (for example existing high soil phosphorus levels, soil characteristics and hydrogeological conditions).

The classification results for the Shannon IRBD show that 516 rivers and canals, 62 lakes, and 7 estuaries are currently below good status and require restoration to good status.

Table 4.2 Water bodies currently at less than good status

Current status	Rivers & canals Number (%) Length km (%)	Lakes & reservoirs Number (%) Area km ² (%)	Estuaries Number (%) Area km ² (%)	Coastal Number (%) Area km ² (%)	Groundwater Number (%) Area km ² (%)
Less than good	516 (57%)	62 (55%)	7 (35%)	0 (0%)	60 (25%)
	3145 (61%)	342 (87%)	198 (79%)	0 (0%)	4498 (26%)

4.1.3 Reduce chemical pollution in surface waters

The core objective is to progressively reduce surface water pollution from priority substances and cease or phase out emissions, discharges and losses of priority hazardous substances. Chemical standards for forty-one substances were established by the EU. The chemical monitoring programme has been completed for freshwaters and groundwaters, but the full set of results for 2009 were not available for consideration in the current assessment. The corresponding data for transitional and coastal waters is not available. Based on the limited information available to date, the level of failures appears to be very low. One river (the Smerlagh) out of nine sites monitored to date in the Shannon IRBD failed chemical status (due to a breach of Polyaromatic Hydrocarbon standard). Two estuaries also fail due to historical monitoring data (non-WFD data) – the lower Shannon estuary water body, due to lead, and the Limerick dock water body (due to brominated diphenylethers, antracence, chloroalkenes and polyaromatic hydrocarbons). Work is underway to identify the source and to determine appropriate measures to reduce chemical pollution.

Table 4.3 Water bodies currently failing chemical pollution standards

Current status	Rivers and canals Number (%) Length km (%)	Lakes and reservoirs Number (%) Area km ² (%)	Estuaries Number (%) Area km ² (%)	Coastal Number (%) Area km ² (%)
Failing chemical status	1 (2%)	0 (0%)	2 (10%)	0 (0%)
	20 (2%)	0 (0%)	126 (50%)	0 (0%)

4.1.4 Achieve protected areas objectives

Some protected areas do not currently meet their protected areas objectives due to water quality conditions. The objective for the water bodies associated with these protected areas is to restore them so that they meet all applicable water standards. In the Shannon IRBD amongst the most sensitive of these protected sites are two designated sites with freshwater pearl mussel populations that are in unfavourable conservation status due to water quality deterioration, particularly heavy siltation and also nutrient enrichment.

Table 4.4 Water bodies associated with protected areas

	Rivers and canals Number (%) Length km (%)	Lakes and reservoirs Number (%) Area km² (%)	Estuaries Number (%) Area km² (%)	Coastal Number (%) Area km² (%)
Waters supporting protected areas	555 (61%) 3,501 (68%)	79 (69%) 361 (92%)	13 (65%) 248 (99%)	2 (18%) 350 (29%)

4.2 Alternative objectives

The Water Framework Directive allows alternative objectives to be set in certain specified circumstances:

- technical, economic, environmental or recovery constraints. In some cases extended deadlines have been set for waters where necessary;
- the nature and uses of certain artificial or heavily modified waters. Alternative objectives have been set to account for their sustainable use;
- proposed new physical modifications and sustainable developments. Alternative objectives may have to be set to cater for future projects.

In these cases, measures must still be taken to achieve best possible status by 2015, even where alternative objectives are set. This plan establishes alternative objectives for certain water bodies in accordance with the *Surface Waters Environmental Objectives Regulations (SI 272 of 2009)* and *Groundwaters Environmental Objectives Regulations (SI 9 of 2010)*. Further information on *alternative objectives* can be found on www.wfdireland.ie.

4.2.1 Extended deadlines

Extended deadlines, usually of one planning cycle (6 years, to 2021) and in some cases two cycles (to 2027) may be applied to some water bodies due to technical, economic, environmental or recovery constraints.

In some cases further investigations are required to confirm the extent of impacts or to identify appropriate measures and implement them. The effectiveness of some measures is uncertain and status recovery is expected to take longer than the first planning cycle. The reasons why timescale extensions are required to restore certain waters to good status in the Shannon IRBD are set out in Table 4.5. The waters where timescale extensions have been set are presented in Maps 4.1 to 4.8.

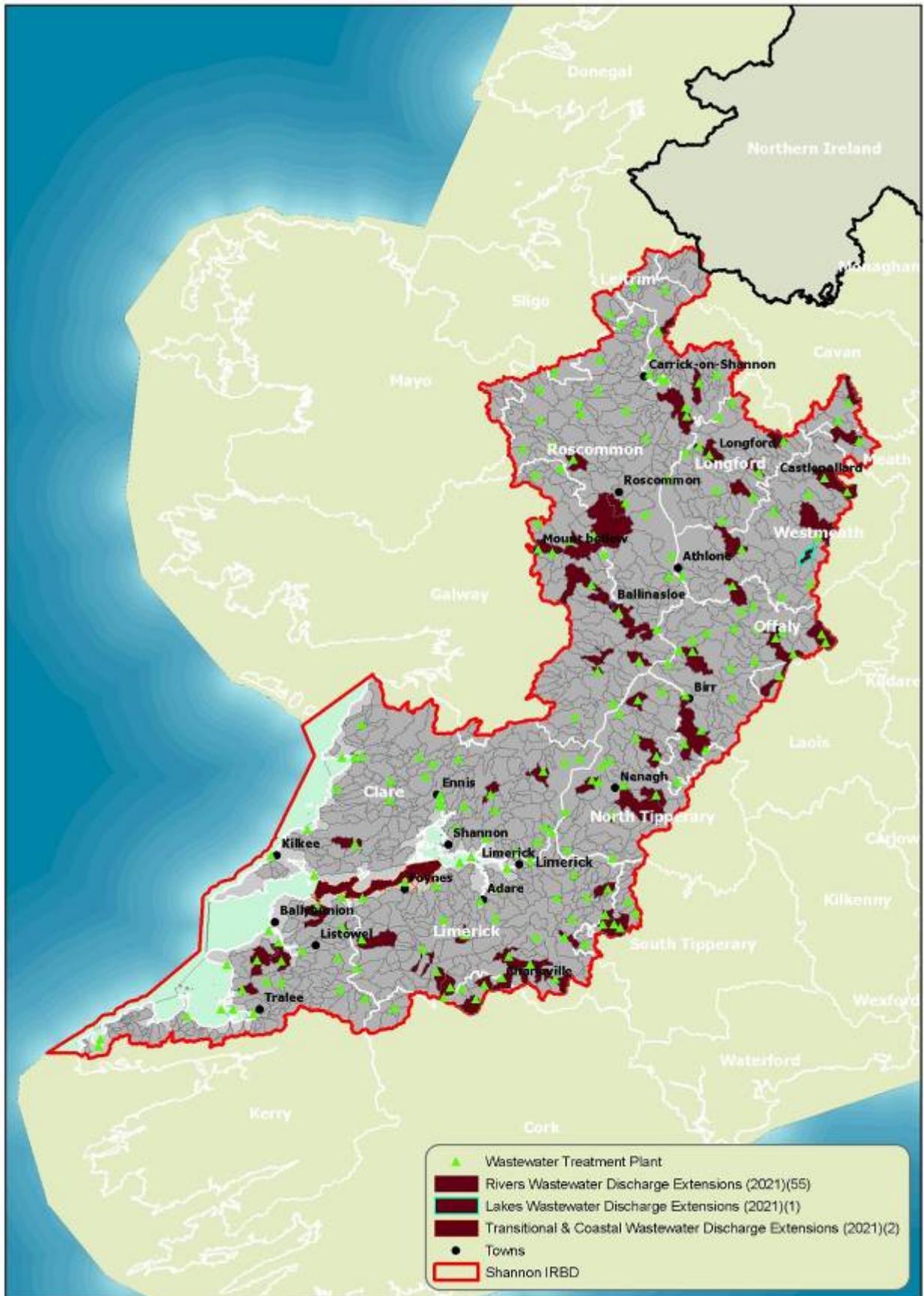
Objectives will be kept under review during each planning cycle. In some limited circumstances it may be necessary to apply a less stringent objective if assessments demonstrate that good status cannot be achieved by 2027.

Table 4.5 Reasons why extended timescales are required in certain water bodies in the Shannon IRBD

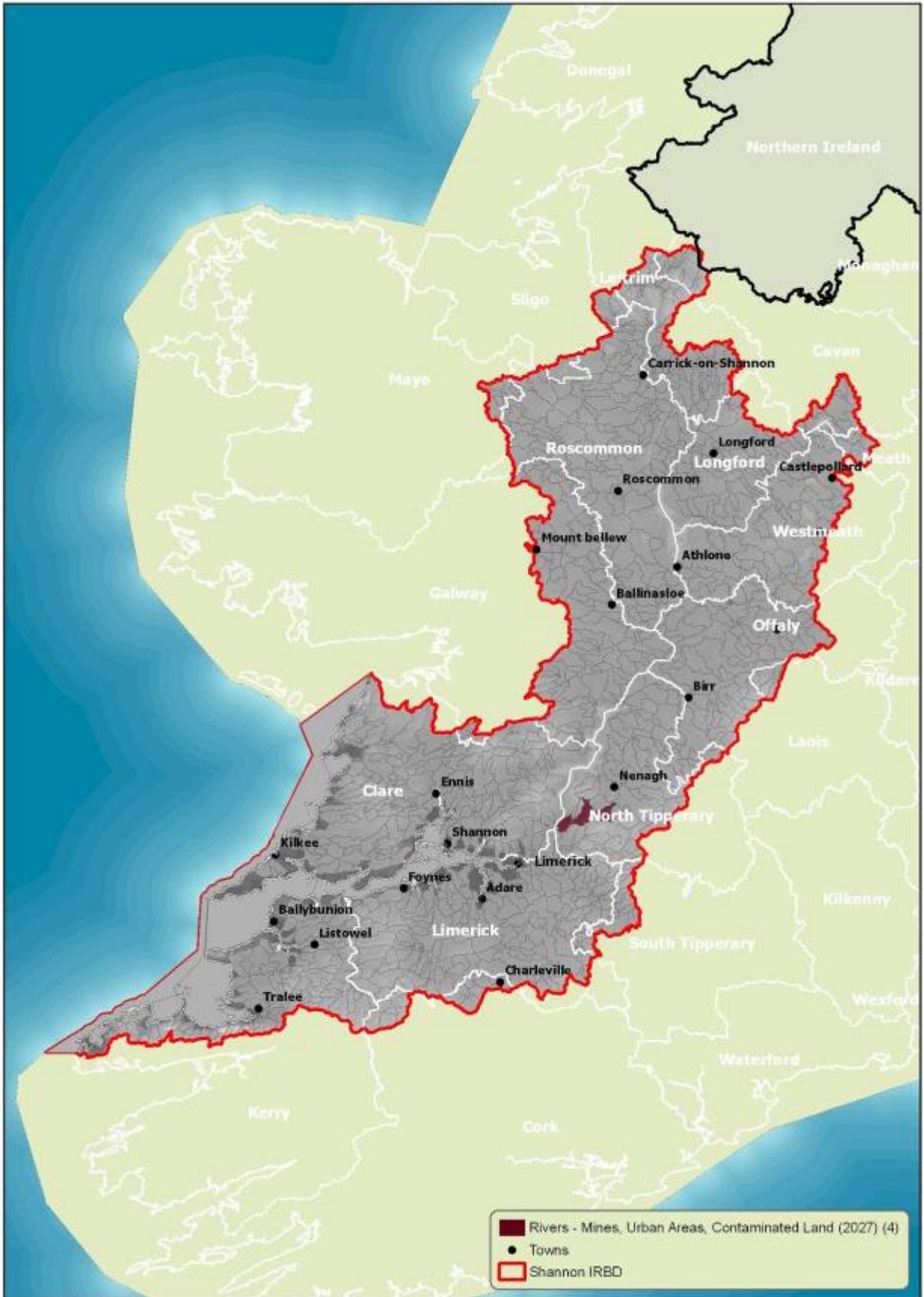
Issue and extension required	Rivers	Lakes	Transitional	Coastal	Groundwater	Likely failing status element	Constraint	Action to 2015
Wastewater discharges from some treatment plants Extend to 2021 Map 4.1	55	1	2	-	-	Mainly phosphorus levels or oxygen conditions supporting ecological status	Practical constraint: the time required to plan and design upgrades to treatment plants and to achieve approvals and licensing means it is not technically possible to achieve good status in 2015. Case by case assessment showed that infrastructure provision is critical to achieving good status.	Local authorities to upgrade plants through the Water Service Investment Programme and operate and manage plants in accordance with discharge authorisation
Mines Extend to 2027 Contaminated sites Extend to 2021 Map 4.2	4	-	-	-	4	Chemical and supporting elements affecting ecological status	Physical recovery: scientific data indicates status recovery may take a significant number of years, possibly more than three planning cycles (18 years). In addition, for some cases, there may be no technical solution and in others Disproportionate Cost Analysis may suggest that the required measures would not be economically justified.	EPA propose to co-ordinate environmental research in addition to the ongoing monitoring of these sites in order to address knowledge gaps. This will help to identify potential technical solutions to control pollution from these sites.
Agriculture: nitrogen losses to groundwaters Extend to 2027 Map 4.3	-	-	-	-	1	Nitrogen levels in groundwaters	Physical recovery: research has found that, even with full implementation of the Good Agricultural Practice regulations (Fenton, <i>et al</i> , in press), recovery from elevated nitrate levels in groundwater bodies will take up to 20 years. The studies into the rate of loss of phosphorus and nitrogen from Irish soils are available in <i>objectives background documents</i> .	EPA to monitor status and trends under WFD programmes. Local authorities to review objectives if necessary.

Issue and extension required	Rivers	Lakes	Transitional	Coastal	Groundwater	Likely failing status element	Constraint	Action to 2015
Agriculture: phosphorus losses to surface waters by runoff Extend to 2021 Map 4.3	103	5	-	-	-	Phosphorus levels supporting ecological status	Physical recovery: research (Schulte, <i>et al</i> , in press), has found that reductions from high soil phosphorus levels (Index 4) to environmentally sustainable levels (Index 3) takes an average of 7 to 15 years, even with full implementation of the Good Agricultural Practice Regulations (SI 272 of 2009), and therefore nutrient losses to waters may persist. The downstream catchment effect on lake recovery is dependent on river recovery timescale.	DAFF/DEHLG to review outcomes of agricultural catchment programmes (ACPs) and Nitrates Action Programme (NAP)
Agriculture: phosphorus losses to surface waters via groundwaters in karst areas Extend to 2021 Map 4.3	188	30	-	-	56	Phosphorus levels supporting ecological status	Certainty of cause: where groundwaters contribute significantly to surface water phosphorus loadings in karst areas, the extent of impact and potential measures need to be investigated. This poses a technical constraint as the cause of the problem has not yet been established with certainty and it is not yet clear what (if any) additional agricultural measures are required or how effective technical solutions would be.	Review outcomes of ACPs and NAP. DEHLG-NPWS to map turloughs' zones of contribution. DAFF to increase farm inspections in karst areas with turloughs and consider piloting of environmentally friendly farming scheme
Forestry: acidification risks Extend to 2027 Map 4.4	3	-	-	-	-	pH, invertebrates, fish	Certainty of cause: the extent to which ecological restoration can be achieved is not known and poses a technical constraint. A forest's life cycle is several decades; evaluation and implementation of measures, and water quality response, will require three cycles.	EPA and Fisheries Boards to monitor catchments; Forest Service to investigate, research and trial measures
Dangerous substances: chemical pollution & chemical status failures Extend to 2021 Map 4.5	1	-	2	-	-	Priority substances, specific pollutants	Certainty of cause: the national monitoring programme has been recently expanded to include a much broader range of substances. More time is needed to find the extent, causes and sources of chemical status non-compliance and to investigate and implement measures. In that light, there is a technical constraint and objectives will need review in 2015.	EPA to monitor waters and establish a register of discharges, emissions and losses. Local Authorities to prepare pollution reduction programmes. In accordance with the Surface Waters Environmental Objectives Regulations 2009.

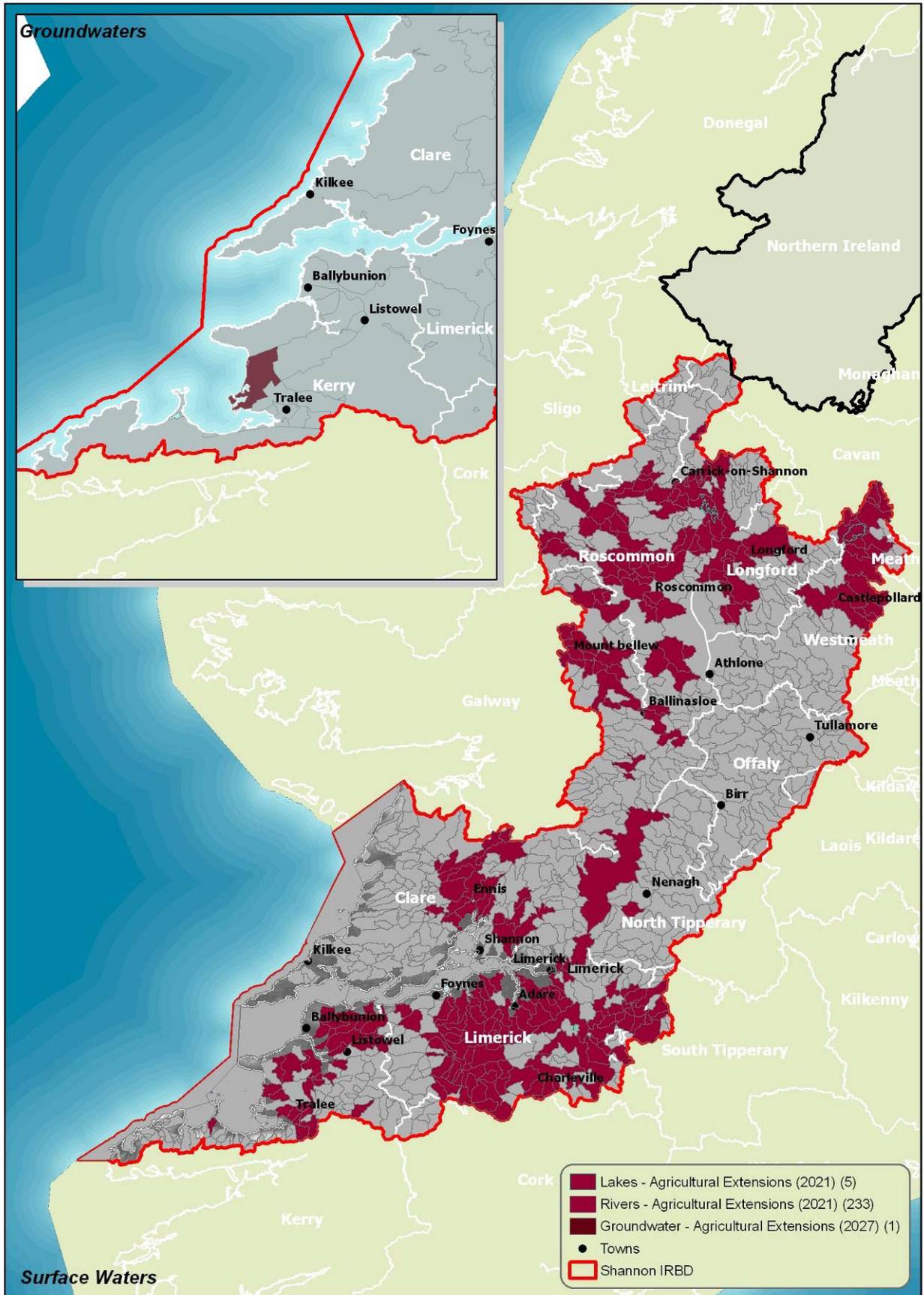
Issue and extension required	Rivers	Lakes	Transitional	Coastal	Groundwater	Likely failing status element	Constraint	Action to 2015
Physical modifications: channelisation risks Extend to 2021 Map 4.6	2	-	-	-	-	Fish	Physical recovery: research in Ireland shows that certain forms of river enhancement of drained channels can significantly improve fish life while maintaining channel conveyance capacity. The primary technical feasibility criteria include sufficient water quality and gradient. Recovery takes 5 to 10 years, so objectives may require review in 2015. Where impact is suspected but fish status is not available, investigation is required during this plan to confirm impact.	OPW (with CFB as service provider) to improve rivers with arterially drained channels, focussing on salmonids. Local Authorities to undertake works in Drainage District water bodies. EPA and Fisheries Boards to monitor catchments
Nitrogen losses to estuaries Extend to 2021 Map 4.7	24	-	1	-	-	Eutrophication in transitional and coastal waters	Certainty of cause: estuaries are eutrophic due to nitrogen inputs from upstream catchments. Evidence suggests that this may be due to elevated nitrogen in groundwaters resulting from land applications of nitrogen on free draining soils [Fenton, <i>et al.</i> in press]. These groundwaters may be contributing significant nitrogen loads to river catchments which discharge to the estuaries. This poses a technical constraint as the source of the problem has not yet been established with certainty and it is not yet clear what (if any) measures are required or how effective technical solutions would be.	EPA and local authorities to monitor and review objectives under WFD programmes Review outcomes of ACPs and NAP
Delayed recovery of highly impacted sites Extend to 2021 Map 4.8	86	3	2	-	-	Overall ecological status	Recent EPA surveys suggest that recovery is slower for waters where status is more than one band below good (i.e. poor or bad). Recovery rates have been assessed on a case-by-case basis considering the pressures acting. It is expected that, as a result of the complex mix of pressures present and the level of impact restoration of status to good in certain poor and bad status sites will extend beyond the first plan period.	Programme of measures to be implemented and EPA to monitor and report on status recovery rates
Combined total number	351	34	6	-	60			
Total as % of all waters	39%	30%	30%	-	25%			



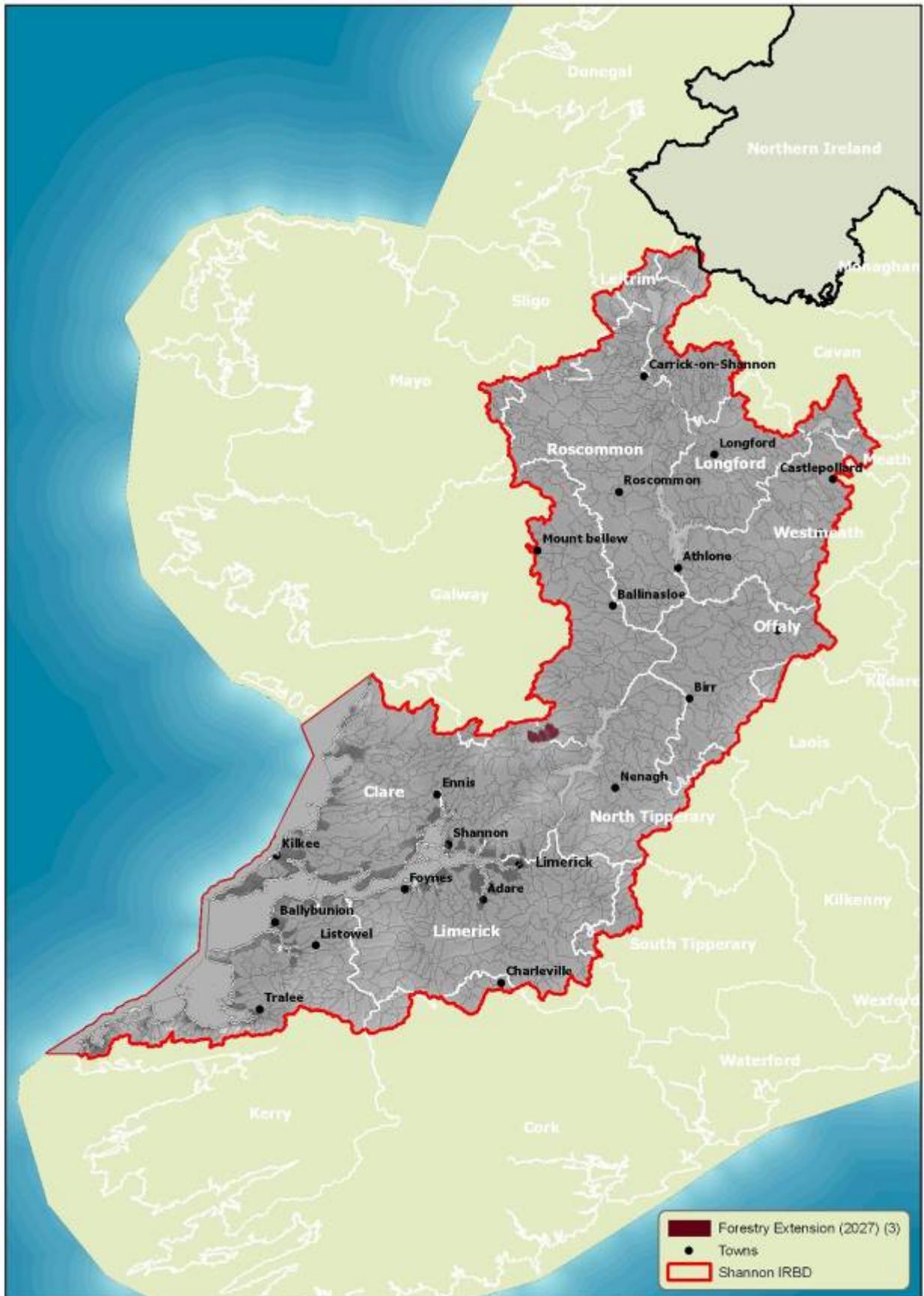
Map 4.1 Extended timescales due to time requirements to upgrade wastewater treatment plant discharges in the Shannon IRBD



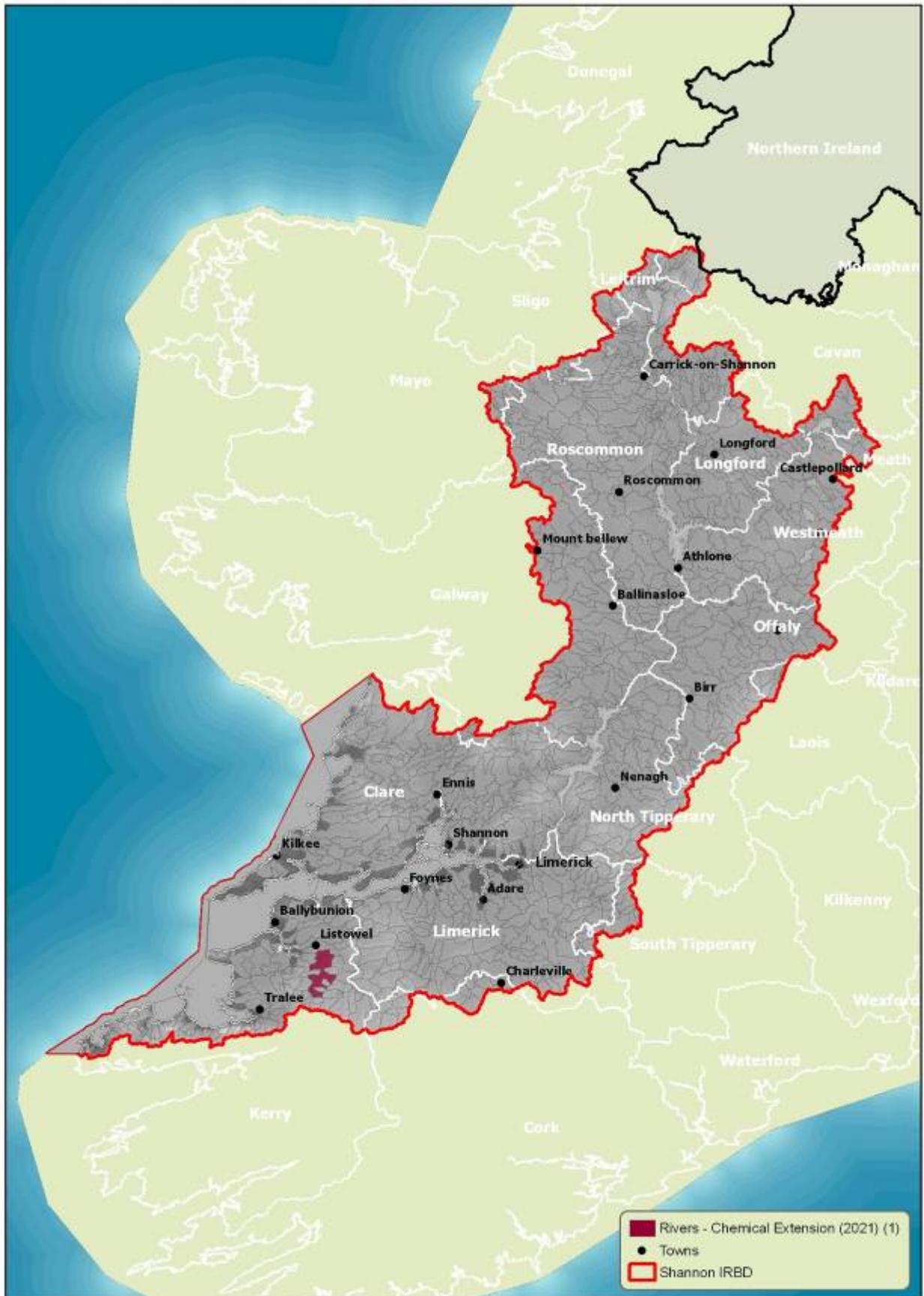
Map 4.2 Extended timescales due to physical recovery timescales at mines and contaminated sites in the Shannon IRBD



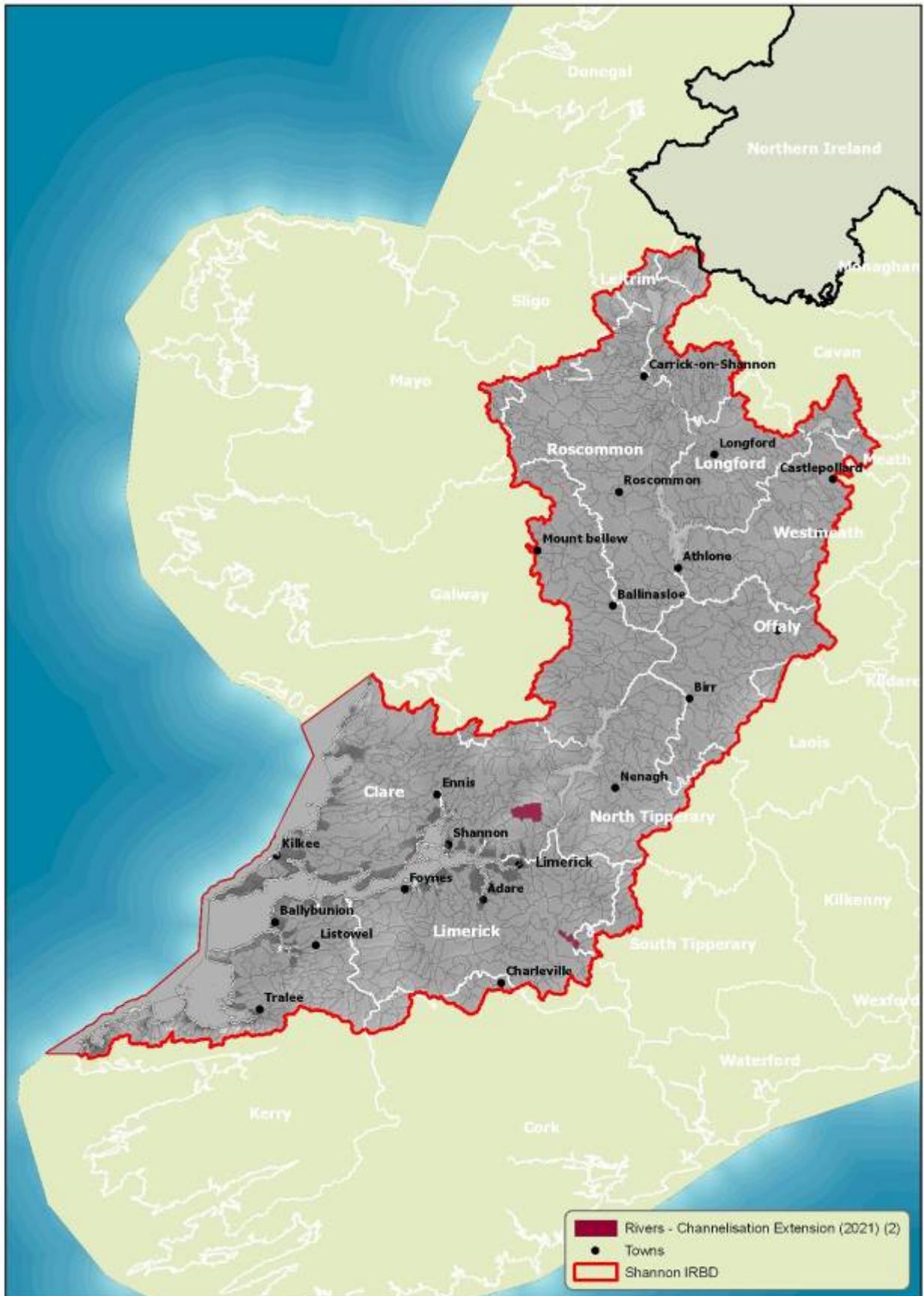
Map 4.3 Extended timescales due to delayed recovery following reduction in agricultural nutrient losses in the Shannon IRBD



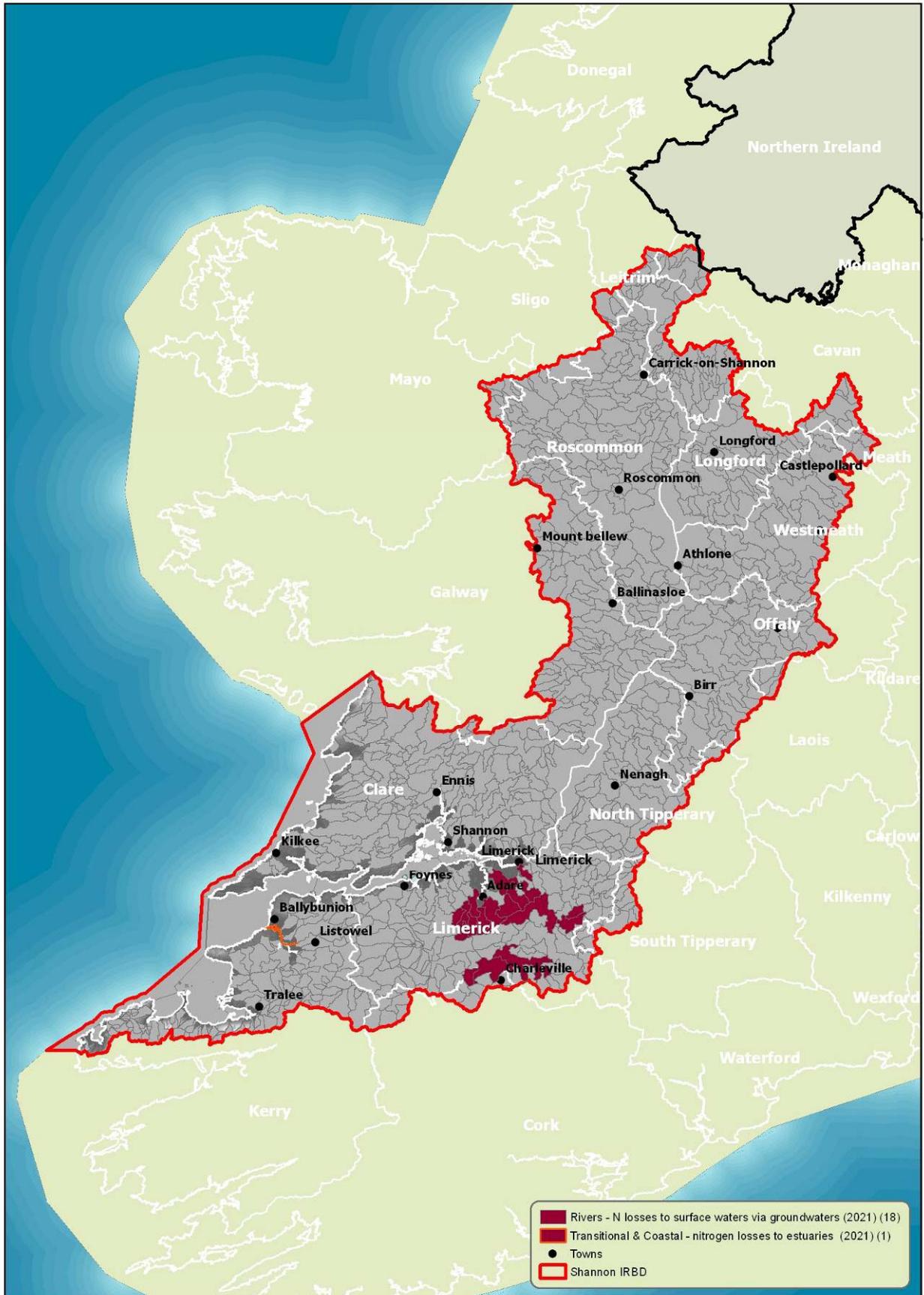
Map 4.4 Extended timescales due to delayed recovery following implementation of forestry acidification measures in the Shannon IRBD



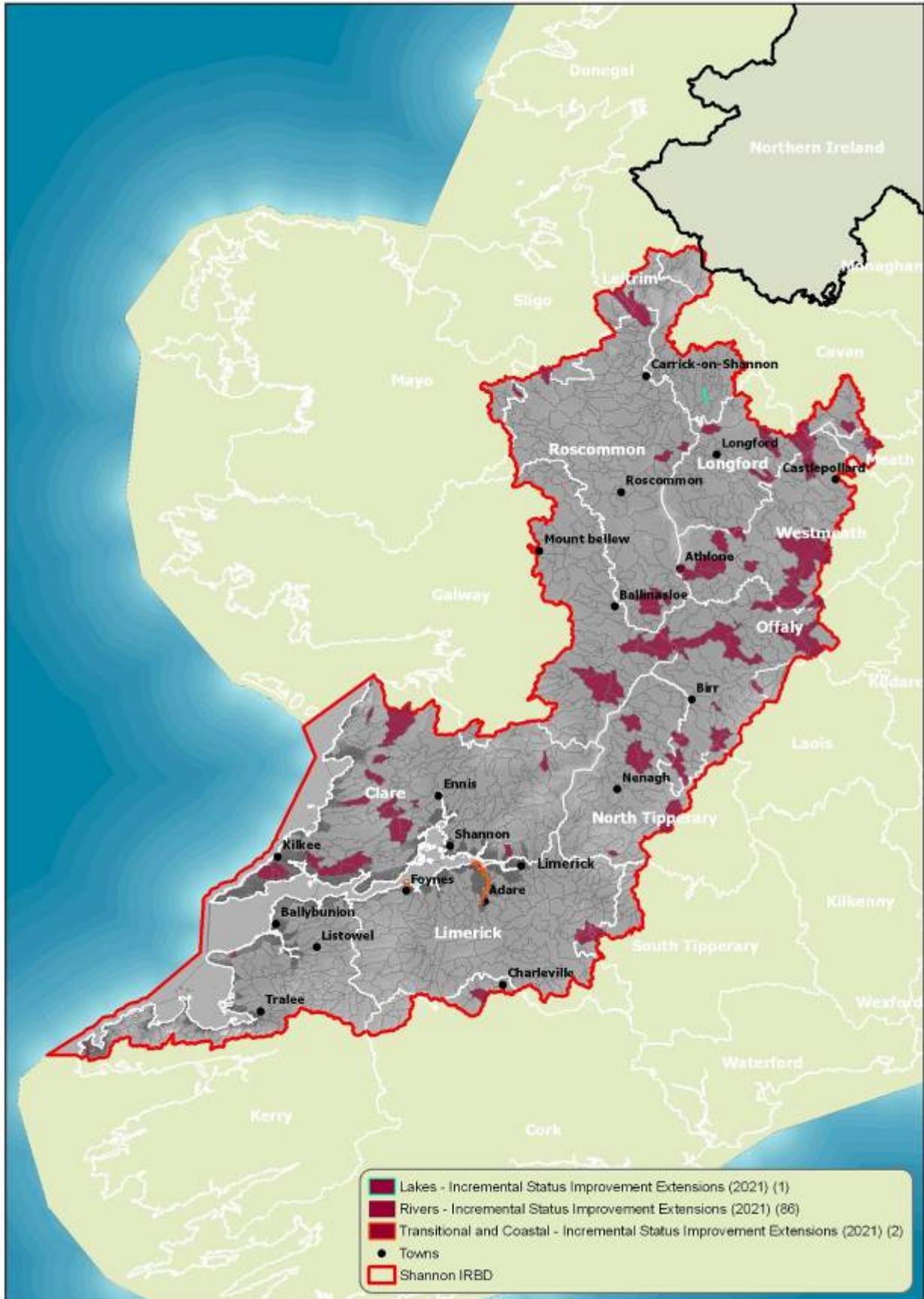
Map 4.5 Extended timescales due to delayed recovery of chemical pollution and chemical status failures in the Shannon IRBD



Map 4.6 Extended timescales due to delayed recovery from physical modifications and physical damage in the Shannon IRBD



Map 4.7 Extended timescales due to delayed recovery from nitrogen losses to estuaries in the Shannon IRBD



Map 4.8 Extended timescales due to delayed recovery of highly impacted sites in the Shannon IRBD

4.2.2 Heavily modified waters and artificial waters

Some surface waters have been substantially changed in character or have been artificially constructed for uses such as navigation, water storage, public supply, flood defence and land drainage. Twenty-one such waters have been designated as heavily modified waters or artificial waters in the Shannon IRBD.

The objective for heavily modified waters and artificial waters is to achieve good ecological potential generally by 2015. This objective allows the important function of these waters to be retained while ensuring that the ecology is protected or improved as far as possible. A detailed screening process was undertaken to designate artificial and heavily modified waters and to establish objectives for these: see the *artificial and heavily modified background document* on www.wfdireland.ie. The method used is based on a common approach, agreed between EU member states. The method requires that a set of agreed mitigation measures are implemented to improve the hydromorphological characteristics (water flow and physical conditions) as much as possible without having significant adverse impacts on the function of these waters or the wider environment.

The application of this methodology required case specific knowledge and judgements to be made on whether a mitigation measure would have a significant impact on the use. Where ecological monitoring data is available and all appropriate mitigation measures are in place, a water body is assessed as meeting good ecological potential; otherwise the action plan includes the investigations and mitigation measures needed to achieve good ecological potential.

Artificial waters	Action by relevant public authority
Athlone canal	currently non functional
Ardnacrusha headrace	status to be determined
Ardnacrusha tailrace	status to be determined
Allen canal	at good ecological potential with measures to protect status
Ballinasloe canal	at less than good ecological potential with measures to restore status.
Boyle canal	At less than good ecological potential with measures to restore status
Cloondara canal	at less than good ecological potential with measures to restore status
Errina-Plassey canal	currently non functional
Grand canal main line	at good ecological potential with measures to protect status
Royal canal Longford branch	currently non functional
Royal canal Lough Owel feeder	at good ecological potential with measures to protect status
Royal canal, East of Lough Owel	at good ecological potential with measures to protect status
Royal canal, West of Lough Owel	at less than good ecological potential due to the current restoration works
Shannon Erne waterway:	at good ecological potential with measures to protect status
Shannon navigation: (6 canal cuts)	at less than good ecological potential with measures to restore status
Tralee Ship canal	status to be determined
Heavily modified waters	Action by stakeholder
River Fergus and River Gaurus (flood protection)	an ecological potential study is proposed to investigate the impacts of all 3 impoundments and identify specific measures to be implemented to support good ecological potential.
Doo lough: (water supply)	
Lough Derg: (hydropower)	
Limerick Dock : (port)	Both ports are currently at good ecological potential with measures in place to protect status.
Foynes Harbour : (port)	

Table 4.6 Heavily modified and artificial waters

Category	Rivers & canals Number (%) Length km (%)	Lakes & reservoirs Number (%) Area km2 (%)	Estuaries Number (%) Area km2 (%)	Coastal Number (%) Area km2 (%)
Artificial waters	16 (1.8%)	0 (0%)	0 (0%)	0 (0%)
Heavily modified waters	2 (<0.1%)	2 (2%)	2 (10%)	0 (0%)
Total as % of all waters	2%	2%	10%	0%

4.2.3 New modifications or sustainable development

Alternative objectives can also be set in cases where certain developments may cause a failure to achieve good status or to maintain high status. This is subject to the developments being of overriding public interest and/or there being overriding benefits to human health and safety. Alternative options for delivering these benefits must be considered and all practicable steps must be taken to mitigate adverse impact on the water body.

The following schemes are new physical modifications in the Shannon IRBD, which may require alternative objectives to be determined by a detailed assessment if the scheme progresses:

- Ennis flood alleviation scheme
- Tullamore flood alleviation scheme
- Woodford River Flood alleviation works
- Completed flood alleviation works, Abbeylara
- Foynes Flood alleviation works
- Mullingar flood alleviation works]
- Newcastle West flood alleviation works
- N69 Listowel bypass
- N21 Abbeyfeale to Adare
- Proposed pumped hydro storage facility in West County Clare
- Lough Boora Parklands: Eco-tourism development
- Reinstatement of Navigation Channel, Camlin River
- Flow amelioration works on Abbey River
- Port of Foynes development

The absence from the plan of possible future developments does not preclude them from progressing, but they must be reported to the EC during subsequent plan updates. Such developments might be, for example, works such as increased flood defences and new road projects carried out by local authorities or specific road projects by the National Roads Authority through the Transport 21 initiative and National Road Development Strategy.

Table 4.7 Waters where there may be new modifications or developments

Type	Rivers and canals Number (%)	Lakes and reservoirs Number (%)	Estuaries Number (%)	Coastal Number (%)
Number & Total as % of all waters	28 (3.1%)	4 (3.5%)	3 (6.5%)	0 (0%)

4.3 The full picture

Table 4.8 shows target timescales for improvement of the Shannon IRBD's waters over the Water Framework Directive's three cycles. By 2015 many surface waters that are currently of moderate quality will be restored to good status; most bad and poor waters will improve in status.

Table 4.8 Timescale for achieving at least good status in surface waters and groundwaters

Deadline	Rivers & canals Number (%) Length km (%)	Lakes & reservoirs Number (%) Area km ² (%)	Estuaries Number (%) Area km ² (%)	Coastal Number (%) Area km ² (%)	Groundwaters Number (%) Area km ² (%)
2009	384 (42%)	49 (43%)	6 (30%)	3 (27%)*	182 (75%)*
	1865 (35%)	51 (13%)	48 (19%)	362 (30%)*	13109 (74%)*
2015	555 (61%)	78 (68%)	8 (40%)	3 (27%)*	184 (76%)*
	2883 (56%)	108 (27%)	113 (45%)	362 (30%)*	13118 (75%)*
2021	899 (99%)	112 (98%)	14 (70%)	3 (27%)*	237 (98%)*
	5071 (100%)	394 (99.8%)	248 (99%)	362 (30%)*	17501 (99%)*
2027	906 (99%)	112 (98%)	14 (70%)	3 (27%)*	242 (100%)*
	5097 (99%)	394 (99.8%)	248 (99%)	362 (30%)*	17607 (100%)*

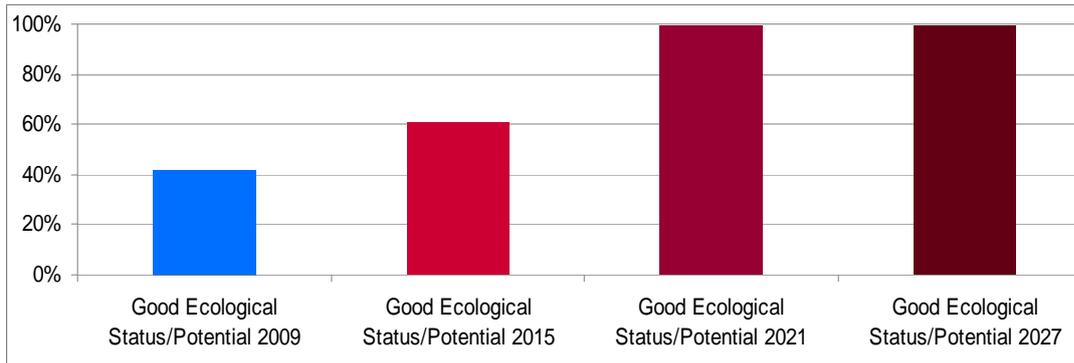
*Objectives have not been set for water bodies where status has not yet been determined.

It is estimated that implementing the measures in this plan will achieve good status by 2015 in 555 rivers and canals, 78 lakes and reservoirs, 8 estuaries, 3 coastal waters and 184 groundwaters, with further improvements during the second and third planning cycles. Graphs 4.1 – 4.5 illustrate the expected trends in status expected over three planning cycles to 2027. Maps 4.9 and 4.10 summarise the environmental objectives for the district's surface waters and groundwaters.

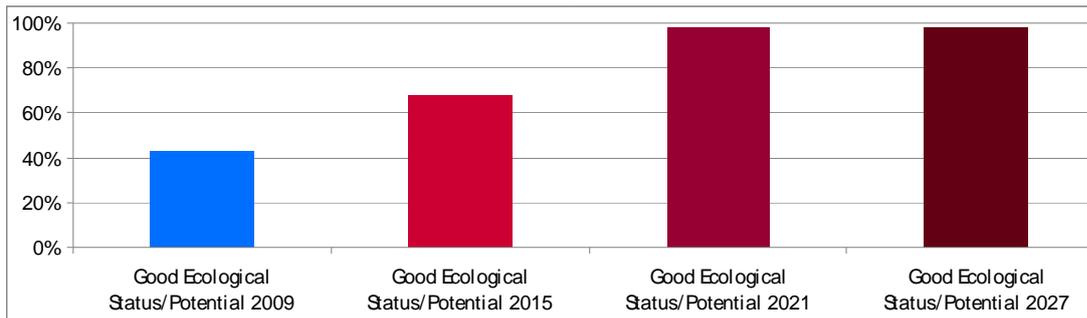
Between publication of the draft plan and finalisation of this plan a detailed assessment was made of the expected timescales for recovery of waters following implementation of measures. This assessment indicates that longer recovery timescales can be expected for a larger number of water bodies. In the draft plans 94% of rivers and canals, 99% of lakes and reservoirs, 100% of estuaries, 45% of coastal waters and 99% of groundwaters were expected to achieve good status by 2015. It is now expected that the good status will be achieved by 2015 in 60% of rivers and canals, 68% of lakes and reservoirs, 40% of estuaries, 27% of coastal waters and 76% of groundwaters.

Objectives will be reviewed and may need to be amended during the lifetime of the plan and in 2015 where significant new information on status, pressures or recovery rates becomes available. For example, the status of certain waters experiencing morphological pressures has yet to be determined. Impacts due to morphological alterations and damage are being assessed for the first time. Fish status is believed to be the most sensitive biological element to morphological impact, however, fish status is also being assessed for the first time. Consequently it will take several years before an adequate knowledge of morphological impacts is established.

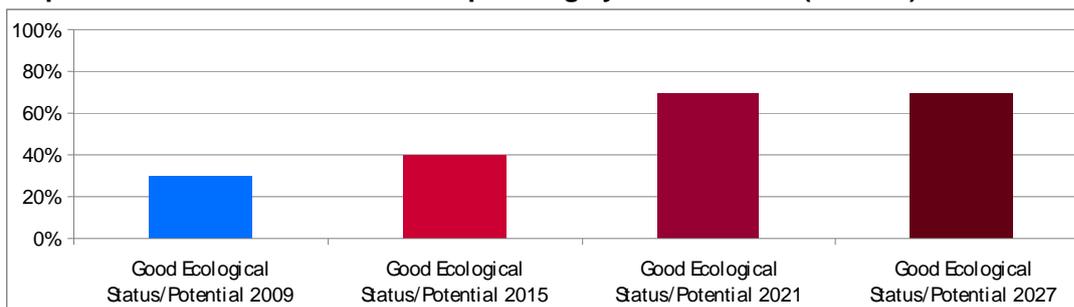
Graph 4.1 – Status trends over three planning cycles rivers and canals (number)



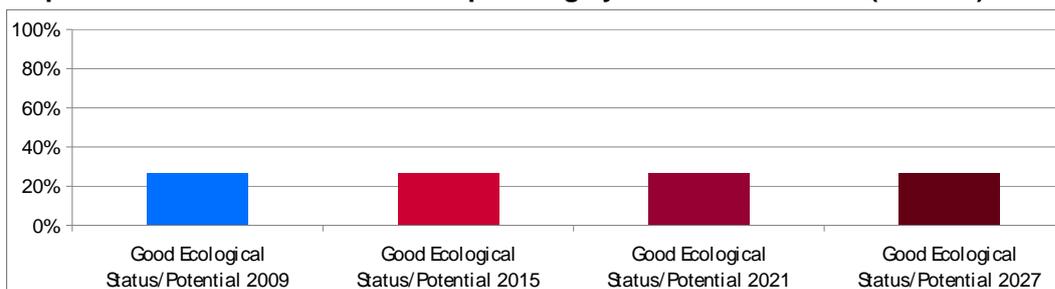
Graph 4.2 – Status trends over three planning cycles lakes and reservoirs (number)



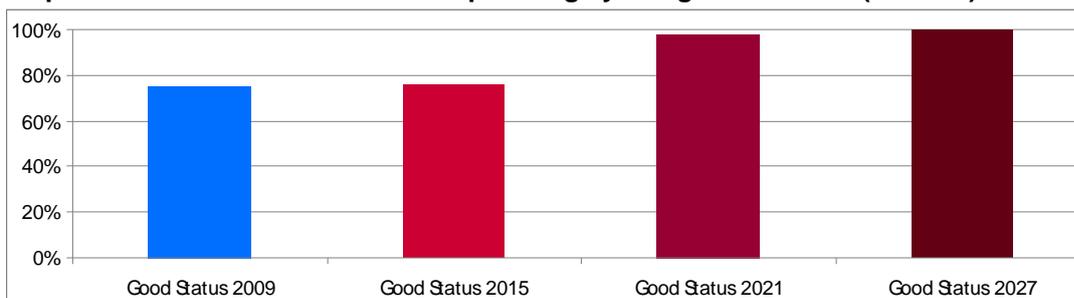
Graph 4.3 – Status trends over three planning cycles estuaries (number)

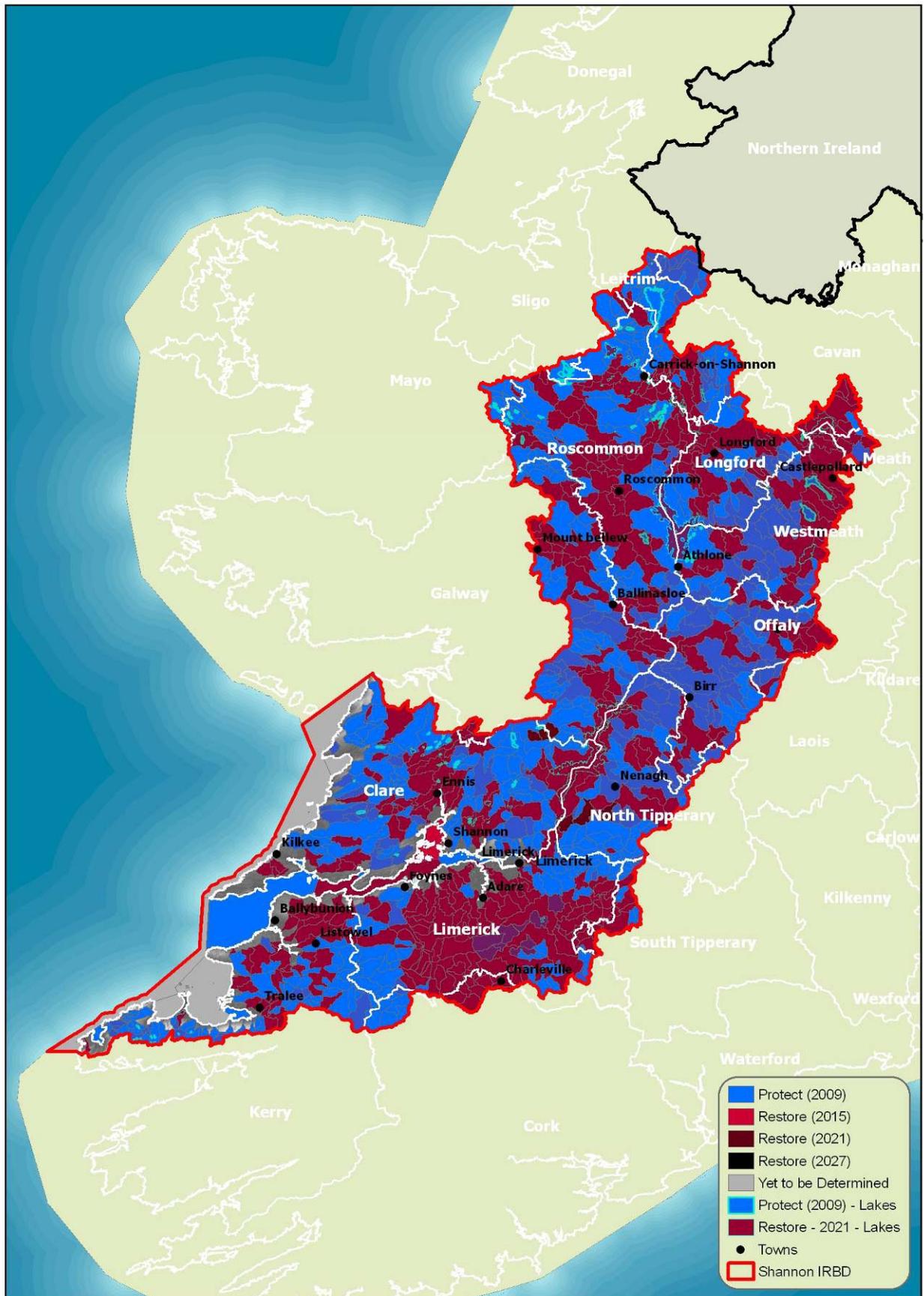


Graph 4.4 – Status trends over three planning cycles coastal waters (number)



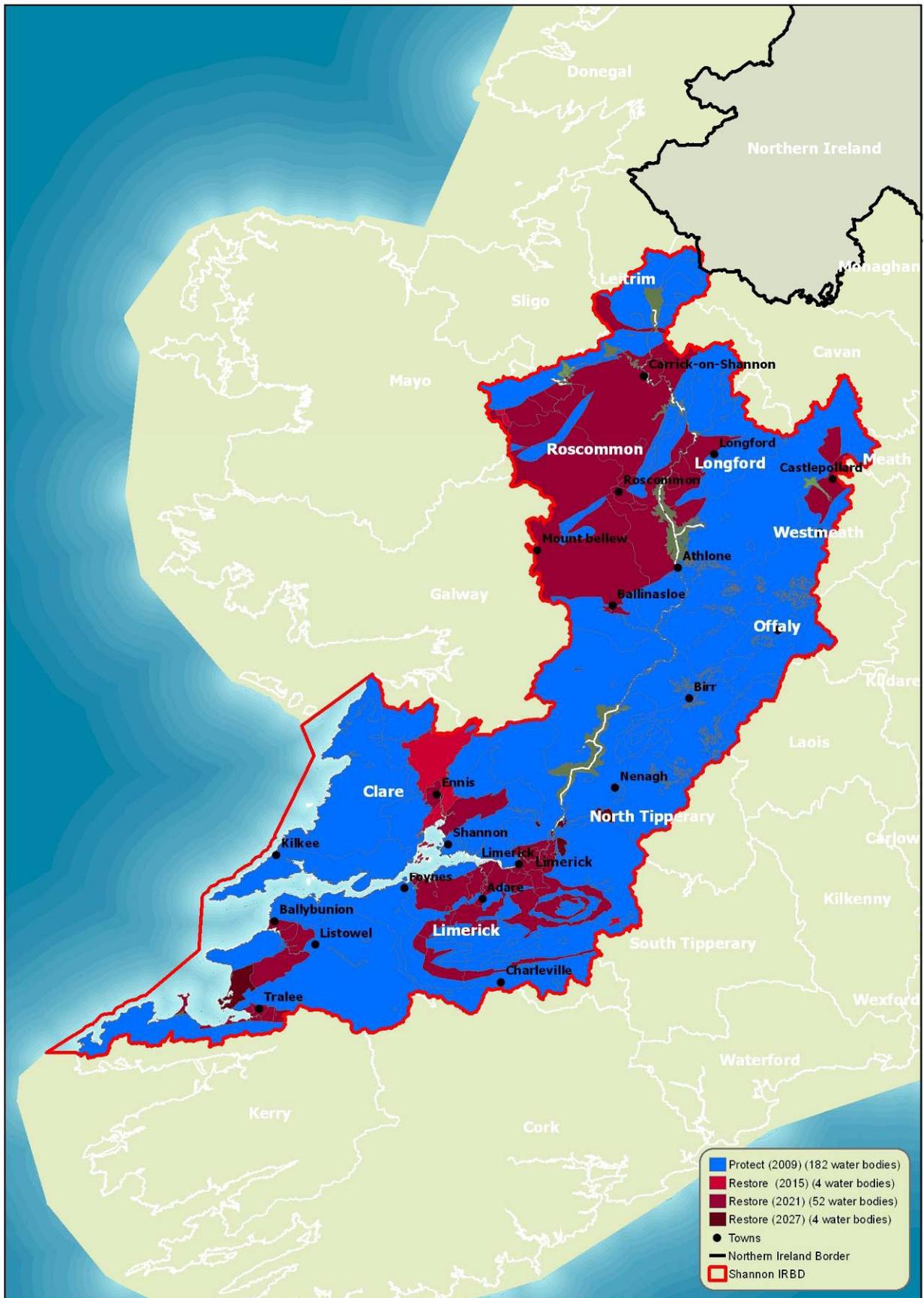
Graph 4.5 – Status trends over three planning cycles groundwaters (number)





Map 4.9 Overall surface waters objectives in the Shannon IRBD

*Objectives have not been set for water bodies where status has not yet been determined.



Map 4.10 Overall groundwaters objectives in the Shannon IRBD

5 The programme of measures for the Shannon IRBD

Chapter 4 set out the objectives for the Shannon IRBD. This chapter describes the measures to be taken to achieve those objectives. Many of the measures are already provided for in national legislation and are being implemented. These include, for example, the Urban Waste Water Treatment Regulations 2001 to 2010 and the Good Agricultural Practice for the Protection of Waters Regulations of 2009. Others measures have been recently introduced (for example new Bathing Water Regulations, 2008) or are under preparation (for example proposed authorisation regulations for abstractions and physical modifications). A full and detailed list of measures is provided in Appendices 4 and 5 and there is more information about the measures in the *national programme of measures background document* and also the suite of *programme of measures — technical studies background documents* where the specific measures for key water management issues are explained (available on www.wfdireland.ie).

The following sections describe:

- legislation recently introduced to give further legal effect to measures required to achieve the objectives established in all river basin plans in Ireland,
- the key measures to be implemented during the first planning cycle,
- range of other potential measures which are being considered but which require further development;
- the more detailed action plans established for the Water Management Units within the Shannon IRBD and
- the key measures to be implemented in the Water Management Units.

5.1 Recent legislation supporting the implementation of the programme of measures

Significant progress has been made in recent years in putting the necessary legislation in place to support the implementation of river basin plans and programmes of measures in Ireland. The core requirements of the Water Framework Directive (2000/60/EC) were transposed under the *Water Policy Regulations (SI 722 of 2003 as amended)*. In addition, the *Surface Waters Environmental Objectives Regulations (SI 272 of 2009)* and the *Groundwater Environmental Objectives Regulations (SI 9 of 2010)* were made to give effect to the measures needed to achieve surface water and groundwater environmental objectives established in river basin management plans. The Regulations place a legal obligation on public authorities to aim to achieve those objectives in the context of their statutory functions. For example, both sets of Regulations require the relevant authorities to review all pollutant discharge authorisations to take account of the objectives established in river basin plans.

Other legislation introduced in recent years, gives effect to various measures required by the Water Framework Directive. These include:

- the *Waste Water Discharge (Authorisation) Regulations (SI 684 of 2007)* which establish an authorisation system of local authority wastewater discharges operated by the Environmental Protection Agency.
- the *Water Services Act (No. 30 of 2007)* which introduces strategic planning in relation to water services provision, strengthening the administrative arrangements for planning the delivery of water services at national and local level. Water Services Strategic Plans prepared by water services authorities in accordance with Section 36 of this Act must take full account of the proper planning and sustainable development of their functional areas including, amongst other things, the provisions of river basin management plans prepared for the relevant area.

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- the *Bathing Water Quality Regulations (SI 79 of 2008)* which transposed the new Bathing Waters Directive (2006/7/EC) establishes a new classification system for bathing water quality and require monitoring and management plans to preserve, protect and improve the quality of bathing waters.
 - the *European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations (SI 296 of 2009)* which set legally binding objectives for water quality in rivers, or parts of rivers, inhabited by freshwater pearl mussels (*Margaritifera*) and designated as a Special Area of Conservation to protect those species. The Regulations also require authorities to take the steps necessary to attain those objectives. They also require the Minister for Environment, Heritage and Local Government, subject to consultations, to prepare a programme of measures for the attainment of the ecological objectives in rivers containing protected populations; and to publish a sub-basin management plan for each relevant river.
 - the *Quality of Shellfish Waters Regulations 2006 (SI 268 of 2006)* which set water quality requirements, provide for the designation of shellfish growing areas and also for the establishment of pollution reduction programmes for the designated waters in order to support shellfish life and growth. The Regulations were amended in 2009 (SI 55 of 2009 and SI 464 of 2009) to designate an additional fifty shellfish waters. There are now a total of sixty-four shellfish waters, nationally. Six are located in the Shannon IRBD.
 - the *Good Agricultural Practice for Protection of Waters Regulations (SI 101 of 2009)*, which provide statutory support for good agricultural practice to protect waters against pollution from agricultural sources and include measures aimed at achieving that objective. These regulations revised and replaced previous regulations made in 2006 and 2007 and provided for strengthened enforcement provisions and for better farmyard management.
 - amendments to the *Urban Waste Water Treatment Regulations 2001 (SI 48 of 2010)* which designate an additional 10 sites as Sensitive Areas. This brings the total number of sites designated nationally to 43 (16 in Shannon IRBD).
 - the *European Communities (Control Of Dangerous Substances From Offshore Installations) Regulations 2009 (SI 358 of 2009)* which provide for the permitting of discharges of certain dangerous substances from offshore installations into the Irish territorial sea by the Minister for Communications, Energy and Natural Resources. The Regulations also provide for the preparation of a pollution reduction programme by the Minister.

5.2 The programme of measures

The key provisions of the programme of measures are summarised in the following sections. The details of measures for the Shannon IRBD are contained in the Water Management action plans for the district.

5.2.1 Control of urban waste water discharges

According to assessments from the Environmental Protection Agency municipal wastewater discharge is suspected to be one of the two most important sources of pollution in monitored stretches of Irish rivers, possibly implicated in up to 38% of the number of polluted river sites recorded (the other source being agricultural activities). The latest Agency report on water quality covering the period 2004-2006 underlines why the control of urban waste water discharges is so important in the Irish context. Of the 39 locations assessed as seriously polluted in this period, 21 were suspected to be so classified as a result of municipal, mostly sewage, discharges. With regard to cases of moderate pollution detected in the period, the bulk of these were suspected to be caused by municipal sources also.

The main effect of pollution from municipal sources is nutrient enrichment (that results in greatly enhanced plant and algal growth) caused by nutrients (nitrogen and phosphorus). Another

frequently encountered effect is siltation. The majority of instances of moderate pollution attributed to 'municipal' sources are locations downstream of sewage discharges from towns.

There has been, and continues to be significant improvements in the management of municipal wastewater discharges. Over the period 2000 to 2006 €2.3 billion was invested in wastewater treatment, meeting 90% of Ireland's infrastructure needs. A further estimated €2.5 billion will be invested during the period 2007 to 2013. However, the focus to date has been on the provision of infrastructure whereas operational aspects also need significant improvement. In the 2006/2007 reporting period, non-compliance with the Urban Waste Water Treatment regulations for very large treatment plant discharges (>15,000 population equivalent) was high (48%), while the majority (81%) of smaller treatment plants (<2,000 population equivalent) did not comply with the required standards (EPA, 2009).

Ireland has enacted two major pieces of legislation in recent times that together constitute key elements in the legislative framework in the area of urban waste water. First, the Waste Water Discharge Authorisation Regulations made in 2007, providing for authorisation in accordance with emission limit values and secondly, the Surface Waters Regulations 2009, providing statutory quality standards for a range of substances in water.

5.2.1.1 Urban waste water treatment Regulations (2001-2010)

The main objective in relation to wastewater is to meet the requirements of the EU Urban Waste Water Treatment Regulations (2001-2010) in full. The purpose of the Regulations is to protect the environment from the adverse effects of urban waste water discharges and discharges from certain industrial sectors. The Regulations require:

- scheduled provision of urban waste water collecting systems – depending on the size of the agglomeration and on the type of water body to which the waste water is discharged;
- scheduled provision of urban waste water treatment plants – depending on the size of the agglomeration and on the type of water body to which the waste water is discharged;
- provision for industrial waste water which enters collecting systems and urban waste water treatment plants to receive any pre-treatment that is required to protect the health of staff, the environment and the fabric and integrity of plant and;
- monitoring by local authorities of discharges from urban waste water treatment plants including the transmission of results to the EPA.

The Urban Waste Water Treatment Regulations (2001-2010) have also designated 43 water bodies as sensitive and in need of special protection due to the threat of eutrophication. This number includes an additional ten sensitive waters designated in recent amending Regulations (SI 48 of 2010).

The Environmental Protection Agency has responsibility for enforcing the Regulations in order to secure improvements in the quality of discharges from urban waste water treatment plants through a strategic, risk based enforcement programme. Based on audits and monitoring returns the Environmental Protection Agency has pointed out various improvements that are needed to comply fully with the Regulations, namely:

- Put in place appropriate treatment at those locations across the country where wastewater is being discharged with either no treatment or inappropriate treatment.
- Provide secondary treatment for those agglomerations that do not have the required level of treatment.
- Carry out monitoring and analysis in accordance with the Urban Waste Water Treatment Regulations, for all treatment plants including those that are managed and operated by third parties on behalf of the local authority.
- Local authorities to review the operation of all urban waste water treatment plants in their functional areas including those below 500 population equivalent. Corrective action

programmes must be developed as a priority where discharges cause environmental pollution in the waters to which the effluents discharge.

5.2.1.2 Waste water discharge (authorisation) Regulation (SI 684 of 2007)

The Waste Water Discharge (Authorisation) Regulations of 2007 (SI 684 of 2007) were introduced for the purpose of making local authority waste water discharges subject to an authorisation regime. The Regulations give effect to obligations under the Water Framework Directive requiring prior authorisation of point source discharges liable to cause pollution. This includes all discharges, losses and emission of pollutants from wastewater works. The regulations also address and implement measures required under a number of other Directives (that is Drinking Water, Ground Water, Habitats, Shellfish, Bathing Water and Birds). The main provisions of the Regulations are as follows:

- the Environmental Protection Agency is the competent authority for the purposes of authorising urban waste water discharges;
- the Environmental Protection Agency sets emission limits for pollutants likely to be in the waste water concerned, and the timeframe within which these limits are to be achieved;
- the Environmental Protection Agency has the power to review a discharge authorisation;
- water services authorities must apply to the Environmental Protection Agency for a licence/certificate authorising all waste water discharges from sewage works;
- discharges from agglomerations with population equivalents greater than 500 must be licensed;
- discharges from agglomerations with a population equivalent below 500 must be certified;
- failure by water services authorities to comply with conditions attaching to an authorisation granted by the Environmental Protection Agency is an offence;
- the provision of false or misleading information or failure to provide a response to a licence review initiated by the Environmental Protection Agency are also offences.

Authorisations have been introduced on a phased basis having commenced in December 2007. All discharges to the aquatic environment from waste water works owned, managed and operated by water service authorities require a waste water discharge licence or certificate of authorisation from the Environmental Protection Agency. The authorities are required to apply to the Agency for a licence or certificate of authorisation by specified dates depending on the population equivalent of the area served by the waste water works.

The Environmental Protection Agency has developed a draft enforcement plan to ensure the requirements of the licences/authorisations are complied with by water services authorities. The enforcement approach to these licences is to be risk based and focuses on the development and implementation of a strategic enforcement plan in conjunction with the relevant stakeholders.

The Waste Water Discharge (Authorisation) Regulations establish a clear linkage between decisions that planning authorities and An Bord Pleanála make on individual planning applications/appeals, and parallel obligations on local authorities, as water services authorities. The “Combined Approach¹ in the Waste Water Discharge (Authorisation) Regulations 2007 require water services authorities to comply with emission limits for the discharge of wastewaters to water bodies arising from the stricter of either or both the Urban Waste Water Regulations (S.I. No. 254 of 2001) and emission limits based on achieving the environmental quality standards for the receiving waters. The Environmental Protection Agency is required

¹ “combined approach”, in relation to a waste water works, means the control of discharges and emissions to waters whereby the emission limits for the discharge are established on the basis of the stricter of either or both, the limits and controls required under the Urban Waste Water Regulations, and the limits determined under statute or Directive for the purpose of achieving the environmental objectives established for surface waters, groundwater or protected areas for the water body into which the discharge is made.

under the Waste Water Regulations to apply the combined approach when issuing licences, ensuring that the licence issued and discharge limits set therein comply in full with the requirements of the EU Urban Waste Water Treatment Directive.

Where a planning authority or An Bord Pleanála forms an opinion that the discharge from a proposed development would result in non-compliance with, or a significant breach of, the combined approach then the planning authority or the Board must either:

- refuse permission or approval for the development,
- impose conditions on any grant of permission or approval to ensure that the discharge will not cause non-compliance with, or a significant breach of, relevant limits; or
- decide not to proceed with the development (as in the case of local authority's own development).

5.2.1.3 Water Services Investment Programme

The Water Services Investment Programme (WSIP) is the instrument through which all major public water and wastewater infrastructure schemes are delivered. The Department of Environment, Heritage and Local Government in collaboration with the water services authorities, is responsible for prioritising, approving, scheduling and financing individual schemes. The Programme is implemented through City and County Councils, which, as water services authorities, are responsible for design, procurement, contract supervision and post-completion operation and maintenance.

The availability of waste water services is an important pre-requisite for environmental sustainability and economic activity across all sectors. Continuing substantial investment is needed to sustain progress on eliminating the deficit in national water services capacity and to attract and support investment that will stimulate economic activity and recovery and increase the productive capacity of the economy.

The main drivers for investment in waste water infrastructure under the Programme are works required to:

- ensure compliance with the Urban Waste Water Treatment Directives;
- ensure compliance with bathing water requirements and elimination of pollution blackspots;
- ensure compliance with shellfish waters requirements;
- meet strategic priorities, for example schemes in cities and towns facing shortages in water services capacity;
- comply with Environmental Protection Agency licensing requirements for municipal waste water discharges;
- meet the requirements of the Water Framework Directive.

Obligations under the Urban Wastewater Treatment Directive have been a central focus of the Water Services Investment Programme. As a result, Ireland's compliance with the requirements of that Directive for the provision of secondary treatment rose to approximately 90% by the end of 2007, compared to 25% at the beginning of the last National Development Plan in 2000. All remaining schemes required for full compliance were included in the Water Services Investment Programme 2007 – 2009.

5.2.1.4 Priorities for follow up actions

Water services authorities, in collaboration with the Department of Environment, Heritage and Local Government, have undertaken a review of priorities for a range of follow up actions in order to ensure that:

- investment under the Water Services Investment Programme is aligned with the high level goals outlined above,

-
- investment is appropriately targeted at key schemes and
 - other appropriate steps are taken.

These actions include; investment in infrastructure, further investigation, improvements in operational performance and the management of treatment capacity. This review has formed the basis for prioritising investment in the next phases of the Water Services Investment Programme (2010-2012) and other actions described below. The criteria used to prioritise included information on design capacity of treatment plants, actual capacity, projected growth in loadings to the plant, compliance of effluent with the standards specified in the urban waste water treatment Regulations and observed impacts on receiving waters.

The review identified the following six categories of urban agglomerations where waste water treatment facilities are to be subject to a range of follow up actions:

Category 1 - Agglomerations with treatment plants requiring identifiable Capital Works. This includes plants deemed to be operating above original design capacity or where constraints on assimilative capacity or sensitivity of receiving waters impose requirements for more stringent discharge standards.

Category 2 - Agglomerations with treatment plants requiring further investigation prior to Capital Works. This category includes agglomerations where the available information suggests that the plant should not result in pressure on the water body, but water quality assessment does not support that. In these cases, the measure is to examine the agglomeration and determine the source of the pressure. At this time, it is not possible to determine the additional measures that will be required and consequently, any works identified as necessary will not be in place before the end of the first planning cycle.

Category 3 - Agglomerations requiring the implementation of actions identified in Pollution Reduction Programmes (PRPs) for Shellfish Waters designated under the European Communities (quality of shellfish waters) Regulations (2006-2009). PRPs for agglomerations discharging to shellfish waters impose additional microbiological discharge standards that must be complied with. This may require additional capital works in some cases. Implementation of the PRPs commenced in early 2010. As part of implementation the need for additional works to achieve all water quality standards will be examined. Where works are identified as necessary they shall be priorities for investment under the WSIP.

Category 4 - Agglomerations with treatment plants requiring improved operational performance through the implementation of Performance Management Systems ranging from improved monitoring of loadings, flows and discharge standards to documented operational management systems. Work is to commence immediately.

Category 5 - Agglomerations requiring investigation of Combined Storm Overflows (CSOs). In these cases, the discharge standards for the waste water treatment plant were acceptable, but observed impacts on the receiving waters suggested that untreated waste water discharges were occurring. The measure is to investigate all suspect CSOs. In cases where the investigation identifies maintenance or management issues, they can be readily addressed and may result in early recovery of receiving waters. However as the result of the investigation cannot be predicted at this time and the time scale for any identified capital works is unknown works are unlikely be in place before the end of the first planning cycle.

Category 6 - Agglomerations where existing waste water treatment capacity is currently adequate but predicted loadings (based on assumed 3% growth in load *per annum*) would result in overloading. The measure is to manage development so that treatment capacity is in accordance with the requirements of the Urban Waste Water Discharges (Authorisations) Regulations of 2007.

5.2.2 Control of unsewered waste water discharges

The Environmental Protection Agency recently published a new binding Code of Practice for Wastewater Treatment Systems and Disposal Systems serving Single Houses (October 2009) following extensive public consultation. The new Code of Practice updates the earlier manual published in 2000 and sets standards for new developments. From a planning perspective, the publication of the new Code of Practice is a very significant step forward in ensuring environmentally sustainable rural development in line with the statutory Planning Guidelines on Sustainable Rural Housing (2005) issued by the Department of Environment, Heritage and Local Government. The purpose of the new Code of Practice is to provide guidance on the provision of wastewater treatment and disposal systems for new single houses. It is intended to assist planning authorities, developers, system manufacturers and designers, system installers and system operators to deal with the complexities of on-site systems.

The Environmental Protection Agency Code of Practice provides guidance on:

- Methods for assessing site suitability for on-site wastewater treatment systems and for identifying minimum environmental protection requirements
- Selection of suitable wastewater treatment systems for sites in un-sewered rural areas
- The design and installation of septic tank systems, filter systems, packaged treatment systems and tertiary treatment systems,
- Maintenance requirements for on-site wastewater treatment systems.

The Department issued a circular letter (Reference PSSP 1/10) to all planning authorities and An Bord Pleanála in January 2010 on foot of the new Environmental Protection Agency Code of Practice. The circular advises authorities of the new arrangements to apply for the assessment of on-site waste water disposal systems for single houses in the light of the new Code of Practice. The circular emphasises that the Code is a key element in ensuring that the planning system fully addresses the protection of water quality when assessing development proposals for new housing in rural areas and in line with the Planning Guidelines for Sustainable Rural Housing issued by the Department in 2005. Planning authorities must ensure that developments in un-sewered areas undergo a site suitability assessment and that both the site itself and the on-site waste water treatment system to be installed are appropriate and meet the required standards.

It is also the Department's intention to amend the Technical Guidance Document supporting the 1997 Building Regulations (SI 497 of 1997) relating to standards for "drainage and waste water disposal" (TGD-H of 2005). This will involve incorporating new and additional guidance based on the new Environmental Protection Agency Code of Practice. The Department will also issue a Circular Letter to all Local Building Control Authorities drawing their attention to the amended guidance document.

In relation to existing unsewered properties, improvements are required regarding the operational performance, maintenance and monitoring arrangements of septic tanks and other on-site waste water treatment systems serving such properties. In response, the Minister for Environment, Heritage and Local Government intends to bring forward and consult on proposals for legislation during 2010. It is intended that this legislation will be in place by quarter 3 of 2010. The proposed legislation will provide standards for the performance, operation and maintenance of septic tanks and similar on-site wastewater treatment systems. It will also provide for the monitoring and inspection of the performance of such treatment systems and will set out the responsibilities of households served by those systems, including requirements to carry out remedial actions where necessary.

5.2.3. Control of agricultural sources of pollution

The control of pollution from agriculture remains a significant challenge to achieving water quality standards in Ireland. The Environmental Protection Agency estimates that agricultural

sources accounts for 31% of pollution incidences. Local authorities in the Shannon IRBD have found that agricultural activities are primarily responsible for widespread diffuse pollution in parts of the District due to over enrichment of soil and inadequate management of farm effluent. The main measure for addressing pollution from agricultural sources is the Good Agricultural Practices Regulations (SI 101 of 2009), commonly known as the “Nitrates Regulations”. These Regulations also give effect to several other EU Directives including those relating to; dangerous substances in water, waste management, protection of groundwater, public participation in policy development and water policy (the Water Framework Directive). The Nitrates Regulations are the main instrument for controlling pollution from agriculture, providing statutory support for good agricultural practice to protect waters against pollution. There have been significant improvements in terms of agricultural pollution control since the introduction of the original Good Agricultural Practice Regulations in 2006. The Regulations require a “National Action Programme” of measures aimed at protecting waters from pollution, and they introduced a binding code of good agricultural practice, which is applicable to all farmers. The regulations have been supported by significant investment in farm waste management (€2 billion since 2006).

A key requirement of the Good Agricultural Practice Regulations is the monitoring and evaluation of the National Action Programme. This consists of;

- collection of accurate baseline data,
- implementation of the Action Programme measures,
- collection of data over the monitoring period, and
- evaluation of effectiveness by comparison of data collected after implementation with baseline data, targets levels and limits.

Water quality monitoring for the purposes of the National Action Programme has been integrated into the previously outlined National water monitoring programme established in 2007 under the Water Framework Directive and is carried out by local authorities and the Environmental Protection Agency.

Despite the improvements in agricultural pollution control in recent years, surveys carried out by local authorities indicate that on average 31% of farms nationally may be non-compliant with the Nitrates Regulations. While the Regulations are in the early stage of implementation, it is clear that an effective inspection and enforcement regime is needed to ensure full compliance.

Enforcement of the Nitrates Regulations is primarily the responsibility of the local authorities acting under the direct supervision of the Environmental Protection Agency. Local authorities have a duty under the Regulations to initiate the necessary farm inspection programmes to assess the level of compliance with the Regulations. These inspections are to be co-ordinated with inspections carried out by other public authorities such as the Department of Agriculture, Fisheries and Food.

Following discussions between the Minister for the Environment, Heritage and Local Government, the Minister for Agriculture, Fisheries and Food and the local authorities it has been agreed that, starting in 2010, inspectors from the Department of Agriculture, Fisheries and Food will, on behalf of the local authorities, carry out a programme of systematic inspections for the purposes of checking compliance with the Nitrates Regulations. Local authorities will continue to retain responsibility for undertaking pollution investigations based on local priorities in accordance with their duties under the full scope of water quality legislation and in line with their respective environmental inspection plans prepared in accordance with the European Union’s Recommendation on Minimum Criteria for Environmental Inspections (RMCEI). The aim of this approach is to ensure that the combined resources of Department of Agriculture,

Fisheries and Food and the local authorities are used to best effect and that duplication of on-farm inspections is avoided.

The selection of farms for inspection by Department of Agriculture, Fisheries and Food will be based on risk-assessment criteria taking into account the level of agricultural pressures, sensitivity of catchments and water quality targets established in River Basin Management Plans. This arrangement, together with inspections undertaken by Department of Agriculture, Fisheries and Food for the purpose of cross compliance, will result in a total of approximately 3,000 farms being inspected nationally *per annum*. If a farm is found to be non-compliant it may be subject to penalty under the single farm payment scheme and follow up inspections and enforcement action will be the remit of local authorities. As noted above, local authorities will continue to carry out inspections, based on local priorities, as required under the full scope of water quality legislation.

The Agricultural Catchments Programme (ACP) is an important component of the National Action Programme. Its main purpose is to provide a scientific evaluation of the effectiveness of the National Action Programme measures and where necessary to underpin the basis for any modifications of the measures that might be required to achieve Water Framework Directive water quality objectives. The ACP is an agri-environmental and socio-economic research programme at the catchment scale supported by a team of scientists, advisors and technicians and managed by Teagasc. It will initially run for a four-year period (2008 –2011). Six agricultural catchments are being intensively managed and monitored nationally. None of these are located in the Shannon IRBD. The catchments were selected to represent typical agricultural enterprise types and typical environmental risks to groundwater and surface water. Two of these catchments contain a high proportion of tillage - one is located on free-draining soils where the greatest risk is of nitrogen loss through leaching and the other is located on heavier soils where phosphorus loss through surface run-off is more likely. There are four grassland-dominated catchments. One of these involves high risk of nitrogen loss, while the other three relate predominantly to risk of phosphorus loss (with varying levels of risk of nitrogen loss).

The ACP is intended to identify challenges in implementation of the National Action Programme and will provide a basis for modifications to the programme and/or recommendations for new agricultural measures for the protection of water, where necessary. (Further information is available at: <http://www.teagasc.ie/aqcatchments/>).

The Nitrates Regulations represent a major step forward in protecting waters from agricultural sources of pollution and are expected to deliver significant improvement in water quality when fully effective. Evidence suggests, however, that they may not be sufficient in some areas of the country:

- The National monitoring programme has indicated a number of patterns of concern. Elevated nitrate concentrations have been consistently observed in the east and southeast of the country in both groundwater and surface waters (EPA, 2008 and 2009). The presence of intensive agricultural practices on free draining soils in the southeast suggests that diffuse agricultural sources are the cause of the elevated nitrate concentrations. Also, the estuaries of the south-east and south of the country, such as the Slaney, Blackwater and Bandon were found to be the most seriously eutrophic. It is suspected that the nitrogen loads from upstream catchments is a significant contributing factor as nitrogen is the main growth-limiting nutrient in seawater.
- The vulnerable nature of the karst limestone aquifers in the west (Galway, Mayo and Roscommon) may explain the elevated phosphate concentrations in groundwater. The groundwater may be contributing to eutrophication in rivers and lakes in these areas. Phosphorus deposited as organic or chemical fertiliser on shallow soils over fissured karst

limestone may enter groundwater readily and may then discharge to rivers through springs. Approximately 20% of the area of Ireland consists of karstified limestone.

- Elevated phosphorus levels have also been observed in areas covered by heavy gley soils with high phosphorus content (Index 4) including parts of counties Cavan, Clare, Cork, Galway, Kerry, Leitrim, Limerick, Longford, North Tipperary, Roscommon and South Tipperary in the Shannon IRBD.

The three scenarios described above pose particular difficulties for water quality management and the agricultural sector in the areas mentioned. Even with the full implementation of the Nitrates Regulations and the National Action Programme it is unlikely that the objective of good status for groundwater and/or surface waters will be met by the 2015 deadline in those areas. Challenges include slow natural rates of water quality recovery, which may extend up to 20 years, and certain ground conditions (hydrogeological and soil characteristics), which cause groundwater bodies to be vulnerable to pollution from nutrient inputs from agricultural activities. Time extensions for achieving water quality objectives have been applied to waters in such areas in order to provide adequate time to investigate the extent of impacts, to identify and implement appropriate management measures and to allow time for water quality to recover.

5.2.4 Water pricing policy

The Water Framework directive intends that water pricing policy should act as an incentive towards efficient water usage so as to “contribute to the environmental objectives of the directive” and to recover “an adequate contribution” of the costs of water services from the main user groups, including industry, agriculture and households.

Since 1998 Government's National Water Pricing Policy has been to charge non-domestic customers for water and waste water services to recover the full costs of providing such services to these customers. Metering of all non-domestic uses is largely complete. The installation of meters on the supply of non-domestic customers facilitates the equitable, transparent and efficient implementation of water pricing policy.

In relation to the domestic sector the cost of capital, operational and maintenance costs for water services have been met in full from the Exchequer since 1997. Following a recent Government decision, legislation is to be introduced by the Minister for Environment, Heritage and Local Government to enable local authorities to charge domestic users for water services in a manner which provides incentives for efficient water use and which recovers an adequate contribution of the costs of water services. Proposals will also be brought forward for a metering programme for domestic users.

5.2.5 Sub-basin management plans and programmes of measures for the purpose of achieving environmental water quality objectives for Natura 2000 sites designated for the protection of Freshwater Pearl Mussel populations

Under the European Communities environmental objectives (Freshwater Pearl Mussel) Regulations, 2009 (SI 296 of 2009) the Minister for Environment, Heritage and Local Government is required to have sub-basin management plans with programmes of measures prepared to achieve environmental water quality objectives established for Natura 2000 sites designated for the protection of Freshwater Pearl Mussel populations.

There are twenty-seven designated populations listed in the Regulations, two of these are located in the Shannon IRBD (Cloon & Owenmore). Twenty six of the twenty-seven designated populations are failing good ecological status due to inadequate water conditions. A sub-basin management plan is required for each catchment containing a designated freshwater pearl mussel population. Plans are being prepared in consultation with the relevant public authorities

and are expected to be completed by mid 2010. Each sub-basin management plan is required to:

- specify environmental objectives and targets;
- provide for the investigation of sources of pressures leading to the unfavourable conservation status of the freshwater pearl mussel;
- establish a programme of measures, including a timeframe, for the reduction of pressures giving rise to unfavourable conservation status;
- lay down a detailed programme of monitoring to be implemented in order to evaluate the effectiveness of measures and progress made towards restoring favourable conservation status.
- A duty is placed on each public authority to take such steps as are necessary, in the context of their functions, to implement the measures identified in the sub-basin management plans. The measures included in sub-basin management plans are complementary and additional to measures contained in a river basin management plan prepared by local authorities. Sub-basin management plans are to be reviewed every 6 years and revised where necessary.

5.2.6 Pollution reduction programmes for the purpose of achieving water quality standards for designated shellfish waters

Under the European Communities (quality of shellfish waters) Regulations (2006-2009) the Minister for Environment, Heritage and Local Government is required to have Pollution Reduction Programmes (PRP) prepared for each designated shellfish water. The purpose of each programme is to take reasonably practicable steps to protect and, where necessary, improve water quality in the designated shellfish growing areas with the aim of achieving the environmental water quality standards established for them. Nationally there are sixty-four designated shellfish waters, six are located in the Shannon IRBD (West Shannon Poulmasherry, West Shannon Carrigaholt, West Shannon Rinevella, West Shannon Ballylongford, Tralee Bay, and Inner Bay Maharees). Following consultations with the relevant public authorities all shellfish PRPs and Strategic Environmental Assessments (SEA) and Appropriate Assessments of Natura 2000 sites (AA) of each, were completed by January 2010. Implementation has now commenced.

The PRP for each shellfish growing area consists of a characterisation of the surrounding catchment area and pressures that may influence water quality (for example known waste water discharges and the nature of agricultural activities), an assessment of water quality in the area and a schedule of detailed catchment level actions planned to control known sources of pollution.

All relevant public authorities are required to perform their statutory functions in a manner that, as far as practicable, will promote compliance with the water quality standards established for designated shellfish waters. The Marine Institute is carrying out a monitoring programme to assess the condition of waters in the shellfish growing area and to verify compliance, or otherwise with the water quality standards. The Marine Institute will submit a report on water quality in each designated area to the Minister each year, including any non-compliances with water quality standards to enable investigation to be undertaken. The PRPs will be reviewed by the Minister at intervals not exceeding three years, and will be updated and amended as needed from time to time.

The PRP schedule of actions identifies the measures required, timescales and the public authority responsible for undertaking the action. The measures are complementary and additional to measures contained in a river basin management plan focussing on the pressures acting on each designated shellfish water.

5.2.7 Control of environmental impacts from forestry

- The National Forestry Inventory shows that forest now occupies 10% of the total land area of Ireland; 57% of forest is in public ownership and 43% in private. Conifers comprise 74% of the total stock. An estimated 43% of the total stocked forest estate is on peat type soils. These plantations are currently being harvested for the Irish timber sector. There are over 180,000 hectares of public and private forestry in the Shannon IRBD. A typical forest lifecycle for conifer plantations is 40 years; that for broadleaves is longer.
- Research into the interaction between forestry and water has continued since the 1980s and the findings have been integrated into Forest Service guidance and codes of practice. While there are many positive benefits of forests, such as biodiversity enhancement through broadleaf plantation, some potential negative pressures have been identified through recent research. These pressures include:
 - artificial acidification of waters arising from the presence of coniferous afforestation on acid-sensitive soils. Afforestation on well buffered acid mineral soils do not exert an acidifying effect. Some 5% of national stocked areas are located in areas with acid-sensitive soils that can exert an acidifying effect on waters.
 - Nutrient enrichment and sedimentation impacts arising from forestry operations (mainly fertilisation and high levels of felling activity) in catchments with forest cover of over 50% on peat soils. Observed impacts from forest stands on mineral soils were significantly less than those on peats. Some 1% of forest stands are located in such settings.
 - Research has shown that these problems were generally associated with forest stands planted before 1990, the year in which the Forest Service Guidelines controlling forestry began to be introduced. This is significant as these older forest stands may have drainage networks directly connected to the river networks and were generally planted right down to the stream edge. Research has highlighted the complex nature of the interaction between forest, forestry activities and water. A number of forestry research projects are currently ongoing², investigating practical mitigation measures to address the pressures that water bodies may experience from forests and forestry operations. The Environmental Protection Agency is also considering additional future research needs to investigate the effectiveness of pollution control measures to address problems of acidification, siltation and nutrient enrichment from fertilisation.
- To date forestry in Ireland has been controlled under the Forestry Act 1946 and through a grant support system administered by the Forest Service of the Department of Agriculture, Fisheries and Food through its guidance documents and codes of practice. To strengthen sustainable forestry management, a new Forestry Bill, replacing the 1946 Forestry Act, has been drafted. A number of provisions are of particular importance to water protection, namely;
- All forestry operations, whether licensed, approved or exempt must be carried out in accordance with any guidelines and regulations issued by the Minister for Agriculture,

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EPA-COFORD funded project HYDROFOR (due for completion in 2013) is investigating the impacts of forests and forestry operations on Ireland's aquatic ecology.

EPA-funded EFFECT project (due for completion in 2011) is assessing the impacts of POMs on stream water quality, focusing on areas of coniferous forest, looking in particular at how do management measures affect stream biology;

COFORD-funded SANIFAC project (due for completion in 2010) which is looking into the effects of clearfelling on the hydrology, chemistry and biology of the receiving waters will be monitored pre and post clearfelling;

COFORD-funded FORFLUX project (due for completion in 2010) looking into understanding the long-term implications of the interaction of the forest with the atmosphere, the soil and surface waters.

Fisheries and Food. Non-adherence to relevant guidelines, code of practice, standards, conditions or regulations issued by the Minister will be an offence.

- It is intended to introduce more flexibility and clarity to the issue of the compulsory replanting after felling. It is proposed to allow for change of land use from forestry to other sustainable uses. It is proposed to give the Minister the power to waive the replanting obligation in certain limited circumstances (for example “public good” infrastructure projects, woodland development, including eco-clusters, limited housing and recreation, areas that are environmentally sensitive to commercial forestry etc.).
- In addition, Aerial Fertilisation Regulations (2006-2007) were introduced to control nutrient pollution from the aerial application of fertilisers to forests. To undertake aerial fertilisation of a forest an Aerial Fertilisation Licence must first be obtained from Department of Agriculture Fisheries and Food. The Regulations lay down a number of conditions, which must be met before the Minister may grant a licence. They also specify certain exclusion zones.
- In March 2008 the Minister for Agriculture, Fisheries and Food and the Minister for the Environment, Heritage and Local Government published guidelines for the protection of Natura 2000 sites designated for the protection Freshwater Pearl Mussel populations from forestry activities. The guidelines are intended to ensure that forest operations such as afforestation, forest road construction, harvesting and forest planning are compatible with the protection of this particularly sensitive species. The guidelines describe a range of measures intended to reduce any potential negative impacts on the species arising from forest operations. They complement all other Forest Service Guidelines, the Code of Best Forest Practice and other regulations. The implementation of the guidelines is mandatory.
- To address the problem of acidification of waters in acid sensitive catchments from afforestation a protocol was agreed between the Department of Environment, Heritage and Local Government, the Forest Service, the Environmental Protection Agency and COFORD in 2001 for dealing with grant-aid applications in acid sensitive areas. All applications received by the Forest Service for grant-aid for afforestation in areas identified as being acid-sensitive are checked for acid buffering capacity as determined by alkalinity levels in run-off water. Soils with moderate acid buffering capacity are referred to the Environmental Protection Agency for recommendation with regard to grant-aid. Depending on the alkalinity levels:
 - Afforestation may be grant aided in areas where the minimum alkalinity of the run-off water is greater than $15\text{mg CaCO}_3\text{l}^{-1}$ (calcium carbonate).
 - Where the minimum alkalinity of the run-off water is in the range $8\text{-}15\text{mg CaCO}_3\text{l}^{-1}$, full, partial or no afforestation may be allowed following discussion and agreement between the Environmental Protection Agency and the Forest Service.
 - Afforestation is not grant aided in areas where the minimum alkalinity of the run-off water is less than $8\text{mg CaCO}_3\text{l}^{-1}$.

5.3 Other measures being considered

A range of other potential measures which are being considered but which require further development are outlined below. Agreed measures in relation to these issues can be introduced through update of Water Management Unit Action Plans during the implementation process:

- Protection of high quality waters: Additional measures may be required in order to protect and restore these sensitive areas and in particular to reduce the impacts of development, forestry and farming.

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- Mines and Contaminated Sites: Additional measures may be required in order to address issues caused by mines and contaminated sites. Further research may be required in order to address knowledge gaps.
 - Physical impact of channelisation on river status: Further monitoring is required in order to identify where ecological status has been impacted by arterial drainage. Remediation measures may be required.
 - Control of Abstractions, Impoundments and Physical modifications: New regulations may be introduced to create a registration and authorisation system for abstractions and impoundments.
 - Estuarine and Coastal (Marine) Monitoring: Increased monitoring is required for these waters. The marine monitoring programme has not been fully implemented in this planning cycle and due to insufficient monitoring it has not been possible to assign status to a large proportion of coastal and transitional waters.
 - Integration of Water Quality and Planning: There may be need to strengthen the statutory basis for integration of water quality objectives with the planning system.
 - Further research: While significant research has already been carried out to support development of these plans, a further programme of research may be warranted to improve our knowledge of the water environment and how best to achieve water quality objectives.

5.4 Water Management Unit action plans

Information on status, objectives and measures in the Shannon IRBD has been compiled for smaller, more manageable geographical areas than river basin districts, termed water management unit action plans. There are seventeen water management units (WMUs) in the Shannon IRBD (Map 5.1). These units represent smaller river and lake basins where management of the pressures, investigations and measures will be focussed and refined during implementation of this plan. In addition, action plans focusing on groundwater and a transitional and coastal water management have been prepared for the Shannon IRBD. The full set of detailed water management unit action plans which are available in *action plan background documents* that accompany this final plan (and are also available on line at www.wfdireland.ie).

WMU action plans are a key background document to the plan. They:

- map the local geographical area showing key point sources of pollutants;
- describe, map and tabulate water status;
- estimate phosphorus loadings from various sources³;
- summarise the risks in relation to key water management issues;
- identify the key measures to address these issues (drawn from the programme of measures)
- tabulate objectives, identifying protected area locations and cases where alternative objectives were chosen.

The WMU action plans are the basis for detailed implementation programmes, which will guide and monitor the progress of implementation between 2009 and 2015. The principal measures identified in WMU action plans to address the key issues in the Shannon IRBD include:

- wastewater treatment plant discharge licensing and prioritised upgrade and operational improvement of some plants;
- licence review and enforcement regarding industrial activities and trade discharges;

³ Phosphorus loadings were estimated using methods from the OSPAR Guidelines for Harmonised Quantification and Reporting Procedures for Nutrients. It must be noted that these represent nutrient source estimates and do not imply water quality impact.

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- farm inspections and enforcement under the Good Agricultural Practice Regulations;
 - monitoring, inspection and enforcement of standards relating to the operation of unsewered property wastewater treatment systems;
 - compliance with codes of practice and Forest Service Protocol in the forestry sector;
 - implementing Freshwater Pearl Mussel sub-basin plans (available at www.wfdireland.ie) for the following two areas: Cloon and Owenmore;
 - implementing Shellfish Waters Pollution Reduction Programmes (available at www.wfdireland.ie) for the following six sites: West Shannon Poulmasherry, West Shannon Carrigaholt, West Shannon Rinevella, West Shannon Ballylongford, Tralee Bay, and Inner Bay Maharees;
 - appropriate regulation of future activities such as abstraction schemes or physical modification schemes;
 - coordination of public authority actions and education and awareness activities where appropriate to engage stakeholders and implement actions in a collaborative and proactive manner;
 - an environmental research programme and investigations to include: verification of impacts on some waters and the identification and piloting of a number of new management measures.

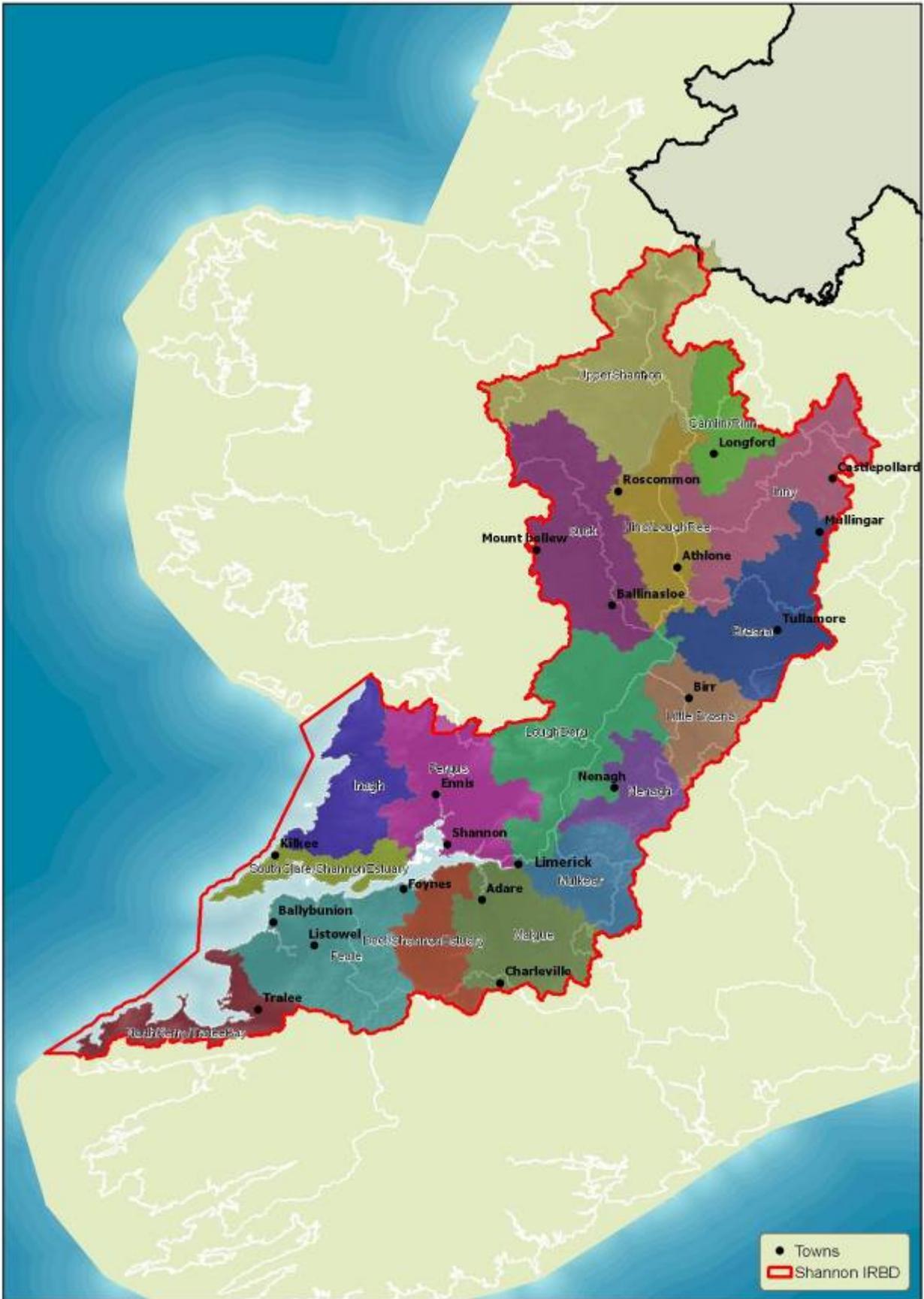
Economic assessment may be required in certain instances when selecting between alternative measures and when determining whether any particular measure should be applied. Guidance on economic assessment and a baseline report on the economic analysis of water use in Ireland are available as *economic background documents* on www.wfdireland.ie. The Environmental Protection Agency have begun some additional work with regard to quantifying the benefits of the water environment. The costs of wastewater discharge and on-site systems measures in the Shannon IRBD have been estimated. Economic analysis has not been used to justify deferral of measures or extension of objectives in the district.

5.5 Summary programme of measures for the Shannon IRBD

Table 5.1 provides a summary of the key measures to be implemented in the Water Management Units in the Shannon IRBD.

Table 5.1 Summary programme of measures for the Shannon IRBD

	Water Management Units																
	Brosna	Camlin-Rinn	Deel-Shannon Estuary	Feale	Fergus	Inny	Little Brosna	Lough Derg	Lough Ree – River Hind	Maigue	Mulkear	Nenagh	North Kerry – Tralee Bay	South Clare – Shannon Estuary	Suck	Upper Shannon	West Coast Clare
Control of urban waste water discharges																	
Treatment plants requiring capital works	6	4	3	7	5	4	0	3	2	6	4	4	1	0	4	7	2
Treatment plants requiring further investigation	7	2	3	8	2	2	0	2	3	3	2	1	4	2	3	2	2
Treatment plants requiring attention to meet Shellfish water PRPs	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Treatment plants requiring improvements in operational performance	7	0	3	0	4	3	0	1	1	10	4	0	0	0	2	2	3
Urban agglomerations requiring investigation of CSOs	3	1	0	1	1	5	0	6	1	3	4	4	1	0	1	3	0
Agglomerations that require management of development	4	3	1	3	2	5	0	9	0	1	2	1	0	0	1	2	0
Properties that will be subject to performance, operational and maintenance standards for on-site waste water treatment systems	Total: 15092 At risk: 144	Total: 7729 At risk: 3457	Total: 6318 At risk: 89	Total: 12860 At risk: 0	Total: 11682 At risk: 38	Total: 14349 At risk: 1303	Total: 613 At risk: 0	Total: 14643 At risk: 738	Total: 8305 At risk: 100	Total: 15300 At risk: 0	Total: 7973 At risk: 0	Total: 4521 At risk: 10	Total: 8898 At risk: 790	Total: 3417 At risk: 0	Total: 12955 At risk: 1051	Total: 14587 At risk: 2101	Total: 8428 At risk: 0
Sub-basin plans for Natura 2000 sites designated for the protection of Freshwater pearl mussel populations	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
Pollution Reduction Programmes for designated shellfish waters	0	0	0	1	0	0	0	0	0	0	0	0	2	3	0	0	0
IPPC licences with discharges to waters that require review	11	3	3	7	12	9	6	7	4	4	1	4	0	3	6	3	0
Licences for discharges to waters under the Water Pollution Acts that require review	16	4	4	4	25	16	6	25	18	3	6	7	3	12	6	24	24
Planned agricultural inspections under the Good agricultural practice Regulations	It is not possible at this stage to provide a breakdown of inspections to be carried out in each of the WMUs for the Shannon IRBD. It has been agreed that farms will be inspected by inspectors from the Department of Agriculture, Fisheries and Food for the purposes of checking compliance with the European Communities (Good Agricultural Practice for the Protection of Waters) Regulation 2009 (SI 101 of 2009). In addition, local authorities will continue to retain responsibility for undertaking pollution investigations based on local priorities in accordance with their duties under a range of environmental legislation and in line their respective environmental inspection plans prepared in accordance with the European Union's Recommendation on Minimum Criteria for Environmental Inspections (RMCEI).																



Map 5.1 Water Management Units in the Shannon IRBD

6 Integrating plans and programmes

6.1 Introduction

In order to effectively protect our water it is important that the River Basin Management Plans are integrated with other plans such as:

- land use and spatial plans;
- conservation plans: habitat and species protection plans (including freshwater pearl mussel subbasin plans);
- water services strategic plans;
- pollution reduction plans and programmes (including surface water pollution reduction plans, groundwater controls, groundwater protection schemes, the National Action Programme, discharge authorisation programmes under the Water Pollution Acts and Environmental Protection Agency Act, shellfish water and bathing water plans);
- waste management plans;
- sludge management plans;
- major accident emergency plans;
- forest management plans;
- flood risk management plans.

6.1.1 Land use planning

Any potential impacts from future development on waters can be mitigated by properly incorporating the objectives established in this plan into development plans to ensure sustainable development. At strategic level Ireland's National Spatial Strategy and elements of the National Development Plan are the key mechanisms to ensure a balance between social, economic and development needs. At regional and local levels, the potential risks to water objectives from future developments will be subject to Strategic Environmental Assessment when preparing statutory planning guidelines and development plans, such as:

- regional planning guidelines;
- county and city development plans and local area plans;
- planning schemes for strategic development zones.

In addition, planning authorities must consider potential risks to waters during the detailed development proposal stages using the Environmental Impact Assessment procedure.

Regional planning guidelines require that development plans incorporate water objectives established in river basin management plans. The Planning and Development Bill 2010 aims to strengthen the legal basis of planning guidelines by requiring development plans to set out a core strategy that demonstrates that the development objectives in the development plan are consistent, as far as practicable, with national and regional development objectives set out in the National Spatial Strategy and regional planning guidelines. A planning authority is required to ensure, when making a development plan, that the plan is consistent with any regional planning guidelines in force for its area.

River basin management plans will be revised in 2015 and 2021. All regional planning guidelines are currently under review and will be reviewed every six years thereafter. All development plans and local plans are required to take account of these regional guidelines and must be reviewed every six years. Guidance on integrating development planning and river basin planning will be issued by the Department of the Environment, Heritage and Local Government in due course.

6.1.2 Flood risk management plans

The Report of Ireland's Flood Policy Review Group 2004 set out a new policy on the management of flood risks which is consistent with the new Floods Directive (2007/60/EC). This includes the preparation of catchment-based Flood Risk Management Plans that will set out the long-term strategy and a prioritised set of measures for managing flood risks, both structural and non-structural. Regulations transposing the Floods Directive are expected soon. Implementation of the *Water Framework Directive* and the *Floods Directive* is to be coordinated. The principal requirements of the *Floods Directive* are:

- undertaking a preliminary flood risk assessment (by 2011);
- preparing flood hazard and risk maps (by 2013);
- preparing flood risk management plans (by 2015);
- coordination with the Water Framework Directive;
- cooperation between member states in relation to transboundary river basins;
- public participation, consultation and dissemination of information and results.

6.1.3 Planning for climate change

River basin management provides an effective mechanism to prepare for and adapt to climate change by incorporating adaptation into the programme of measures. However, due to the high level of uncertainty in present climate predictions, a flexible approach is required. This river basin plan is adaptable to climate change in that the actions are 'no regrets'; that is, they are worthwhile whatever the extent of future climate change. The Water Framework Directive monitoring programme will collect information that improves understanding of climate change. In accordance with EU guidance, information is provided in this section of the plan on climate trends and impacts, paving the way for further action in later river basin management cycles. *Climate change background documents*, referred to in this section, are available at www.wfdireland.ie.

Projected climate impacts have been summarised in a number of recent publications including "A Summary of the State of Knowledge on Climate Change Impacts for Ireland" (EPA), and "Climate Change: Meeting the Challenge of Adaptation", (Irish Academy of Engineering). These provide expert reviews of impacts and recommendations that are relevant to the management of the river basin district. They predict a wide range of significant changes, notably temperature rise, increased precipitation, sea level rise, increased storm surge, wetter winters and drier summers; other changes are expected in ground and surface water runoff and surface fresh water temperatures. This will lead to enhanced evapotranspiration from soils and evaporation from waters.

Many of these changes will impact on aquatic ecosystems and on water management. They could potentially change the movement of diffuse pollutants, and the seasonal response to temperature, for example, more extreme rainfall events will accelerate the movement of diffuse pollutant plumes through soils and aquifers into water bodies, with less time for natural biological treatment within the soil, or seasonal timing of agricultural spreading may need to be modified as rainfall and temperatures change. A northward shift in the spatial distribution of species has been observed across Europe. Continued increases in occurrence of invasive species may affect indigenous vulnerable species in the river basin district, thereby altering natural biodiversity and requiring special protection measures.

With due regard to the uncertainties of climate prediction modelling, actions in this plan have been "climate checked", that is their resilience to predicted trends has been considered. The report 'Adapting the Plan to Climate Change', available at www.wfdireland.ie concludes that climate issues may be relatively significant for measures and actions related to:

-
- biodiversity and protected areas;
 - abstractions;
 - river and marine morphology.

Measures contained within this plan, and the monitoring programme, will need to take account of changes to temperature, to ground and surface water flows, and to sediment movement, and to allow for their link with changes to habitats and species, particularly habitat fragmentation and alien species.

In order to ensure sustainable water use, abstraction controls will need to take account of future changes in rainfall patterns and consequent impacts on availability of water resources. Water conservation programmes and increased storage capacity will improve climate resilience. Buffer zones around water bodies are a win-win measure, ensuring that habitats are better able to cope and migrate with changing climatic conditions, while improving soil and subsoil water retention.

The climate check also highlighted more general climate considerations. For example, design standards for critical infrastructure (such as combined sewer overflows) may need to be adapted to cope with more frequent storm flow surges.

In summary, the programme of measures will need to be resilient to climate change impacts. This is especially important for expensive and long-term investments such as large infrastructure projects. Planning for protected areas, droughts, water scarcity and flood prevention will also become increasingly crucial. During the period of this plan, preparations will be made for more detailed climate-proofing of actions in the next plan.

6.1.4 Strategic Environmental Assessment and Appropriate Assessment for Natura 2000 Sites

To ensure that the plan does not have adverse consequences for the wider environment (beyond its focus on waters), an Environmental Report was prepared as part of the Strategic Environmental Assessment (SEA) of the river basin management plan and programme of measures for the Shannon IRBD in accordance with national and EU legislation. Similarly an Appropriate Assessment (AA) for Natura 2000 Sites was prepared to ascertain any impacts to Protected Areas. Statutory consultation about these assessments was undertaken with the relevant bodies in both Ireland and Northern Ireland (Northern Ireland Environment Agency, Environmental Protection Agency, Department of the Environment, Heritage and Local Government and Department of Communications, Energy and Natural Resources). Views on the Environmental Report, the Habitats Directive Assessment Report and the draft plan were also sought during a consultation period from December 2008 to June 2009. The comments made in the submissions received on the three documents were used to refine and amend the contents of the final plan; their influence is discussed in detail in the SEA Statement. All SEA and AA reports, including the SEA Statement are available with the *environmental assessment background documents* at www.wfdireland.ie.

The SEA considered three alternative scenarios:

- Business as Usual: implementation of the Basic Measures;
- Business as Usual Plus: as above but with added Other Basic Measures;
- Individual Additional or Supplementary Measures.

The alternatives were tested against defined SEA Environmental Objectives, and cover each of a series of SEA environmental topic issues from the legislation. The objectives took account of the current state of the environment, feedback received and relevant national and EU plans, programmes and legislation.

Topic issue	Objective
Biodiversity, flora & fauna	Prevent damage to terrestrial, aquatic and soil biodiversity, particularly EU designated sites and protected species.
Population	Contribute to sustainable development.
Human health	Protect and reduce risk to human health in undertaking water management activities.
Soil	Avoid damage to the function and quality of the soil resource in the district.
Water	Prevent deterioration of the status of waters with regard to quality, quantity and improve status for rivers, lakes, transitional and coastal waters and groundwaters to at least good status, as appropriate to the Water Framework Directive.
Air quality	Minimise emissions to air as a result of plan activities.
Climatic factors	Minimise contribution to climate change by emission of greenhouse gasses associated with plan implementation.
Material assets 1	Maintain level of protection provided by existing morphological infrastructure, eg flood defences, coastal barriers, groynes.
Material assets 2	Provide new and upgrade existing water management infrastructure to protect human health and ecological status of water bodies.
Material assets 3	Support economic activities within the district without conflicting with the objectives of the Water Framework Directive.
Material assets 4	Protect water as an economic resource.
Cultural heritage	Avoid damage to cultural heritage resources in the district.
Landscape	Avoid damage to designated landscapes in the district.

The SEA Statement documents how the recommendations of both the Environmental and Appropriate Assessment Reports, as well as the views of the statutory consultees and other submissions received during consultation, have influenced the preparation of the final Shannon IRBD plan and programme of measures. It also provides information on the arrangements put in place to monitor and mitigate any significant environmental effects of implementing the plan.

The SEA has allowed integration of sustainability objectives in the decision-making process. The SEA has included valuable mitigation which recognises the multiple stakeholders in the district and has a focussed agenda to help achieve a balance between land uses that are not always compatible.

An extensive list of mitigation measures was included as part of the Shannon IRBD plan. There is a *summary of SEA mitigation measures* on www.wfdireland.ie. A total of 84 mitigation measures have been recommended, including a number of measures identified during the Appropriate Assessment for Natura 2000 Sites. These are broadly categorised as:

- requirement for Environmental Assessment at the project level where measures were anticipated to impact on EU Designated sites and on built heritage in particular;
- recommendations for changes to land-use planning;
- recommendation for education and awareness campaigns to inform stakeholders of how they are impacting on our waters and what they can do to mitigate their impacts;
- guidance to assist sector specific changes;
- requirement to take account of cumulative impacts in nutrient planning and loading;
- measures to contribute to climate change abatement including use of renewable energy;
- recognition that pollution pathways other than water should be considered; and
- further studies to inform information gaps and assist in monitoring.

Linked with the SEA Environmental Objectives are targets and Indicators, which will be used to monitor the impact of the plan on the wider environment. The *targets and indicators document* is on www.wfdireland.ie.

Appendix 1 Background documents

Background documents published both nationally and by the Shannon IRBD to facilitate understanding of the Water Framework Directive, can be found at www.wfdireland.ie.

Contacts

- Shannon International River Basin District competent authorities
- Shannon International River Basin District Advisory Council Membership
- Shannon International River Basin District Management Group Membership

[Click here](#)

Characterisation Report

Submission in accordance with Article 5 of Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, and in accordance with EC-DG Environment D.2 document "Reporting Sheets for 2005 Reporting" dated 19 November 2004. [Click here](#)

The Characterisation and Analysis of Ireland's River Basin Districts National Summary Report [Click here](#)

Shannon International River Basin District National Summary Report [Click here](#)

Shannon International River Basin District Article 5 Characterisation Technical Summary Report [Click here](#)

Compendium of public submissions and responses [Click here](#)

Characterisation Report background documents [Click here](#)

- Approach to Delineation of Groundwater Bodies
- Technical Requirements for Groundwater and Related Aspects
- The Calcareous/ Non-Calcareous ("Siliceous") Classification of Bedrock Aquifers in the Republic of Ireland
- Reference Conditions for Irish Rivers – Description of River Types and Communities
- Summary Note of Irish Lake Typology to be applied in Ireland's River Basin Districts
- Heavily Modified & Artificial Water Bodies Preliminary Identification Methodology
- Guidance on Thresholds and Methodology to be Applied in Ireland's River Basin Districts
- Economic Analysis of Water Use in Ireland Final Report
- Guidance on the Assessment of the Impact of Groundwater Abstractions
- Methodology for Risk Characterisation of Ireland's Groundwater
- Advice on the Implementation of Guidance on Monitoring Groundwater
- Point Source Pressure Risk Assessment for Groundwaters
- Guidance on the Assessment of Pressures and Impacts on Groundwater Dependent Terrestrial Ecosystems
- Verifying the Predictive Risk Assessment Methodology for Mobile Diffuse Inorganic Pollutants
- Guidance on the Application of Groundwater Risk Assessment to Areas Designated for the Protection of Habitats and Species
- Guidance on Pressures and Impacts Methodology
- Guidance for Practitioners on the Methodology to be Applied In Ireland's River Basin Districts – Alien Species Risk Assessment Methodology

- Linking catchment characteristics and water chemistry to the ecological status of Irish rivers
- Guidance on Thresholds and Methodology to be Applied in Ireland's River Basin Districts:
 - Bathing Waters Impact Data Risk Assessment Methodology
 - Fishing & Aquaculture Risk Assessment Methodology
 - Surface Water Hydrology Risk Assessment Methodology
 - Surface Water Lakes Risk Assessment Methodology
 - Fresh Water Pearl Mussel (Margaritifera) Risk Assessment Methodology
 - Marine Direct Impact Risk Assessment Methodology
 - Surface Water Morphological Risk Assessment Methodology
 - Surface Water Point Source Discharges Risk Assessment Methodology
 - Rivers Diffuse Pollution Risk Assessment Methodology

Monitoring Programme

Water Framework Directive Monitoring Programme. Prepared to meet the requirements of the EU Water Framework Directive (2000/60/EC) and National Regulations implementing the Water Framework Directive (S.I. No. 722 of 2003) and National Regulations implementing the Nitrates Directive (S.I. No. 788 of 2005) [Click here](#)

Significant Water Management Issues Report

Water Matters "*Have your say*" Shannon International River Basin District Summary Leaflet [Click here](#)

Water Matters "*Have your say*" Shannon International River Basin District Booklet [Click here](#)

Digest of submissions and responses to Significant Water Management Issues Reports, Shannon International River Basin District [Click here](#)

Significant Water Management Issues background documents [Click here](#)

- Dangerous Substances Usage 'Bottom-up study' – Background Report
- Freshwater Morphology POMS Study - Progress Update in support of SWMI Report
- Abstraction Pressure Assessment - Background document to the Water matters Report
- Groundwater risk from Urban Pressures - Background document to the Water matters Report
- Urban Pressures – Background document to the Water matters Report
- Groundwater risk from Diffuse Mobile Organics (Pesticides) - Background document to the Water matters Report
- Forest and Water - Support Document to Water Matters Report
- Onsite Waste Water Treatment Systems – Background document to the Water matters Reports
- Municipal & Industrial Regulation (discharges) - Progress Update in support of the SWMI Report
- Marine Morphology Progress Update in support of the SWMI Report
- Heavily Modified Water Bodies & Artificial Water Bodies - Progress Update in support of the SWMI Report.

Draft River Basin Management Plan

Water Matters “ <i>Help Us Plan!</i> ” Summary Leaflet Click here
Water Matters “ <i>Help Us Plan!</i> ” Draft River Basin Management Plan for the Shannon International River Basin District Click here (Ireland portion)
Register of Protected Areas and High Status Sites
Register of Protected Areas document and lists Click here
Water Framework Directive Annex IV Protected Areas: Water Dependant Habitats and Species and High Status Sites Click here
Programmes of Measures – technical studies
National Summary Programme of Measures Report Click here
Water Framework Directive Risk Assessment Update Click here
Municipal and Industrial Regulation
<p>Recommendations For Programmes of Measures for Point Source Discharges to Surface Waters Resulting from Municipal and Industrial Regulated Activities</p> <p>Programme Of Measures Discharges From Urban Waste Water Treatment Plants Background Document</p> <p>Click here</p>
Forest and Water
<ul style="list-style-type: none"> • Forests and Surface Water Eutrophication and Sedimentation For Water Final Draft Report • Forests and Surface water Eutrophication – Sedimentation Literature Review • Programme of Measures and Standards For Forest and Water • Forestry and Surface Water Acidification (For Water) • Forests and Surface water Acidification Literature Review • Priority action, relevant pollutant and general component candidate substances for surface waters in Ireland <p>Click here</p>
On-site Wastewater Treatment Systems
<ul style="list-style-type: none"> • Unsewered Wastewater Treatment Systems National Study Final Report • National Identification and Mapping of Sewered and Unsewered Areas • An assessment into the potential impact of on-site wastewater treatment systems on surface water quality. Summary Report. <p>Click here</p>
Dangerous Substances

- Dangerous Substances Usage Programme of Measures Study Literature Review and Final Report
- Summary Document – Dangerous Substances Screening Summary Report and appendices
- Veterinary treatments and other substances used in finfish aquaculture in Ireland.

[Click here](#)

Freshwater Morphology

- A Freshwater Morphology Programme of Measures and Standards Study *Aerial Survey, Feature extraction, typology generation and development of a GIS tool to assist in Irish river and lake morphological assessment*
- Freshwater Morphological Assessment in Rivers Risk Assessment Refinement, Classification and Management Outcome Report
- Assessment of the Risk of Barriers to Fish Migration in the Nore
- Catchment
- Review of Best Practice Measures
- Channelisation Recovery Assessment
- Cost Effectiveness and Feasibility of River Enhancement Schemes
- Comparative Studies of Morphological Fieldwork Techniques Outcome Report
- Analysis of Irish Recovery Datasets
- Legislation Review
- Literature Review
- Recommendations for Programmes of Measures
- Final Report

[Click here](#)

Marine Morphology

Marine Morphology National Methodology Report [Click here](#)

Abstractions

- Assessment Methodology for Surface Water Abstractions from Lakes
- Groundwater Abstractions Pressure Assessment
- A review of the environmental flow methods focusing on their use with various biotic groups to assess the effects of abstraction pressures in Ireland
- The Assessment of Abstraction Pressures in Rivers in Ireland
- Revised River Risk Assessment for Abstractions Pressures

[Click here](#)

Urban Pressures

- The Assessment of Urban Pressures in River and Transitional Water Bodies in Ireland
- Urban Groundwater Pressures Assessment

[Click here](#)

Surface Water Groundwater Interactions

Further Characterisation Study. An integrated approach to quantifying groundwater and surface water contributions to streamflow [Click here](#)

Diffuse Mobile Organics

Risk to Groundwater from Diffuse Mobile Organics [Click here](#)

Status

- Report on the Interim Classification of Ecological Potential and Identification of Measures for Ireland's Artificial Water Bodies (AWBs)
- Report on the Interim Classification of Ecological Potential
- And identification of measures for Ireland's Heavily Modified Water Bodies (HMWBs)
- Interim Classification of Irish Coastal and Transitional Waters for the purposes of the EU Water Framework Directive. November 2008.
- Interim Lake Status Report
- Interim Classification of Rivers for the purposes of the EU Water Framework Directive.
- Interim Classification of Groundwater for the purposes of the EU Water Framework Directive

[Click here](#)

Economic

- Review of Water Resource Benefit Values
- Economic Analysis of Water Use in Ireland Final Rep

[Click here](#)

WMU Action Plans

- Brosna Water Management Unit Action Plan
- Camlin – Rinn Water Management Unit Action Plan
- Deel – Shannon Estuary Water Management Unit Action Plan
- Feale Water Management Unit Action Plan
- Fergus Water Management Unit Action Plan
- Inny Water Management Unit Action Plan
- Little Brosna Water Management Unit Action Plan
- Lough Derg Water Management Unit Action Plan
- Lough Ree – Hind Water Management Unit Action Plan
- Maigue Water Management Unit Action Plan
- Mulkear Water Management Unit Action Plan
- Nenagh Water Management Unit Action Plan
- North Kerry – Tralee Bay Water Management Unit Action Plan
- South Clare – Shannon Estuary Water Management Unit Action Plan
- Suck Water Management Unit Action Plan
- Upper Shannon Water Management Unit Action Plan
- West Coast Clare Water Management Unit Action Plan

[Click here](#)

Ospar Guidance

OSPAR Guidelines for Harmonised Quantification and Reporting Procedures for Nutrients (HARP-NUT) [Click here](#)

Climate Change

A Summary of the State of Knowledge on Climate Change Impacts for Ireland. Climate Change Research Programme (CCRP) 2007-2013 Report Series No. 1 [Click here](#)

2009 SNIFFER Workshop Report, June 2009, [Click here](#)

Ireland at Risk, Critical Infrastructure, Adaptation for Climate Change”, The Irish Academy for Engineers, 2009 (Carroll, E., Sparks T., Donnelly, A. and Cooney, T. 2009

Biology and Environment Proceedings of the Royal Irish Academy 109B, 115–126) [Click here](#)

Adapting the Plans to Climate Change Final Report [Click here](#)

Environmental Assessment

Scoping Document

Strategic Environmental Assessment for the Water Framework Directive River Basin Management Plans and Programmes of Measures - Shannon International River Basin District [Click here](#)

Environmental Report

Strategic Environmental Assessment for the Water Framework Directive River Basin Management Plans and Programmes of Measures - Shannon International River Basin District [Click here](#)

Habitats Directive Article 6 Assessment

Water Framework Directive River Basin Management Plans and Programmes of Measures - Shannon International River Basin District [Click here](#)

Artificial and heavily modified water bodies

Programmes of Measures and Standards Overall Summary Report – Heavily Modified Water Bodies and Artificial Water Bodies [Click here](#)

Objectives

Objectives Setting Background Document [Click here](#)

Lag Time: A Methodology For The Estimation Of Vertical, Horizontal Travel & Flushing Timescales To Nitrate Threshold Concentrations In Irish Aquifers *Fenton et al in press*

A review of nitrate lag times in Europe and their implications for the Water Framework Directive *Fenton et al in press*

Modelling phosphorus decline: expectations of the Water Framework Directive in Ireland *Schulte et al in press*

Links to Plans and Programmes
Register of Plans and Programmes Click here
Guidance
River Basin Management Planning – A Practical Guide for Public Authorities Click here
Public participation
Consultation Paper on Public Participation in River Basin Management Click here
Public Consultation Events flyers and newspaper notices Click here
Timetable and Work Programme for making a River Basin Management Plan for the Shannon International River Basin District Click here
Managing Our Shared Waters - A Joint North/South Consultation Paper on International River Basin Districts and Administrative Arrangements for Implementation of the EC Water Framework Directive (2000/60/EC) Click here
Shannon International River Basin Districts Draft River Basin Management Plan Submissions Digest Report Click here
Compliance statement
Shannon IRBD Compliance Report Click here
More Detailed Plans and Programmes
Freshwater Pearl Mussel Sub-basin Management Plans
<ul style="list-style-type: none"> • Freshwater Pearl Mussel – Cloon Sub-Basin Management Plan • Freshwater Pearl Mussel – Owenmore Sub-Basin Management Plan Click here
Monitoring Methods Report Freshwater Pearl Mussel Sub-basin Plans Click here
Shellfish Pollution Reduction Programmes
<ul style="list-style-type: none"> • West Shannon Poulnasherry Shellfish Pollution Reduction Programme • West Shannon Poulnasherry Shellfish Characterisation Report • West Shannon Carrigaholt Pollution Reduction Programme • West Shannon Carrigaholt Characterisation Report • West Shannon Rinevella Shellfish Pollution Reduction Programme • West Shannon Rinevella Bay Characterisation Report • West Shannon Ballylongford Shellfish Pollution Reduction Programme • West Shannon Ballylongford Characterisation Report • Tralee Bay Shellfish Pollution Reduction Programme

-
- Tralee Bay Shellfish Characterisation Report
 - Inner Bay Maharees Pollution Reduction Programme
 - Inner Bay Maharees Characterisation Report

[Click here](#)

Miscellaneous

DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2000 establishing a framework for Community action in the field of water policy. [Click here](#)

European Community (Water Policy) Regulations, 2003 (SI No. 722 of 2003) [Click here](#)

European Communities (Water Policy) (Amendment) Regulations 2005, (SI No. 413 of 2005) [Click here](#)

Appendix 2 Contact Details for Local Authorities

ShIRBD Co-ordinator

Project	Title	Telephone	General Email
ShIRBD Co-ordinator	Coordinator	061 496264	environ@limerickcoco.ie

Local Authorities

Local Authority	Title	Telephone	General Email
Cavan	Director of Services	049 4378486	environ@cavancoco.ie
	Senior Engineer	049 4378486	
Clare	Director of Services	065 6846331	enviroff@clarecoco.ie
	Senior Engineer	065 6846331	
Cork	Director of Services	021 4532700	environment@corkcoco.ie
	Senior Engineer	021 4532700	
Galway	Director of Services	091 476402	environment@galwaycoco.ie
	Senior Engineer	091 476402	
Kerry	Director of Services	066 7162000	environ@kerrycoco.ie
	Senior Executive Engineer	066 7162000	
Laois	Director of Services	057 8674375	environment@laoiscoco.ie
	Senior Engineer	057 8674375	
Leitrim	Director of Services	071 9620005	environment@leitrimcoco.ie
	Senior Engineer	071 9620005	
Limerick (County Council)	Director of Services	061 496264	environ@limerickcoco.ie
Limerick (City Council)	Senior Engineer	061 496264	
	Director of Services	061 407190	environ@limerickcity.ie
Longford	Senior Engineer	061 407190	
	Director of Services	043-3343367	environment@longfordcoco.ie
Mayo	Senior Engineer	043-3343367	
	Director of Services	094 902 44 44	environment@mayococo.ie
Meath	Senior Engineer	094 902 44 44	
	Director of Services	046 9097200	environment@meathcoco.ie
Offaly	Senior Engineer	046 9097200	
	Director of Services	057 9357403	environmentdept@offalycoco.ie
Roscommon	Senior Engineer	057 9357403	
	Director of Services	090 6637260	environment@roscommoncoco.ie
Sligo	Senior Engineer	090 6637260	
	Director of Services	071 9111900	enviro@sligococo.ie
Tipperary North	Senior Engineer	071 9111900	
	Director of Services	067 44786	environment@northtippcoco.ie
Tipperary South	Senior Engineer	067 44786	
	Director of Services	052 6134380	environment@southtippcoco.ie
Westmeath	Senior Engineer	052 6134380	
	Director of Services	044 933226	environment@westmeathcoco.ie
	Senior Engineer	044 933226	

Appendix 3 Protected Areas in the Shannon IRBD

Drinking Waters – Groundwater
Marble Arch
Slieveanierin
Lough Lene
Abbeyfeale
Abbeyfeale_1
Abbeyfeale_2
Abbeyfeale_3
Abbeyfeale_4
Abbeyfeale_5
Annaghmore
Ardfert
Ardnacrusha
Askeaton
Askeaton_3
Askeaton_1
Askeaton_2
Ennis
Athlone West
AthloneWest_2
Athloneurban_e
Athloneurban_w
Athlonewest_1
Aughrim
Aughrim_1
Inny_8
Ballinderry
Ballingarry
Ballingarry_1
Ballyallinan
Ballybunion_1
Ballybunion_2
Ballybunion
Ballygar
Ballylongford
Ballylongford_1
Ballylongford_2
Ballylongford_3
Ballylongford_4
Ballymanus
Ballyneety
Ballysteen
Ballysteen_1
Clara_6
Banagher

Drinking Waters – Groundwater
Birr
Borrisokane
Borrisokane_1
Brandon Head
Bredagh
Bruree
Burren
Carrick on Shannon_4
Castlerea Bellanagare_1
Carrick on Shannon
CarrickonShannon_1
CarrickonShannon_2
CarrickonShannon_3
Castleconnell
Castlerea
Castlerea Bellanagare
Charleville
Charleville_1
Charleville_2
Charleville_3
Charleville_4
Clara
Clara_1
Clara_2
Clara_3
Clara_4
Clara_5
Clonaslee West
Craggaunboy
Cratloe
Crusheen
Carrick on Shannon_5
Curlew Mountains
Curlew_1
Curraghroe
Curraghroe_1
Derravarragh
Derravarragh_1
Duckstown
Ennis_1
Ennis_2
Ennisurban
Fedamore
Fedamore_1

Drinking Waters – Groundwater
Fedamore_2
Fedamore_3
Feenagh
Ferbane
Ferbane_1
Funshinagh
Funshinagh_1
GL1
GL2
GL3
GL4
GL4_1
GL4_2
GL5
GL5_1
GL6
GL7
Geashill
Geashill_1
Geevagh
Glenade Dowra
Herbertstown
Hospital
Hospital_2
Hospital_3
Inny
Inny_1
Inny_2
Inny_3
Inny_4
Inny_5
Inny_6
Inny_7
Kerry Head
Kildimo
Kilglass Dromod
Kilkishen
Kilmeedy
Kilrush
Kilrush_1
Kilrush_2
Kilrush_3
Kilrush_4
Knockaderry

Drinking Waters – Groundwater
Knockroe East
Knockroe Northwest
Knockroe Southwest
KnockroeSouthwest_1
Knockseefin-Longstone East
Knockseefin-Longstone West
Lanesborough
Lanesborough_1
Lanesborough_2
Limerick City East
Limerick City North
Limerick City Northwest
Limerick City South West
LimerickCityNorth_1
Limerickurban_sw_1
Limerickurban_n
Limerickurban_se
Lismaline
Lissycasey
Longford Ballinalee
Longford_1
Longford_2
Longford_3
Longford_4
Longford_5
Longfordurban
Lough Ackrick
Lough Allen Uplands
Lough Graney
LoughAllenUplands_1
LoughAllenUplands_2
LoughAllenUplands_3
LoughAllenUplands_4
Inny_9
Inny_10
Inny_11
Inny_12
Derravarragh_2
Clonaslee West_1
Milltown Malbay
MilltownMalbay_1
MilltownMalbay_2
MilltownMalbay_3
Mohill
Mohill_1
Mount Mary

Drinking Waters – Groundwater
Mullingarurban_n
Mullingarurban_s
Fedamore_4
Carrick on Shannon_6
Nenagh
Nenagh_1
Nenagh_10
Nenagh_2
Nenagh_3
Nenagh_4
Nenagh_5
Nenagh_6
Nenagh_7
Nenagh_8
Nenagh_9
Nenaghurban
Newcastle West
Newcastlewest_1
Newtown Forbes
North Kilmallock
NorthKilmallock_1
Curlew Mountains_2
Pallas Grean
Patrickswell
Roscommonurban
Roscreaurban
Rough Point
Scramoge North
Scramoge South
Shanagolden
Shannon Pot
Shannonurban
Shinrone
Shinrone_1
Shinrone_2
Slieve Bawn Telton
Slieve Bloom North
Slieve Bloom South
Slieve Elva
Slieve Phelim
SlievePhelim_1
SlievePhelim_2
SlievePhelim_3
SlievePhelim_4
SlievePhelim_5
SlievePhelim_6

Drinking Waters – Groundwater
SlievePhelim_7
SlievePhelim_8
SouthSuck_1
Spa
Suck North
Suck South
Tralee
Tralee_1
Traleeurban
Tulla-Newmarket on Fergus
TullaNewmarket_1
TullaNewmarket_2
Tullamore
Tullamore_1
Tullamoreurban_n
Tullamoreurban_s
Tynagh
Tynagh_1
Tynagh_2
Tynagh_3
Limerickurban_sw

Drinking Water – River Water Body
PA1_28_93
Murroogh (River)
Skivileen (River)
Annageeragh (River)
Ballymacravan (River)
Ballycullinan (Stream)
Owenslieve (River)
PA1_27_1271
Owenagarney [Ratty] (River)
PA1_27_1289
PA1_26_636
Bilberry (River)
PA1_26_844
PA1_26_874
Owenacharra (River)
Rhine (River)
Owennayle (River)
Black (River)
Rath (River)
Riffey (River)
Inny (River)
Suck (River)
Shannon (River)

Drinking Water – River Water Body
PA1_26_1469
PA1_26_1509
Black (River)
PA1_26_2264
PA1_26_2341
PA1_26_2379
Clooncraff (River)
PA1_26_2580
PA1_26_2595
Fallan (River)
PA1_26_2862
Shannon (River)
PA1_26_3101
PA1_26_3153
Yellow (River)
Shannon (River)
PA1_26_3574
PA1_26_3580
PA1_26_3650
Black (River)
PA1_26_3878
Camlin (River)
PA1_26_3975
PA1_26_4098
Shannon (River)
Graney (River)
Tullamore (River)
Clodiagh (River)
Gorragh (River)
Shannon (River)
Shannon (River)
PA1_25_779
Camcor (River)
Gageborough (River)
Kilcrow (River)
Monaghanstown (River)
PA1_25_3709
Glashacloonaraveela (River)
Shannon (River)

Drinking Water – River Water Body
Maigue (River)
Deel (River)
Deel (River)
Maigue (River)
Feale (River)
PA1_23_264
Smearlagh (River)
Finglas (River)
Scorid (River)
PA1_23_720
Owencashla (River)
PA1_23_1251
PA1_23_2917
Feale (River)

Drinking Water Lake Water Body
Acummeen (Lough)
Allen (Lough)
Bleach Lough
Cavetown Lough
Clogher Lough
Derg (Lough)
Derg (Lough) pHMWB
Donogher (Lough)
Doo Lough
Fin Lough
Forbes (Lough)
Gara (Lough)
Gortglass Lough
Graney (Lough)
Grange Lough
Gur (Lough)
Keagh (Lough)
Kinale (Lough)
Lickeen Lough
Nafulla (Lough)
Nambrack (Lough)
Naminna (Lough)
Nawelean (Lough)

Drinking Water Lake Water Body
Ree (Lough)
Shad Lough
Treanamarly Lough
Urlaur Lough
Lough Inchiquin
Lough George
Lough Acrow
Rosroe Lake
Lislanaghan Lake
Ballycullinana Lake
Castle Lake

Shellfish Waters
West Shannon Poulasherry Bay
West Shannon Carrigaholt
West Shannon Rinevella
West Shannon Ballylongford
Tralee Bay
Inner Bay, Maharees

Bathing Waters
Ballyallia
Ballybunion North
Ballybunion South
Ballycuggeran, Lough Derg
Ballyheigue
Banna Strand
Bathing Place at Portumna, Lough Derg
Cappagh Pier, Kilrush
Castlegregory
Fanore
Fenit
Keeldra
Kilkee
Lahinch
Lilliput, Lough Ennell
Maharabeg
Mountshannon, Lough Derg
Portnashangan, Lough Owel
Spanish Point
White Strand, Doonbeg
White Strand, Miltown Malbay

UWWT nutrient sensitive areas	Location
Cashen/Feale Estuary	Downstream of Poulnahaha old Railway Bridge to Moneycashen
Feale Estuary Upper	Downstream of Finuge Bridge, to Poulnahaha old Railway Bridge
Lee Estuary Upper (Tralee)	From Ballymullin Bridge to seawards end of Tralee ship canal
Little Brosna River	Bunnow River - upstream of Roscrea sewage outfall to Cahaskin river confluence
Lough Derg	on the River Shannon
Lough Ennell	County Westmeath
Lough Ree	on the River Shannon
River Brosna	Downstream of Mullingar sewage outfall
River Brosna	from its outfall at Lough Ennell, County Westmeath, to its confluence with the River Shannon.
River Camilin	From sewage treatment works at Longford to River Shannon
River Fergus	from the sewage outfall at Clonroadmore, Ennis County Clare, to the freshwater limit of the Fergus Estuary.
River Hind	Downstream of Roscommon town sewage treatment works to Lough Ree
River Nenagh	Downstream of sewage treatment works to outfall in Nenagh to Lough Derg
River Shannon (Upper)	from its confluence with the Camlin River to Lough Ree and from its outflow at Lough Ree to Clonmacnoise.
Tullamore River	0.5km section downstream of sewage treatment works outfall

SITECODE	Special Area of Conservation
000332	Akeragh, Banna And Barrow Harbour
000566	All Saints Bog And Esker
001626	Annaghmore Lough (Roscommon)
002341	Ardagullion Bog
002356	Ardgraique Bog
002279	Askeaton Fen Complex
000588	Ballinturly Turlough
000014	Ballyallia Lake
000016	Ballycullinan Lake
002246	Ballycullinan, Old Domestic Building
000641	Ballyduff/Clonfinane Bog
002313	Ballymore Fen
002339	Ballynamona Bog And Corkip Lough
000019	Ballyogan Lough
002112	Ballyseedy Wood
000994	Ballyteige (Clare)
000432	Barrigone
000231	Barroughter Bog
000592	Bellanagare Bog
000020	Black Head-Poulsallagh Complex
002032	Boleybrack Mountain
002124	Bolingbrook Hill
002346	Brown Bog
000595	Callow Bog
002347	Camderry Bog
002336	Carn Park Bog
000597	Carrowbehy/Caher Bog
002250	Carrowmore Dunes
001021	Carrowmore Point To SPANish Point And Islands
001242	Carrownagappul Bog
001625	Castlesampson Esker
000571	Charleville Wood
000572	Clara Bog
000930	Clare Glen
000859	Clonaslee Eskers And Derry Bog
000600	Cloonchambers Bog
002348	Clooneen Bog
000248	Cloonmoylan Bog
000614	Cloonshanville Bog
000218	Coolcam Turlough
002349	Corbo Bog
002110	Corliskea/Trien/Cloonfelliv Bog
002317	Cregg House Stables, Crusheen
000255	Croaghill Turlough
002337	Crosswood Bog

SITECODE	Special Area of Conservation
000584	Cuilcagh - Anierin Uplands
000174	Curraghchase Woods
002350	Curraghlehanagh Bog
000030	Danes Hole, Poulnalecka
000604	Derrinea Bog
000261	Derrycrag Wood Nature Reserve
000032	Dromore Woods And Loughs
002338	Drumalough Bog
001926	East Burren Complex
000607	Errit Lough
000575	Ferbane Bog
000576	Fin Lough (Offaly)
000448	Fortwilliam Turlough
001637	Four Roads Turlough
000679	Garriskil Bog
001430	Glen Bog
001912	Glendree Bog
002213	Glenloughaun Esker
001013	Glenomra Wood
001432	Glenstal Wood
000036	Inagh River Estuary
002236	Island Fen
001197	Keeper Hill
002263	Kerry Head Shoal
000647	Kilcarren-Firville Bog
002264	Kilkee Reefs
002319	Kilkishen House
002214	Killeglan Grassland
000285	Kilsallagh Bog
002318	Knockanira House
002147	Lisduff Fen
000609	Lisduff Turlough
001683	Liskeen Fen
000296	Lisnageeragh Bog And Ballinastack Turlough
000610	Lough Croan Turlough
000299	Lough Cutra
002241	Lough Derg, North-East Shore
000685	Lough Ennell
001818	Lough Forbes Complex
000611	Lough Funshinagh
000051	Lough Gash Turlough
000301	Lough Lurgan Bog/Glenamaddy Turlough
000688	Lough Owel
000440	Lough Ree
000308	Loughatorick South Bog
002165	Lower River Shannon

SITECODE	Special Area of Conservation
002261	Magharee Islands
002351	Moanveanlagh Bog
000054	Moneen Mountain
002340	Moneybeg And Clareisland Bogs
000580	Mongan Bog
000375	Mount Brandon
000581	Moyclare Bog
000057	Moyree River System
000612	Mullygollan Turlough
002157	Newgrove House
002091	Newhall And Edenvale Complex
002010	Old Domestic Building (Keevagh)
002314	Old Domestic Buildings, Rylane
002245	Old Farm Buildings, Ballymacrogan
001847	Philipston Marsh
001776	Pilgrim'S Road Esker
002126	Pollagoona Bog
000319	Pollnacknockaun Wood Nature Reserve
000037	Pouladatig Cave
000064	Poulnagordon Cave (Quin)
002316	Ratty River Cave
002353	Redwood Bog
000919	Ridge Road, Sw Of Rapemills
000216	River Shannon Callows
001313	Rosturra Wood
000692	Scragh Bog
000326	Shankill West Bog
000585	Sharavogue Bog
000939	Silvermine Mountains
002258	Silvermines Mountains West
002312	Slieve Bernagh Bog
000412	Slieve Bloom Mountains
002185	Slieve Mish Mountains
001831	Split Hills And Long Hill Esker
002247	Toonagh Estate
000439	Tory Hill
002070	Tralee Bay And Magharees Peninsula, West To Cloghane
002354	Tullaghanrock Bog
002343	Tullaheer Lough And Bog
001571	Urlaur Lakes
002296	Williamstown Turloughs

SITECODE	Special Protection Area
004079	Akeragh, Banna and Barrow Harbour SPA
004103	All Saints Bog SPA
004041	Ballyallia Lough SPA
004101	Ballykenny Fisherstown Bog SPA
004105	Bellangare Bog SPA
004005	Cliffs of Moher SPA
004153	Dingle Peninsula SPA
004137	Dovegrove Callows SPA
004102	Garriskill Bog SPA
004045	Glen Lough SPA
004114	Illaunonearaun SPA
004189	Kerry Head SPA
004119	Loop Head SPA
004058	Lough Derg (Shannon) SPA
004043	Lough Derravaragh SPA
004044	Lough Ennell SPA
004048	Lough Gara SPA
004011	Lough Gill SPA
004046	Lough Iron SPA
004061	Lough Kinale and Derragh Lough SPA
004047	Lough Owel SPA
004064	Lough Ree SPA
004065	Lough Sheelin SPA
004125	Magharee Islands SPA
004182	Mid-Clare Coast SPA
004096	Middle Shannon Callows SPA
004017	Mongan Bog SPA
004086	River Little Brosna Callows SPA
004077	River Shannon And River Fergus Estuaries SPA
004097	River Suck Callows SPA
004168	Slieve Aughty Mountains SPA
004160	Slieve Bloom Mountains SPA
004165	Slievefelim to Silvermines Mountains SPA
004161	Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA
004018	Tralee Bay SPA

Appendix 4: National legislation transposing eleven key EU Directives relevant to water protection

The 11 key EU Directives	National legislation
Bathing Waters Directive (2006/7/EC)	Bathing Water Quality Regulations SI 79 of 2008
Birds Directive (79/409/EEC)	European Communities (Natural Habitats) Regulations, SI 94 of 1997 as amended in 1998 and 2005
Habitats Directive (92/43/EEC)	European Communities (Natural Habitats) Regulations, SI 94 of 1997 as amended by in 1998 and 2005
Drinking Waters Directive (98/83/EC)	Environmental Objectives (Freshwater Pearl Mussel) Regulations, SI 296 of 2009
Major Accidents and Emergencies Directive (96/82/EC)	European Communities (Drinking Water) (No.2) Regulations, SI 278 of 2007
Environmental Impact Assessment (85/337/EEC) as amended by Directive 2003/35/EC	Water Services Act (No 30 of 2007)
Sewage Sludge Directive (86/278/EEC)	European Communities (Control of Major Accident Hazards Involving Dangerous Substances) Regulations, SI 74 of 2006
Urban Wastewater Treatment Directive (91/271/EEC)	Planning and Development Act, No 30 of 2000 as amended 2002
Plant Protection Products Directive EU Regulation: (EC) No 1107/2009	Planning and Development Act, No 30 of 2000 as amended 2002
Nitrates Directive (91/676/EEC)	Planning and Development Regulations, SI 600 of 2001 as amended 2006 to 2007
Integrated Pollution Prevention Control Directive (2008/1/EC)	Environmental Impact Assessment Regulations, SI 349 of 1989 as amended 1994 to 2006
	Waste Management (Use of Sewage Sludge in Agriculture) Regulations, SI 148 of 1998 as amended 2001
	Waste Management Act (No 10 of 1996) as amended 2001
	Urban Waste Water Treatment Regulations, SI 254 of 2001 as amended in 2004 and 2010.
	Water Services Act (No 30 of 2007)
	Authorisation, Placing on the Market, Use & Control of Plant Protection Products Regulations, SI 83 of 2003 as amended from 2003 to 2009
	European Communities (Good Agricultural Practice for the Protection of Waters) Regulations, SI 101 of 2009
	Environmental Protection Agency Acts, No 7 of 1992 and No 27 of 2003 and Environmental Protection Agency (Licensing) Regulations, SI 85 of 1994 as amended in 1995, 1996, 2004 and 2008:

Appendix 5: Shannon IRBD Action Programme

What	Who leads	When & where
CO-ORDINATING ACTIONS		
<p>Water Policy Regulations (SI 722 of 2003) as amended in 2005: Purpose: provide statutory basis for the provisions of the Water Framework Directive</p> <p>Relevant Actions: Each public authority must exercise its functions in a manner which is consistent with, and contributes to, achieving the objectives of the plan.</p> <p>Coordinate activities for the purposes of Articles 4, 5, 7, 10, 11 and 13 of the Directive and report to the European Commission. Maintain a register of protected areas</p> <p>Coordinate plan implementation at district level</p> <p>Support ongoing public participation and RBD Advisory Councils</p> <p>Coordinate with Northern Ireland authorities and participation groups on shared waters</p> <p>Conduct public awareness and targeted education campaigns, including disseminating information using tools such as Water Maps</p>	<p>Public authorities in Regulations</p> <p>EPA</p> <p>Local authorities</p> <p>Local & public authorities</p> <p>DEHLG, EPA, local authorities</p> <p>DEHLG, local authorities</p>	<p>2009–2015 National</p> <p>2009–2015 National</p> <p>2009–2015 Whole RBD</p> <p>2009–2015 Whole RBD</p> <p>2009–2015 Shared waters</p> <p>2009–2015 National</p>
<p>Surface Water Objectives Regulations (SI 272 of 2009) and Groundwater Objectives Regulations (SI 9 of 2010): Purpose: to give effect to the measures needed to achieve the environmental objectives under Water Framework Directive and the Dangerous Substances Directive</p> <p>Relevant Actions: Where necessary align the following plans and programmes with river basin management plans:</p> <ul style="list-style-type: none"> • land use and spatial plans • conservation and heritage plans • water services strategic plans • pollution reduction plans including national action plan, IPPC programme, local authority discharge authorisation programmes, groundwater and surface water pollution reduction programmes, shellfish waters pollution reduction programmes, bathing waters management plans, waste management plans, freshwater pearl mussel sub-basin plans, groundwater protection schemes, eel and salmon fishery conservation plans 	<p>Local authorities, DEHLG-NPWS, DEHLG, EPA, Coillte, OPW</p>	<p>2009–2015 National</p>

What	Who leads	When & where
<ul style="list-style-type: none"> • waste and sludge management plans • major accident emergency plans • forest management plans • flood risk management plans (forthcoming) 		
<p>Other potential measures which are being considered but which require further development as outlined in Section 5.3. Agreed measures in relation to these issues can be introduced through update of Water Management Unit Action Plans during the implementation process:</p> <ul style="list-style-type: none"> • Protection of high quality waters: • Mines and Contaminated Sites: • Physical impact of channelisation on river status: • Control of Abstractions, Impoundments and Physical modifications: • Estuarine and Coastal (Marine) Monitoring: • Integration of Water Quality and Planning: • Further research. 	To be confirmed	2009–2015 National
Develop guidance and training for local authorities as required	Environmental Services National Training Group	2009–2015 National
BATHING WATERS DIRECTIVE (2006/7/EC)		
<p>Bathing Water Quality Regulations (SI 79 of 2008): Purpose: to ensure that the quality of bathing water is maintained or improved to comply with bathing water standards in order to protect public health and the environment.</p> <p>Relevant actions: Identify bathing waters. Monitor and classify bathing water quality status. Develop Bathing Waters Management Plans, including any necessary measures, to achieve bathing water quality standards. Disseminate bathing water quality information to the public.</p> <p>Cooperate on cross border bathing waters including exchange of information and joint action.</p>	Local authorities Local authorities, DEHLG, EPA	2009–2015 Designated sites
BIRDS AND HABITATS DIRECTIVES (79/409/EEC and 92/43/EEC)		
<p>European Communities (Natural Habitats) Regulations (SI 94 of 1997) as amended in 1998 and 2005: Purpose: to ensure the protection of habitats and species of European importance.</p> <p>Relevant actions: Designate sites hosting habitats and species of European importance for inclusion in the Natura 2000 network as</p>	DEHLG-NPWS,	2009–2015 Designated sites

What	Who leads	When & where
<p>needed. Establish appropriate conservation measures, and management plans where necessary, to ensure achievement of favourable conservation status.</p> <p>Ensure that appropriate assessment is carried out in relation to activities which are likely to impact on designated sites and, where necessary, regulate activities. Introduce compensatory measures to ensure the coherence of the Natura 2000 network if damaging activities are allowed to go ahead.</p> <p>Promote education on the need to protect species and habitats, encourage research necessary to achieve the aims of the regulations.</p> <p>Environmental Objectives (Freshwater Pearl Mussel) Regulations (SI 296 of 2009): Purpose: To set legally binding objectives for water quality in rivers, or parts of rivers, inhabited by freshwater pearl mussels Margaritifera and designated as Special Area of Conservation (SAC) so as to protect this species. The regulations also require steps to be taken to attain those objectives.</p> <p>Relevant actions: Establish environmental quality objectives. Undertake monitoring, assess conservation status and investigate pollution. Develop management plans (sub-basin plans of River Basin Management Plans), including any necessary measures, to ensure achievement of environmental quality objectives.</p> <p>Examine discharge authorisations to designated areas and establish if they require review.</p> <p>Monitor the implementation of the sub-basin management plans and ensure their implementation.</p>	<p>DEHLG</p> <p>Relevant parties DEHLG-NPWS, DEHLG,</p> <p>DEHLG</p> <p>DEHLG-NPWS</p> <p>Public authorities</p> <p>DEHLG</p>	
DRINKING WATER DIRECTIVE (98/83/EC)		
<p>European Communities (Drinking Water) (No. 2) Regulations (SI 278 of 2007): Purpose: to ensure that drinking water intended for human consumption is wholesome and clean.</p> <p>Relevant actions: Monitor for compliance with drinking water quality standards. Maintain a register of water supplies. Immediately investigate non-compliances and inform consumers. Prepare Action Programmes where the drinking water quality standards are not met.</p> <p>Prohibit water supplies considered to pose a potential danger to human health.</p> <p>Ensure compliance with the regulations and supervise group water schemes.</p>	<p>Local authorities</p> <p>Local authorities, HSE EPA</p>	<p>2009–2015 Designated sites</p>

What	Who leads	When & where
<p>Water Services Act (No 30 of 2007): Purpose: to facilitate the provision of safe and efficient water services and water service infrastructure for domestic and non-domestic requirements.</p> <p>Relevant actions: Monitor public water supplies and monitor and supervise private drinking water supplies. Develop Water Services Strategic Plans, including measures, to meet the Act's requirements including achievement of drinking water standards. Prohibit or restrict water supplies that pose a potential threat to human health or the environment. Inform consumers of non-compliances and ensure that remedial actions are taken where necessary. Prohibit or restrict certain water uses if there is a deficiency of supply. Implement a Rural Water Programme and a licensing system for the Group Water Scheme sector.</p> <p>Supervise and monitor water services authorities and issue compliance notices in relation to non-compliances. Plan and supervise investment under the Water Services Investment Programme.</p> <p>Supervise public water supplies</p>	<p>Local authorities</p> <p>DEHLG</p> <p>EPA</p>	
MAJOR ACCIDENTS AND EMERGENCY DIRECTIVE (96/82/EC)		
<p>European Communities (Control of Major Accident Hazards Involving Dangerous Substances) Regulations (SI 74 of 2006): Purpose: to ensure that operators of establishments where dangerous substances are present take all necessary measures to prevent the occurrence of major accidents and to limit the consequences of accidents for people and the environment.</p> <p>Relevant actions: Prepare on-site emergency plans identifying major hazards and specifying prevention and mitigation measures.</p> <p>Prepare off-site emergency plans for action outside the establishment in the event of a major accident.</p> <p>Require written notification of activities involving specified dangerous substances. Require operators to demonstrate safe operation and storage and to investigate their operations in the event of a major accident. Organise inspections and measures where necessary. Supply information on major accidents to public authorities.</p> <p>Planning and Development Act (No. 30 of 2000) as amended in 2002: Purpose: to provide for the proper planning and development of urban and rural areas.</p> <p>Relevant actions:</p>	<p>Operators</p> <p>Local authorities</p> <p>DETE</p>	<p>2009–2015 Qualifying sites</p> <p>2009–2015 Qualifying sites</p>

What	Who leads	When & where
Ensure that adequate controls are in place for relevant new developments.	Local authorities	
ENVIRONMENTAL IMPACT ASSESSMENT DIRECTIVE (85/337/EEC)		
<p>Environmental Impact Assessment Regulations (SI 349 of 1989) as amended from 1994 to 2006: Purpose: require that certain developments be assessed for likely environmental effects before planning permission is granted.</p> <p>Relevant actions: Require certain developments, by either the private or the public sector, to prepare Environmental Impact Assessments for consideration before planning permission is granted (taking account of objectives established in river basin management plans) and make them available to the public. Notify authorities in Northern Ireland of any planning application which is likely to have significant effects on the environment in Northern Ireland.</p>	Planning authorities	2009–2015 National
SEWAGE SLUDGE DIRECTIVE (86/278/EEC)		
<p>Use of Sewage Sludge in Agriculture Regulations (SI 148 of 1998) as amended in 2001: Purpose: require that sewage sludge is used in accordance with a nutrient management plan.</p> <p>Relevant actions: Supervise the supply and use of sewage sludge in agriculture and ensure that it is used in accordance with nutrient management plans. Maintain a register of sludge biosolids movements and use and make it available to the public. Ensure adherence to the code of practice in relation to the use of biosolids in agriculture.</p> <p>Waste Management Act (No. 10 of 1996): Purpose: to regulate waste management in order to protect human health and the environment.</p> <p>Relevant actions: Prepare sludge management plans for the management of wastewater sludge (taking account of WFD objectives). Require measures to be taken in relation to the holding, recovery or disposal of waste in order to prevent or limit environmental pollution, where necessary. Require land owners to prepare nutrient management plans where necessary.</p>	Local authorities	2009–2015 National 2009–2015 National
URBAN WASTEWATER TREATMENT DIRECTIVE (91/271/EEC)		
<p>Urban Wastewater Treatment Regulations (SI 254 of 2001) as amended in 2004 and 2010: Purpose: to ensure that the environment is not adversely affected by the disposal of inadequately treated urban waste water through the provision of urban wastewater collection systems and treatment plants.</p> <p>Relevant actions: Design, construct, operate, maintain and monitor treatment plants to achieve requirements in relation to treatment standards, nutrient sensitive areas and WFD objectives. Choose discharge points so as to minimise impact on the</p>	Local authorities, DEHLG	2009–2015 National

What	Who leads	When & where
<p>environment. Ensure that sewage sludge can be disposed of safely. Financial investments can be made under the Water Services Investment Programme.</p> <p>Water Services Act (No 30 of 2007): Purpose: to facilitate the provision of safe and efficient water services and water service infrastructure for domestic and non-domestic requirements.</p> <p>Relevant actions: Plan and supervise provision of wastewater services under the Water Services Investment Programme. Prepare and implement Water Services Strategic Plans to support sustainable provision of wastewater services.</p>	<p>Local authorities</p>	<p>2009–2015 National</p>
PLANT PROTECTION PRODUCTS DIRECTIVE (91/414/EEC)		
<p>Authorisation, Placing on the Market, Use & Control of Plant Protection Products Regulations (SI 83 of 2003) as amended from 2003 to 2009: Purpose: to authorise plant protection product for use or placing on the market to ensure that no harmful effects arise for human and animal health and that there is no unacceptable impact on the environment</p> <p>Relevant actions: Notify the DEHLG of all new information on potentially dangerous effects of authorised plant protection products on the environment or groundwater.</p> <p>The conditions of authorisation are selected to minimise risks for consumers, workers and the environment. The use of a plant protection product in a manner other than specified on its approved label is illegal.</p>	<p>Relevant persons</p>	<p>2009–2015 National</p>
NITRATES DIRECTIVE (91/676/EEC)		
<p>Good Agricultural Practice for the Protection of Waters Regulations (SI 101 of 2009): Purpose: provide statutory support for good agricultural practice to protect waters against pollution from agricultural sources and give further effect to several EU Directives including the Nitrates Directive, dangerous substances in water, waste management, protection of groundwater, public participation in policy development and water policy (the Water Framework Directive).</p> <p>Relevant actions: Review the nitrates National Action Programme to determine its effectiveness, including Agricultural Catchment Programme studies, in consultation with all interested parties. Ensure implementation of the National Action Programme.</p> <p>Monitor as necessary for the purposes of the Regulations. Provide recommendations and direction to local authorities</p>	<p>DEHLG, DAFF EPA</p>	<p>2009–2015 National</p>

What	Who leads	When & where
<p>with respect to monitoring, inspections and measures.</p> <p>Carry out monitoring to establish the extent of pollution in surface and groundwaters attributable to agriculture and determine trends in the occurrence and extent of such pollution. Carry out farm inspections (to coordinate with other farm inspection programmes).</p> <p>Additional actions: Agriculture: Consider increasing farm inspections in karst areas with turloughs and piloting of environmentally friendly farming scheme Map turloughs' zones of contribution.</p>	<p>Local authorities, DAFF</p> <p>DAFF, DEHLG- NPWS</p>	
INTEGRATED POLLUTION PREVENTION CONTROL DIRECTIVE (2008/1/EC)		
<p>Environmental Protection Agency Acts (No 7 of 1992; No 27 of 2003) and Environmental Protection Agency (Licensing) Regulations (SI 85 of 1994) as amended in 1995, 1996, 2004 and 2008: Purpose: to prevent or reduce emissions to water, land and air, to reduce waste and to use energy and resources efficiently.</p> <p>Relevant actions: Ensure that operators of certain industrial and agricultural installations obtain IPPC licenses with conditions and ELVs based on BAT and relevant national and European legislation. Enforce licence conditions including monitoring. Maintain a register of licences and make available to the Commission and to the public. Undertake reviews of existing licences as required (taking account of WFD and Environmental Quality Objectives). Ensure cross border consultation where necessary.</p> <p>Obtain the consent of sanitary authorities for discharges to sewers</p>	<p>EPA</p> <p>Operator</p>	<p>2009–2015 National</p>
COST RECOVERY FOR WATER SERVICES		
<p>Water Pricing Policy: Purpose: to promote the conservation and efficient use of water resources in accordance with the Water Framework Directive</p> <p>Relevant actions: Develop and implement strategy to achieve water metering of domestic users connected to public water supplies.</p> <p>Introduce legislation to allow local authorities to charge domestic users for water services.</p> <p>Develop charging methodology for water services and introduce water charges for domestic users.</p>	<p>DEHLG</p> <p>DEHLG</p> <p>Local Authorities</p>	<p>2009–2015 National</p>
PROMOTION OF EFFICIENT AND SUSTAINABLE WATER USE		
<p>Water Services Act (No. 30 of 2007):</p>		<p>2009–2015</p>

What	Who leads	When & where
<p>Purpose: to facilitate the provision of safe and efficient water services and water service infrastructure for domestic and non-domestic requirements.</p> <p>Relevant actions: Develop and implement strategy to achieve water metering of domestic users connected to public water supplies. Facilitate the provision of efficient water services.</p> <p>Rehabilitate and repair water works.</p> <p>Ensure that water distribution systems are in a fit state and free from leaks.</p> <p>National Water Conservation (Leakage Reduction) Programme: Purpose: to establish water conservation and leakage control strategies.</p> <p>Relevant actions: Establish and maintain GIS-based water management systems. Establish an ongoing leakage control programme. Rehabilitate and replace defective water supply networks. Develop water conservation public awareness campaigns. Provide project-specific funding designed to meet specific leakage reduction targets.</p>	<p>DEHLG</p> <p>Local Authorities</p> <p>Premises owner/occupier</p> <p>Local authorities, DEHLG</p>	<p>National</p> <p>2009–2015 National</p>
PROTECTION OF DRINKING WATER SOURCES		
<p>Groundwater Protection Schemes: Purpose: to protect groundwater sources by enabling regulatory authorities to take account of the potential risks to groundwater when considering the control and location of potentially polluting activities.</p> <p>Relevant actions: Control the location and nature of developments and activities in accordance with groundwater protection schemes.</p> <p>Good Agricultural Practice for the Protection of Waters Regulations (SI 101 of 2009): Purpose: the protection of waters against pollution caused by nitrates from agricultural sources.</p> <p>Relevant actions: Exclude chemical and organic fertilisers and farm manures from within specified distances of wells, boreholes, springs or abstractions points</p> <p>Planning and Development Act (No. 30 of 2000): Purpose: to provide for the proper planning and development of urban and rural areas.</p> <p>Relevant actions:</p>	<p>Local authorities</p> <p>Farmers</p>	<p>2009–2015 National</p> <p>2009–2015 National</p> <p>2009–2015 National</p>

What	Who leads	When & where
<p>Control of developments and activities in order to protect water resources.</p> <p>Water Policy Regulations (SI 722 of 2003) as amended in 2005: Purpose: to provide a statutory basis for the provisions of the Water Framework Directive including the establishment and maintenance of a Register of Protected Areas.</p> <p>Relevant actions: Keep Register of Protected Areas, which includes protected drinking waters, updated.</p> <p>Also, identify and protect all surface and groundwater bodies that are used, or may be used in the future, as sources of drinking water for more than 50 people or where the rate of abstraction is > 10m³ per day. Establish monitoring programmes for bodies of water providing >100 cubic metres as an average. Ensure that there is no deterioration of quality in identified bodies of water so as to reduce the level of purification treatment required.</p> <p>Consideration is also being given to the designation of safeguard zones around current and future abstractions under the Drinking Water Regulations.</p> <p>Environmental Objectives (Groundwater) Regulations (SI 9 of 2010): Purpose: The establishment of legally binding quality objectives for all bodies of groundwater and environmental quality standards for pollutants. Public authorities are required to examine and where appropriate, review existing discharge authorisations to ensure that the emission limits laid down in authorisations support compliance with the new water quality objectives/standards.</p> <p>Relevant actions: Perform functions in a manner that does not knowingly cause or allow deterioration in the quantitative status of a body of groundwater.</p> <p>All direct discharges of pollutants into groundwater are prohibited subject to certain exemptions.</p> <p>Point source discharges and diffuse sources liable to cause groundwater pollution must be controlled so as to prevent or limit the input of pollutants into groundwater.</p> <p>Identify hazardous and non-hazardous substances for the purpose of preventing and limiting pollutant inputs</p> <p>Where necessary or appropriate, issue advice and/or give directions to a public authority or authorities concerned on</p>	<p>Local authorities, An Bord Pleanála DEHLG</p> <p>EPA</p> <p>To be assigned</p> <p>To be assigned</p> <p>Public authorities</p> <p>Local authorities</p> <p>EPA</p> <p>EPA</p> <p>EPA</p>	<p>2009–2015 Designated sites</p>

What	Who leads	When & where
<p>the measures to be taken to prevent and limit inputs of pollutants into groundwater.</p> <p>Where necessary or appropriate, issue advice and/or give directions to a public authority or authorities concerned on the measures to be taken to prevent and limit inputs of pollutants into groundwater.</p> <p>Where necessary or appropriate:</p> <p>(a) review, or cause to have reviewed, existing codes of practice including other such mechanisms and controls already in place for the purpose of preventing or limiting the input of pollutants into groundwater;</p> <p>(b) identify such other areas and/or activities requiring the introduction of similar type controls so as to prevent or limit the input of pollutants into groundwater ;</p> <p>(c) direct a public authority to undertake a review and, where necessary, update a code of practice, or in the case of an activity requiring the introduction of new controls, prepare a new code of practice or system of control for the activity in question. A public authority must comply with the direction given by the Agency within the timeframe prescribed;</p> <p>Examine and if necessary review all existing discharge authorisations to groundwater to take into account the new quality standards and to prevent or limit inputs of pollutants to groundwater.</p> <p>Environmental Objectives (Surface Water) Regulations (SI 272 of 2009): Purpose: The establishment of legally binding objectives for all surface waters.</p> <p>Relevant actions: Achieve compliance with drinking water protected area objectives.</p> <p>Water Services Act (No 30 of 2007): Purpose: to facilitate the provision of safe and efficient water services and water service infrastructure for domestic and non-domestic requirements.</p> <p>Relevant actions: Monitor public water supplies and monitor and supervise private drinking water supplies. Develop Water Services Strategic Plans, including measures, to meet the Act's requirements including achievement of drinking water standards. Prohibit or restrict certain water uses if there is a deficiency of supply. Implement a Rural Water Programme and a licensing system for the Group Water Scheme sector.</p> <p>Supervise and monitor water services authorities and issue compliance notices in relation to non-compliances. Plan and supervise investment under the Water Services Investment Programme.</p>	<p>EPA</p> <p>EPA</p> <p>Relevant authorities</p> <p>Public authorities</p> <p>Local authorities</p> <p>DEHLG</p>	

What	Who leads	When & where
Supervise public water supplies	EPA	
ABSTRACTION AND IMPOUNDMENTS		
<p>Environmental Impact Assessment Regulations (SI 349 of 1989) as amended from 1994 to 2006: Purpose: require that certain developments be assessed for likely environmental effects before planning permission can be granted.</p> <p>Relevant actions: Undertake environmental impact assessment for drilling for water supplies above specified thresholds, groundwater abstraction and artificial groundwater recharge schemes above specified thresholds and works for the transfer of water resources between river basins above specified thresholds.</p> <p>Water Pollution Act (No 1 of 1977) as amended in 1990: Purpose: to provide for the control of water pollution thereby protecting possible drinking water sources</p> <p>Relevant actions: Maintain registers of abstractions and make available to the public.</p> <p>Water Supplies Act (No 1 of 1942): Purpose: require that provisional orders be obtained by local authorities abstracting drinking water supplies.</p> <p>Relevant actions: Local authorities must adhere to conditions set down in provisional orders when abstracting drinking water from a water source.</p> <p>Planning and Development Act (No. 30 of 2000) as amended in 2002: Purpose: to provide for the proper planning and development of urban and rural areas.</p> <p>Relevant actions: Local authorities must obtain planning permission for groundwater abstractions for public drinking water supplies.</p> <p>Additional actions: Abstractions: Good practice measures are available in the Programmes of Measures – technical studies – Abstractions and National Summary Programme of Measures background documents.</p>	<p>Local authorities</p> <p>Local authorities</p> <p>Local authorities, DEHLG</p> <p>Local authorities, An Bord Pleanála</p>	<p>2012–2015 National</p> <p>2012–2015 National</p> <p>2009–2015 Prioritised sites</p> <p>2009–2015 Prioritised sites</p>
POINT SOURCE DISCHARGES		

What	Who leads	When & where
<p>Environmental Objectives (Surface Water) Regulations (SI 272 of 2009): Purpose: The establishment of legally binding quality objectives for all surface waters and environmental quality standards for pollutants. Public authorities are required to examine and where appropriate, review existing discharge authorisations to ensure that the emission limits laid down in authorisations support compliance with the new water quality objectives/standards.</p> <p>Relevant actions: Establish measures to achieve the quality objectives and standards. Where necessary, consult with other public authorities and with relevant competent authorities in Northern Ireland.</p> <p>Set emission limits based on BAT when authorising new discharges to ensure achievement of the quality objectives. Review all existing discharge authorisations to take into account the new quality standards. Prepare programmes for the monitoring and inspection of farm installations to verify compliance.</p> <p>Classify waters and make the classification available in GIS. Establish an inventory of emissions discharges and losses of priority substances, priority hazardous substances and other pollutants.</p> <p>Prepare a plan for the progressive reduction of pollution by priority substances and the ceasing or phasing out emissions, discharges and losses of priority hazardous substances.</p>	<p>Public authorities</p> <p>Local authorities, EPA, DEHLG</p> <p>EPA</p> <p>Coordinating local authority</p>	<p>2009–2015 National</p>
<p>Environmental Objectives (Groundwater) Regulations (SI 9 of 2010): Purpose: The establishment of legally binding quality objectives for all bodies of groundwater and environmental quality standards for pollutants. Public authorities are required to examine and where appropriate, review existing discharge authorisations to ensure that the emission limits laid down in authorisations support compliance with the new water quality objectives/standards.</p> <p>Relevant actions: All direct discharges of pollutants into groundwater are prohibited subject to certain exemptions.</p> <p>Point source discharges and diffuse sources liable to cause groundwater pollution must be controlled so as to prevent or limit the input of pollutants into groundwater.</p> <p>Identify hazardous and non-hazardous substances for the purpose of preventing and limiting pollutant inputs</p> <p>Where necessary or appropriate, issue advice and/or give directions to a public authority or authorities concerned on the measures to be taken to prevent and limit inputs of pollutants into groundwater.</p>	<p>Local authorities</p> <p>EPA</p> <p>EPA</p> <p>EPA</p>	<p>2009–2015 National</p>

What	Who leads	When & where
<p>Where necessary or appropriate, issue advice and/or give directions to a public authority or authorities concerned on the measures to be taken to prevent and limit inputs of pollutants into groundwater.</p> <p>Where necessary or appropriate:</p> <p>(a) review, or cause to have reviewed, existing codes of practice including other such mechanisms and controls already in place for the purpose of preventing or limiting the input of pollutants into groundwater;</p> <p>(b) identify such other areas and/or activities requiring the introduction of similar type controls so as to prevent or limit the input of pollutants into groundwater ;</p> <p>(c) direct a public authority to undertake a review and, where necessary, update a code of practice, or in the case of an activity requiring the introduction of new controls, prepare a new code of practice or system of control for the activity in question. A public authority must comply with the direction given by the Agency within the timeframe prescribed;</p> <p>Examine and if necessary review all existing discharge authorisations to groundwater to take into account the new quality standards and to prevent or limit inputs of pollutants to groundwater.</p> <p>Water Pollution Act (No 1 of 1977) as amended in 1990 and Water Pollution Regulations (SI 108 of 1978) as amended in 1992 and 1996: Purpose: to provide for the control of water pollution through prosecution for water pollution offences; use of pollution control conditions in the licensing of effluent discharges; issue of notices specifying measures to prevent water pollution.</p> <p>Relevant actions: License discharges to surface waters and sewers from small scale industrial and commercial sources. Review licenses at intervals of not less than 3 years. Keep registers of discharge licenses and make them available to the public.</p> <p>Prosecute for water pollution offences; attach appropriate pollution control conditions in the licensing of effluent discharges from industry, etc., made to waters or to sewers; issue notices specifying measures to be taken within a prescribed period to prevent water pollution; Issue notices to stop pollution of waters and requiring the mitigation or remedying within a period specified; seek court orders, including High Court injunctions.</p> <p>Notify local authorities of accidental discharges and spillages of polluting materials which enter, or are likely to enter, waters.</p>	<p>EPA</p> <p>EPA</p> <p>Relevant authorities</p> <p>Local authorities</p> <p>Local authorities, Fisheries Boards, DEHLG-NPWS</p> <p>Relevant persons</p>	<p>2009–2015 National</p> <p>2009–2015</p>
<p>Wastewater Discharge Authorisation Regulations (SI 684 of 2007):</p>		<p>2009–2015</p>

What	Who leads	When & where
<p>Good practice measures are available in the Programmes of Measures – technical studies – Municipal and Industrial Regulations, Urban Pressures and National Summary Programme of Measures background documents.</p> <p>Minerals Development Act (No 31 of 1940) as amended from 1960 to 1999: Purpose: to provide for the development and working of the mineral resources of the State whilst managing potential impact on the water environment</p> <p>Relevant actions: Grant Prospecting Licenses for exploration of specified minerals in specified areas subject to conditions. Grant Minerals or Mining Licenses with respect to State owned minerals. Grant Mining Permissions to work substances in small quantities. Grant Unworked Minerals Licenses with respect to unworked minerals.</p> <p>Energy Act (No. 40 of 2006): Purpose: to regulate the energy industry whilst managing potential impact on the water environment</p> <p>Relevant actions: Prepare Mine Rehabilitations Plans for the long-term rehabilitation of mine sites where it is considered necessary for the purposes of public or animal health or the environment.</p> <p>Waste Management Act (No 10 of 1996) as amended in 2001: Purpose: to regulate waste management in order to protect human health and the environment.</p> <p>Relevant actions: Prepare an inventory of closed waste disposal or recovery sites.</p> <p>European Communities (Quality of Shellfish Waters) Regulations (SI 268 of 2006) as amended in 2009: Purpose: to protect or improve shellfish waters in order to support shellfish life and growth by setting water quality requirements to be met.</p> <p>Relevant actions: Undertake monitoring and investigate pollution. Develop and implement Shellfish Pollution Reduction Programmes, including any necessary measures, to achieve shellfish water quality standards.</p> <p>European Communities (Freshwater Pearl Mussel) Regulations (SI 296 of 2009): Purpose: For the purpose of achieving the water quality objectives established for designated sites for the protection of freshwater pearl mussel populations.</p>	<p>DCENR</p> <p>DCENR Local authorities,</p> <p>EPA, GSI</p> <p>DEHLG, Local authorities</p>	<p>2009–2015 National</p> <p>2009–2015 Prioritised Sites</p> <p>2009–2015 Prioritised Sites</p> <p>2009–2015 Designated sites</p> <p>2009–2015 Designated sites</p>

What	Who leads	When & where
<p>Relevant actions: Public authorities that authorise discharge to any of the listed rivers to set down emission limit values that aim to achieve the prescribed ecological quality targets; and to examine existing authorisations within a set time and review them as appropriate.</p>	Public authorities	
DIFFUSE SOURCE DISCHARGES		
<p>Water Pollution Act (No 1 of 1977) as amended in 1990 and Water Pollution Regulations (SI 108 of 1978) as amended in 1992 and 1996: Purpose: to provide for the control of water pollution through prosecution for water pollution offences; use of pollution control conditions in the licensing of effluent discharges made to waters or to sewers; issue of notices specifying measures to be taken to prevent water pollution.</p> <p>Relevant actions: Serve notices or directions on persons requiring measures to be taken in order to prevent or control pollution of waters, where necessary.</p> <p>Notify local authorities of accidental discharges and spillages of polluting materials which enter, or are likely to enter, waters.</p> <p>Planning and Development Act (No 30 of 2000) as amended in 2002: Purpose: to provide for the proper planning and development of urban and rural areas.</p> <p>Relevant actions: Grant permission for on-site waste water treatment systems subject to site suitability assessment.</p> <p>EPA Code of Practice for Wastewater Treatment Systems serving Single Houses (2009) Purpose: to provide guidance on the provision of wastewater treatment and disposal systems for new single houses.</p> <p>Relevant actions: the guidance addresses the following Assess site suitability for on-site wastewater treatment systems and identify minimum environmental protection requirements Select suitable wastewater treatment systems for sites in un-sewered rural areas Design and install septic tank systems, filter systems, packaged treatment systems and tertiary treatment systems, Maintenance requirements for on-site wastewater treatment systems.</p>	<p>Local authorities, Fisheries Boards, DEHLG- NPWS Relevant persons</p> <p>Local authorities</p> <p>Planning authorities, developers, manufacturers designers, installers and</p>	<p>2009–2015 National</p> <p>2009–2015 National</p> <p>2009–2015 National</p>

What	Who leads	When & where
<p>The guidance is supported by DEHLG circular letter (Reference PSSP 1/10) and Planning Guidelines on Sustainable Rural Housing (2005)</p> <p>Amend the Technical Guidance Document supporting the 1997 Building Regulations (SI 497 of 1997) relating to standards for “drainage and waste water disposal” (TGD-H of 2005) and issue a supporting Circular Letter to all Local Building Control Authorities.</p> <p>For existing unsewered properties, bring forward and consult on proposals for legislation to provide standards for the performance, operation and maintenance of septic tanks and similar on-site wastewater treatment systems and also for the monitoring and inspection of the performance of such treatment systems and set out the responsibilities of households served by those systems, including requirements to carry out remedial actions where necessary.</p> <p>Additional actions: On-site systems: Good practice measures are available in the Programmes of Measures – technical studies – On-site wastewater treatment systems and National Summary Programme of Measures background documents.</p> <p>Forestry Act (No 13 of 1946) as amended in 1976 and 1988 and Aerial Fertilisation Regulations (SI 592 of 2006) as amended in 2007 and codes of practice, guidance documents administered through a grant support system: Purpose: to provide for the development and regulation of forestry.</p> <p>Relevant actions: Promote forestry with financial incentives. License forestry activity and where necessary, attach additional conditions in sensitive areas.</p> <p>Encourage sustainable, commercial afforestation. Ensure compliance with guidance and codes of practice.</p> <p>A new Forestry Bill, replacing the 1946 Forestry Act, has been drafted to strengthen sustainable forestry management. Provisions relating to water protection are;</p> <ul style="list-style-type: none"> • All forestry operations must be carried out in accordance with any guidelines and regulations issued by the Minister for Agriculture, Fisheries and Food. • Allowing for change of land use from forestry to other sustainable uses. 	<p>operators Planning authorities & An Bord Pleanála</p> <p>DEHLG</p> <p>Minister for the Environment, Heritage and Local Government</p> <p>Forest Service</p> <p>Forest Service</p> <p>Minister for the Department of Agriculture, Fisheries and Food</p> <p>Forest Service,</p>	<p>2010</p> <p>2009–2015 National</p>

What	Who leads	When & where
<p>In acid sensitive catchments apply a protocol agreed between the Department of Environment, Heritage and Local Government, the Forest Service, the EPA and COFORD for dealing with grant-aid applications in acid sensitive areas. All relevant applications received by the Forest Service are checked for alkalinity levels in run-off water. Borderline cases are referred to the Environmental Protection Agency for recommendations.</p> <p>2008 guidelines for the protection of Natura 2000 sites designated for the protection Freshwater Pearl Mussel populations from forestry activities are intended to ensure that forest operations such as afforestation, forest road construction, harvesting and forest planning are compatible with the protection of this particularly sensitive species. The guidelines describe a range of measures intended to reduce any potential negative impacts on the species arising from forest operations.</p> <p>Strategic Plan for the Development of Forestry: Purpose: to provide for the development and regulation of forestry.</p> <p>Relevant actions: Adhere to forest management plans and the principles of sustainable forest management.</p> <p>Ensure implementation of the National Forestry Standard and adherence to the code of best forest practice.</p> <p>Additional actions: Forestry: Good practice measures are available in the Programmes of Measures – technical studies – Forest and Water and National Summary Programme of Measures background documents.</p> <p>Environmental Objectives (Freshwater Pearl Mussel) Regulations (SI 296 of 2009) Purpose: For the purpose of achieving the water quality objectives established for designated sites for the protection of freshwater pearl mussel populations.</p> <p>Relevant actions: Develop management plans (sub-basin plans of River Basin Management Plans), including any necessary measures, to ensure achievement of environmental quality objectives.</p>	<p>EPA</p> <p>Forest Service</p> <p>All stakeholders</p> <p>Forest Service</p> <p>DEHLG-NPWS, relevant public authorities</p>	<p>2009–2015 National</p> <p>2009–2015 Designated sites</p>
AUTHORISATION OF DISCHARGES TO GROUNDWATERS		
<p>Environmental Objectives (Groundwater) Regulations (SI 9 of 2010): Purpose: to provide for specifying the criteria for classifying groundwater status and identifying significant increasing pollution trends; provide for a proportionate risk-based response to groundwater protection.</p> <p>Relevant actions:</p>		<p>2009–2015 National</p>

What	Who leads	When & where
<p>Purpose: the prevention and reduction of pollution by the establishment of a publicly accessible pollutant release and transfer register.</p> <p>Relevant actions: Submit required data in relation to releases of pollutants and off-site transfers of pollutants and waste.</p> <p>Provide for electronic collection, assessment of data and report data to the EU Commission in relation to releases of pollutants and off-site transfers of pollutants and waste. Enforce regulations.</p>	<p>Operators</p> <p>EPA</p>	<p>National</p>
PHYSICAL MODIFICATIONS		
<p>Planning and Development Act (No 30 of 2000) as amended in 2002; Environmental Impact Assessment Regulations (SI 349 of 1989) as amended from 1994 to 2006:</p> <p>Purpose: to provide for the proper planning and development of urban and rural areas. Require that certain developments be assessed for likely environmental effects before planning permission is granted.</p> <p>Relevant actions: Consider the environmental impacts of developments as part of the planning process.</p> <p>Additional actions: Physical modifications: Good practice measures are available in the Programmes of Measures – technical studies – Freshwater Morphology, Marine Morphology and National Summary Programme of Measures background documents.</p> <p>Investigate the ecological potential of heavily modified waters and implement identified mitigation measures.</p>	<p>Local authorities</p> <p>Relevant public authorities</p>	<p>2009–2015 National</p> <p>2009–2015 Prioritised sites</p>
OTHER ACTIVITIES IMPACTING ON WATER STATUS		
<p>Alien species: Introduce new regulations under the Wildlife Act to control introduction or possession of any species of flora or fauna which may be detrimental to native species.</p>	<p>DEHLG</p>	<p>2009–2015 National</p>
PREVENTION OR REDUCTION OF THE IMPACT OF ACCIDENTAL POLLUTION INCIDENTS		
<p>Framework of Major Emergency Management</p> <p>Purpose: framework for emergency preparedness and response capability identifying hazards and risk to society, the economy, but also the environment including our natural water resource.</p> <p>Relevant actions: Prepare Major Emergency Plans with supporting plans, procedures and arrangements. Initiate a major emergency</p>	<p>Local authorities,</p>	<p>2009–2015 National</p>

What	Who leads	When & where
<p>development programme for the implementation of the Major Emergency Plans. Co-ordinate the inter-agency aspects of major emergency preparedness and management in assigned regions.</p> <p>Ensure and promote implementation of the Framework.</p>	<p>An Garda Síochána, HSE</p> <p>Dept of Justice, Equality & Law Reform, Dept of Health & Children, DEHLG</p>	
OTHER ISSUES		
<p>Climate change: all measures have been assessed to ensure that the plan adequately considers the potential impacts of climatic change (see Chapter 6) – this will be reviewed as climate change information improves.</p> <p>Invasive alien species: support measures being developed by the national alien species study (conducted by QUERCUS) and local investigations at district level</p> <p>Cruising and boating: enforce pump-out control and speed restrictions at district level.</p> <p>Peat extraction: enforce licensing controls and rehabilitation plans at district level.</p>	<p>DEHLG, EPA</p> <p>DEHLG-NPWS, local authorities</p> <p>Waterways Ireland, local authorities</p> <p>EPA, local authorities, Bord na Móna</p>	<p>2009–2015 National</p> <p>2009–2015 National</p> <p>2009–2015 Prioritised sites</p> <p>2009–2015 Prioritised sites</p>